

Saferide Annotated Bibliography

Compilation of abstracts

In the literature review, I looked at a rich set of academic papers that approach commuting from different research traditions, including the transportation, infrastructure, economics, behavioral, social and environmental psychology. Among these traditions, I observed four distinct approaches. There are some overarching papers that can be situated in more than one category. These papers come up with a comparative analysis to reach integrated frameworks.

- 1- **Mechanics of commuting:** It includes stress-strain models explaining the rationale of commuting problem (predictability, time urgency, control versus physiological, psychological, behavioral), transportation demand management systems, urban planning (monocentric versus sprawl city model),.
- 2- **Behavioral psychology, attitudes, perceived control:** This category is crystallized with the “Theory of planned behavior”, claiming that people in their travel-mode choice are pretty conscious and goal-oriented, and make their decisions with the combination of attitude, subjective norm and perceived behavioral control.
- 3- **Habits, situational and interactional aspects:** Contrary to the previous one, this research approach gives importance to the situational factors and social interactions. Research on habit is also worth to mention. People are goal-oriented, however, once they made a deliberate choice, their behaviors get habitual, and automatized, whenever a goal-intention is ignited, people automatically act the same way they did before. This might be one of the core reasons why people have hard time to change their travel-mode choice.
- 4- **Research on norms, values** effecting the commuting choice, pro-environmental, pro-social factors, norm-based models. This approach tries to understand the social dimensions of people’s travel-mode choice. One of their categorization pro-social and pro-self indicates the personality types that play an important role in the travel-mode choice. The notion of social-dilemma is another interesting theme, unfolding the conflict between the individual and the social preferences.

- 1 **Pro-environmental travel behavior: The importance of attitudinal factors, habits, and transport policy measures, Eriksson, L. (2008). Department of Psychology, Umeå University, Sweden.**

This inquiry illustrates the interplay between car habit strength and moral motivation in order to explain car use reduction. Car users with a strong car use habit and a strong moral motivation reduced their car use the most. Second, normative factors, such as, problem awareness and personal norm, in combination with policy specific beliefs, such as, perceived fairness, perceived effectiveness, and perceived personal impact, were found to be important for the acceptability of transport policy measures. In addition, personal norm was found to be particularly important for the acceptability of push measures and packages containing a push and a pull measure, while problem awareness was particularly important for the acceptability of pull measures. Third, a package containing a push measure and a pull measure was expected to lead to a larger car use reduction compared to the individual measures. *Using the car more efficiently and changing travel behavior, were the most commonly chosen car reducing strategies. Moreover, both internal motivational factors, such as personal norm, and the perceived personal impact of the measure, were found to be important for the expected car use reduction* in response to different TDM measures.

- 2 **Effects of values, problem awareness, And personal norm on willingness to reduce personal car use, Nordlund, A. M., & Garvill, J. (2003), Journal of Environmental Psychology, 23, 339-347.**

Personal norm is central in the causal chain of effects from general and environmental values, general and specific problem awareness on willingness to cooperate. The personal norm mediates most of the effects of values and specific problem awareness on willingness to cooperate. The individual's value orientation is important for establishing or increasing a general awareness of environmental problems and further as the base from which the personal norm related to cooperation is derived. The importance of a specific awareness of negative environmental consequences of car traffic and the seriousness of these problems, for activating the personal norm was also established.

The results of this study indicate that strategies aimed to increase the willingness to reduce personal car use should emphasize self-transcendent and ecocentric values, clarify the negative environmental consequences of car use, and thereby accentuate the moral dilemma of personal car use. In general the respondents showed a willingness to reduce own car use with 26 percent. However, only 19 percent of the variance in willingness to cooperate in this specific situation was explained by the variables in the model. Stern (2000) has argued that perceived moral obligation to cooperate usually is not the only factor influencing environmentally significant behavior. Inclusion of other factors in the model, such as nonenvironmental motives (e.g. increased personal health, strengthened personal economy) could increase the explanatory power.

- 2 **The Automatic Activation of Goal-directed behavior: The case of travel habit Henk Aarts, Ap Dijksterhuis, Journal of Environmental Psychology (2000) 20, 75^82**

In the present paper, automaticity in habitual travel mode choice behaviour was investigated. Expanding on the idea that habits are mentally represented, it was proposed that when travel behaviour is habitual, activation of a travel goal automatically activates a travel mode in memory. In an experiment, participants were presented with travel goals (e.g. having to go to the university) and asked to mention a transport mode. The typical travel mode choice for those destinations was either permitted, or not permitted under conditions of cognitive load or not. Results showed that suppressing habitual responses is difficult, and often not successful under conditions of cognitive load, indicating that a transport mode choice can become automatically associated with travel goals.

- 3 **An interdependence analysis of commuting decisions** *European Journal of Social Psychology*, Vol. 27, 441±463 (1997)

The current research advances an interdependence analysis of commuting decisions (i.e. commuting by car versus public transportation), delineating the determinants of an individual's outcomes in terms of own decisions, other commuters' decisions, and the combination or interaction of own and others' decisions (Kelley & Thibaut, 1978). Consistent with hypotheses, findings revealed that a concern with comfort led to a higher overall personal preference for the car, and a lower overall preference for others to commute by public transportation, when compared to a concern with travel time. Additionally, consistent with the claim that commuter decisions are also guided by considerations broader than a concern with individual outcomes, findings revealed that individuals with prosocial orientations (i.e. those concerned with maximizing collective outcomes) in combination with high levels of trust (i.e. believing in the honesty and cooperative intentions of others) exhibited a greater overall personal preference for public transportation, and a reduced desire to avoid other commuters, relative to individuals with a prosocial orientation and low levels of trust, or a proself orientation (i.e. those concerned primarily with maximizing own outcomes), regardless of levels of trust. Finally, consistent with the current interdependence analysis, intention to commute by car was positively associated with not only overall personal preference for the car, but also with the desire to avoid other commuters.

- 4 **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*, Vol. 33 No. 6, November 2001, 796-808

The aim of this study was to investigate how cooperation can be facilitated in the real-world social dilemma of choosing to commute by automobile rather than by public transport. A survey of 335 drivers was carried out before and during an 8-day temporary freeway closure in Osaka, Japan. The results showed that the frequency of switching to public transport during the closure was inversely related to the frequency of automobile commuting before the closure. Furthermore, drivers who more frequently commuted by automobile overestimated commuting time by public transport to a larger extent than did drivers who commuted less frequently by automobile. At the same time, the larger the overestimation the more likely were drivers to change their perception of commute time. It is suggested that a temporary structural change, such as a freeway closure, may be an important catalyst that triggers cooperation in a social dilemma.

- 5 **Psychological and Situational Influences on Commuter-Transport-Mode Choice**, Christy M. Collins and Susan M. Chambers *Environment and Behavior*, 2005; 37; 640.

The relative importance and relationship between psychological and situational factors in predicting commuter-transport-mode choice was tested by four hypotheses. First, the influence of individuals' values on commuter behavior is mediated by their corresponding beliefs about the environmental threat of cars (mediation hypothesis). Second, the influence of these beliefs on behavior is moderated by individual consideration of future consequences and control beliefs (moderation hypothesis). Third, cost, time, and access factors contribute to individuals' commuter choice (situational hypothesis). Fourth, situational and psychological factors jointly influence proenvironmental behavior (interaction hypothesis). A sample of 205 Australian university students completed a survey to measure these relationships. Regression analyses indicated support for the mediation, situational, and interaction hypotheses. *It was concluded that to achieve a transport-mode shift to public transport, public policy strategies should focus on individuals' transport-related environmental beliefs (personal control and environmental effect of cars)*

and situations (access to public transport at reduced cost).

- 6 **Introduction: Habitual travel choice Transportation 30: 1–11, 2003 Kluwer Academic Publishers. Printed in the Netherlands. Tommy Garling, & Kay W. Axhausen.**

In this introduction to the special issue on habitual travel choice, we provide a brief account of the role of habit in travel behavior, discuss more generally what habitual choice is, and briefly review the issues addressed in the solicited papers. These issues include how habitual travel behavior should be measured, how to model the learning process that makes travel choice habitual, and how to break and replace car-use habits.

- 7 **Mobility As A Positional Good Implications for Transport Policy and Planning Todd Litman Victoria Transport Policy Institute, 8 March 2007**

“Positional” (also called “prestige”) goods confer status on their consumers. However, this increased status is offset by reduced status to others, resulting in no direct net benefit to society. As wealth increases so does the portion of consumption motivated by positional value. Many mobility-related goods and services have positional value, including vehicle ownership and use, and exotic holidays. This paper investigates how positional value affects transportation decisions, explores the resulting economic impacts, and discusses implications for transport policy and planning.

- 8 **A Social Dilemma Analysis of Commuting Preferences: The Roles of Social Value Orientation and Trust’ Paul A. M. Van Lange, Mark Van Vugt, Ree M. Meertens and Rob, A. C. Ruiter. Journal of Applied Social Psychology, 1998, 28, 9, pp. 796-820.**

The current research advances a social dilemma analysis of commuting, examining the roles of preexisting personality differences in social value orientation (i.e., prosocial vs. proself orientation) and trust (i.e., a general belief in the honesty and cooperative intentions of others) in determining preferences for collectively desirable commuting options: preferences for commuting by public transportation (Study 1) and carpooling (Study 2). *Consistent with predictions, both studies revealed that, relative to preferences of prosocials, preferences of proselfs were more strongly associated with beliefs about the relative efficiency of cars (i.e., an outcome affecting personal well-being).*

Also, greater preferences for collectively desirable actions were observed among prosocials with high trust-relative to prosocials with low trust and proselfs with high or low trust-providing support for the claim that 2 conditions (i.e., prosocial goals and trust in others) must be met to obtain collectively desirable commuting preferences.

Asocial dilemma is defined as a situation in which (a) behaving in a collectively undesirable manner (i.e., the noncooperative option) yields better personal outcomes than behaving in a collectively desirable manner (i.e., the cooperative option), irrespective of others’ choices; (b) yet, if most or all people choose the noncooperative option, the outcomes for all individuals involved are worse than if all or most people choose the cooperative option (cf. Hamburger, 1979; Messick & Brewer, 1983; Van Lange & Messick, 1996).

Commuting by car versus commuting by public transportation or carpooling represents a social dilemma, in that commuting by car typically yields better outcomes for individuals, whereas commuting by public transportation and carpooling are less polluting and therefore collectively more

desirable.~

The present findings may have important real-world implications. Past public campaigns stressing the importance of behaving in a societally beneficial manner have not been terribly effective at increasing the use of alternatives to the car (e.g., Baerwald, 1985; Kostyniuk, 1982). The current results suggest that some people may be more likely to respond to such campaigns (e.g., individuals with prosocial orientations), if the campaigns concurrently attempt to bolster the public's trust that other commuters will also make a contribution. And, how could one promote collectively desirable preferences and behavior among individuals with proself orientations? *In light of the current findings (i.e., support of Hypothesis 1b), it would be important to design campaigns that emphasize how collectively desirable behaviors may also promote one's personal well-being. That is, such campaigns may require an additional emphasis on the personal benefits associated with commuting by public transportation or carpooling or the personal costs associated with commuting by car.* In a similar manner, cooperation among proselfs, in particular, may be promoted by structural solutions to social dilemmas aimed at (a) *enhancing personal costs associated with the noncooperative option (e.g., providing no additional parking space to reduce the attractiveness of commuting by car), or (b) enhancing personal benefits associated with the cooperative option (e.g., enhancing comfort in trains).*

9 **Transportation Choices and Air Pollution Effects of Telework**
Erasmia Kitou¹ and Arpad Horvath²
Journal of Infrastructure Systems, Vol. 12, No. 2, June 1, 2006.

Telework has emerged as a possible solution to transportation-related air pollution problems. This paper analyzes, both deterministically and probabilistically, a California-based 1-day telework scenario, and explores how the mode of transportation and other parameters such as vehicle miles traveled, vehicle model, occupancy rate, telecommuting frequency, and season "heating or cooling" affect the air pollution effects of telework programs when energy consumption-related emissions due to heating, cooling, lighting, and the use of electronic and electrical equipment "in the home and company office" are accounted for.

Among others, the study found that total telework-related CO₂ emissions during the cooling season and SO₂, NO_x, and hydrocarbon emissions in both seasons appear to be lower than non telework emissions for all modes of transportation except for light rail with higher NO_x emissions and urban transit buses with roughly equal NO_x emissions in the heating season. Light rail also has higher telework N₂O and CH₄ emissions. However, given the uncertainties in the data, the differences may be negligible. Urban transit buses and commuter express buses were found to be associated with more telework than nontelework CO emissions in both seasons. For these two modes, telework PM₁₀ emissions are higher in the cooling and about the same in the heating season than nontelework emissions. Natural gas-powered ferries have more telework PM₁₀ emissions than nontelework emissions. The study also found that for low-frequency telework programs energy use impacts could overturn transportation-related emission reductions independent of the mode of transportation used. Avoiding more polluting modes of transportation, increasing occupancy rates, substituting longer commutes and especially increasing telecommuting frequency could counteract these negative effects.

10 **Emotions, habits and rational choices in ecological behaviours: The case of recycling and use of public transportation, Journal of Environmental Psychology 28 (2008) 51–62**
Giuseppe Carrus¹, Paola Passafaro, Mirilia Bonnes

Two field studies examined the role of attitudes, subjective norms, perceived control, anticipated emotions, past behaviour and desire in the prediction of pro-environmental behavioural intention. The model of goal-directed behaviour (MGB) was applied to predict intentions to use public transportation instead of the private car for going to work (Study 1, N 1/4 180), and to recycle household waste (Study

2, N 1/4 154)

Multiple regression and structural equation modeling were used to test the hypotheses in studies 1 and 2, respectively. As expected, results of the two studies indicate that *negative anticipated emotions and past behaviour are significant predictors of desire to engage in pro-environmental action*. Desire, in turn, positively predicts pro-environmental behavioural intentions. A direct link between past behaviour and intentions was also detected. Implications of the results for the promotion of pro-environmental behaviour are discussed.

- 11 **When is Commuting Desirable to the Individual? David T. Ory, Patricia L. Mokhtarian, Lothlorien S. Redmond, Ilan Salomon, Gustavo O. Collantes, and Sangho**
Growth and Change, Vol. 35 No. 3 (Summer 2004), pp. 334-359

Commuting is popularly viewed as a stressful, costly, time-wasting experience from the individual perspective, with the attendant congestion imposing major social costs as well. However, several authors have noted that commuting can also offer benefits to the individual, serving as a valued transition between the home and work realms of personal life. Using survey data collected from about 1,300 commuting workers in three San Francisco Bay Area neighborhoods, empirical models are developed for four key variables measured for commute travel, namely: *Objective Mobility, Subjective Mobility, Travel Liking, and Relative Desired Mobility*. Explanatory variables include measures of general travel-related attitudes, personality traits, lifestyle priorities, and sociodemographic characteristics. Both descriptive statistics and analytical models indicate that *commuting is not the unmitigated burden that it is widely perceived to be. About half of the sample were relatively satisfied with the amount they commute, with a small segment actually wanting to increase that amount*. Both the psychological impact of commuting, and the amounts people want to commute relative to what they are doing now, are strongly influenced by their liking for commuting.

An implication for policy is that some people may be more resistant than expected toward approaches intended to induce reductions in commuting (including, for example, telecommuting). New creativity may be needed to devise policies that recognize the inherent positive utility of travel, while trying to find socially beneficial ways to fulfill desires to maintain or increase travel.

- 12 **Incentives, Morality, Or Habit? Predicting Students' Car Use for University Routes With the Models of Ajzen, Schwartz, and Triandis**
Sebastian Bamberg and Peter Schmidt Environment and Behavior 2003; 35; 264

The predictive power of the Ajzen, Triandis, and Schwartz models are compared in the context of car use for university routes. Two hundred fifty-four students filled out a questionnaire designed to measure the components of the three models.

In the prediction of intention to use a car, results indicated that one variable from the Triandis model—role beliefs—increased the explanatory power offered by the components of the Ajzen model. In the prediction of self-reported car use, one variable of the Triandis model—car use habit—significantly increased the predictive power of the Ajzen model. The central variable of the Schwartz model—personal norm—exerted no significant effect either on intention or on behavior. The implications of the findings for interventions to reduce the car use of students for university routes are discussed.

These three models were selected because they cover issues that are currently discussed in environmental research in a controversial manner: *Are proenvironmental behaviors mainly normative, moral behaviors (due to the norm activation model) or mainly guided by the calculation of personal utility and costs (theory of planned behavior)? Is the enactment of everyday environmentally relevant*

Saferide: Research on Alternative Ways of Commuting

The predictive power of the Ajzen, Triandis, and Schwartz models are compared in the context of car use for university routes. Two hundred fifty-four students filled out a questionnaire designed to measure the components of the three models.

In the prediction of intention to use a car, results indicated that one variable from the Triandis model—role beliefs—increased the explanatory power offered by the components of the Ajzen model. In the prediction of self-reported car use, one variable of the Triandis model—car use habit—significantly increased the predictive power of the Ajzen model. The central variable of the Schwartz model—personal norm—exerted no significant effect either on intention or on behavior. The implications of the findings for interventions to reduce the car use of students for university routes are discussed.

These three models were selected because they cover issues that are currently discussed in environmental research in a controversial manner: *Are proenvironmental behaviors mainly normative, moral behaviors (due to the norm activation model) or mainly guided by the calculation of personal utility and costs (theory of planned behavior)? Is the enactment of everyday environmentally relevant behavior mainly under conscious control (theory of planned behavior), or is it activated in a more automatic, habitualized fashion (theory of interpersonal behavior)?*

Briefly, the TPB stipulates that when confronted with the need to decide on a course of action, people consider the likely consequences of available alternatives (behavioral beliefs), they weigh the normative expectations of important reference individuals or groups (normative beliefs), and they consider required resources and potential impediments or obstacles (control beliefs). These considerations or beliefs result, respectively, in the formation of attitudes toward the behavior of interest, subjective norms with respect to the behavior, and perceived behavioral control.

Whereas the TPB states that social behavior is under the individual's conscious control, the TIB proposes that the level of consciousness decreases as the level of habit in performing the behavior increases. Consequently, Triandis suggested that apart from intention and behavioral control (which he conceptualized as the presence of facilitating objective conditions), the construct habit is to be considered as an additional predictor of behavior.

13 **Qualitative Research to Assess Interest in Public Transportation for Work Commute, Kerstin Carr, University of Regensburg, Journal of Public Transportation, Vol. 11, No. 1, 2008**

Given the need for reducing single occupancy vehicle commutes, this article presents a case study of employer-based research. Using conjoint analysis as a qualitative research method, factors that potentially influence people's choices to drive alone to work were studied at a major company in Columbus, Ohio. Such factors included reasons for driving alone, satisfaction with commute, perceptions toward transportation modes, importance of transportation attributes, and likelihood to switch if certain Transportation Demand Management measures were implemented. Target groups were formed by using simple regression and cluster analysis of a stated-ranking question regarding transportation attributes.

The overall study results suggest that flexibility, cost, and time are the most important reasons for choosing a transportation mode. These results are not surprising. However, answers of the stated-ranking question indicate that commuters will trade off transportation attributes if provided with concrete scenarios. For this particular study, results demonstrated that flexibility and time decrease in value when cost reaches a certain level.

d.s. This paper is the closest one to our findings..

- 15 **Habit and information use in travel mode choices, Henk Aarts, Bas Verplanken Ad van Knippenberg, Acta Psychologica 96 (1997) 1-14**

This study focuses on the role of habit in the process of information use underlying daily travel mode choices. Based on the 'policy capturing' paradigm, eighty-two students performed a multi attribute travel mode judgment task, in which they could use information about travel circumstances in order to make a number of judgments. Measures of information use were obtained by performing multiple regression analyses for each subject. It was found that habit reduced the elaborateness of information use in judgments of travel mode use. This effect was independent of effects of manipulated accountability demands.

- 16 **The Promotion of New Behavior by Forming an Implementation Intention: Results of a Field Experiment in the Domain of Travel Mode Choice, Sebastian Bamberg, Journal of Applied Social Psychology, 2000,30,9p,p . 1903-1922**

In the context of an experimental field study, it is analyzed whether furnishing a goal intention with an implementation intention (Gollwitzer, 1993) increases the probability that a new behavior is enacted. For this purpose, 90 students who did not normally use public transportation were asked to test (just one time) a special public transportation offer they had never used before. With a nonobstrusive questionnaire manipulation, the subjects of the experimental group were stimulated to form an Implementation intention. The results show that forming an implementation intention significantly increases the probability of enacting the goal intention; that is, testing the public transportation offer. The theoretical and practical implications of this finding are discussed.

- 17 **Dynamic Ride Sharing: Theory and Practice By Randolph W. Halll and Amer Qureshe Journal of Transportation Engineering/ July/August. 1997**

Dynamic Ride-sharing (DR) is envisioned as an automated process by which individuals find ride matches on a trip by trip basis. This paper examines the DR concept on both a theoretical basis and on the basis of actual implementation in Los Angeles. Specifically, the paper investigates the likelihood that the user of a DR system would be successful in finding a ride-match. In a theoretical sense, this paper shows that dynamic ride-sharing is a viable concept. For a congested freeway corridor, the number of trips generated per unit time and space should be sufficient to yield a reasonably large population of potential ride-matches for a DR system. Unfortunately, as demonstrated in the experiment, theory and practice are not the same. Even when individuals share common trip patterns, consummating a ride-match is no easy task for logistical reasons. At best, one might expect a one in five chance of someone offering a ride when trip patterns are similar. This probability would decline for casual trips, and when contacting individuals who have not expressed a prior willingness to carpool.

It is more like a problem statement.

- 18 **Context change and travel mode choice: Combining the habit discontinuity and self-activation hypotheses, Bas Verplankena, Ian Walkera, Adrian Davis, Michaela Jurasek, Journal of Environmental Psychology 28 (2008) 121-127**

The habit discontinuity hypothesis states that when a context change disrupts individuals' habits, a window opens in which behavior is more likely to be deliberately considered. The self-activation hypothesis states that when values incorporated in the self-concept are activated, these are more likely to guide behavior. Combining these two hypotheses, it was predicted that context change enhances the likelihood that important values are considered and guide behavior. This prediction was tested in the domain of travel mode choices among university employees who had recently moved versus had not recently moved residence. As was anticipated, participants who had recently moved and were environmentally concerned used the car less frequently for commuting to work. This was found not only when compared to those who were low on environmental concern (which would be a trivial finding), but also to those who were environmentally concerned but had not recently moved. The effects were controlled for a range of background variables. *The results support the notion that context change can activate important values that guide the process of negotiating sustainable behaviors.*

- 19 **Analyzing Changes in Urban Form and Commuting Time Marie-Hélène Vandersmissen, Paul Villeneuve, and Marius Thériault**
The Professional Geographer, 55(4) 2003, pages 446–463

Urban work trips have changed in important ways during the last decades. In Quebec City, a medium-sized Canadian metropolitan area, commuting distances increased for both male and female workers between 1977 and 1996, while durations increased for male workers and decreased for female workers. This article seeks to identify spatial and social factors responsible for these changes. We develop a disaggregate model of trip duration estimated on the basis of large samples derived from travel surveys comparable through time. Using categorical variables to specify change, we are able to separate change effects from level effects attributable to various dimensions of urban form. *Our analysis clearly indicates that, once travel mode and key social factors are controlled for, the shift from a monocentric to a dispersed city form is responsible, in the Quebec metropolitan area, for increasing commuting time.* This is contrary to findings in larger metropolitan areas, where, it has been argued, the suburbanization of jobs maintains stability in commuting duration.

- 20 **Commute variability and strain**
Avraham N. Kluger ,
Journal of Organizational Behavior, Vol. 19, 147±165 (1998)

The commute impedance model (e.g. Stokols, Novaco, Stokols and Campbell, 1978) is evaluated through a literature review and a survey of commuters who drive to work (N = 418). A new construct for the study of commuting—commute variability—is introduced and tested in the framework of the survey. Findings from the literature review indicated (a) partial support for the first proposition of the impedance model namely, that impedance—measured as commute distance or time—causes strain (e.g. employee health deficits), but (b) no support for the second proposition of the model namely, that the impedance±strain is moderated by control or the availability of choice. Similarly, the survey showed that (a) commute length (impedance) is consistently correlated with strain, (b) choice is weakly and negatively related to strain, but (c) there is no interactive relationship of choice and length with strain. Furthermore, the results suggest that (a) commute variability is the strongest correlate of commute strain, and that (b) once commute variability is partialled out, most of the partial correlations between impedance and strain are not significant. The paper concludes with an alternative commuting±strain model which includes the new commute-variability construct.

Taken together, the findings of the survey and the literature review raise the hypotheses that *commute*

The commute impedance model (e.g. Stokols, Novaco, Stokols and Campbell, 1978) is evaluated through a literature review and a survey of commuters who drive to work (N = 418). A new construct for the study of commuting—commute variability—is introduced and tested in the framework of the survey. Findings from the literature review indicated (a) partial support for the first proposition of the impedance model namely, that impedance—measured as commute distance or time—causes strain (e.g. employee health deficits), but (b) no support for the second proposition of the model namely, that the impedance-strain is moderated by control or the availability of choice. Similarly, the survey showed that (a) commute length (impedance) is consistently correlated with strain, (b) choice is weakly and negatively related to strain, but (c) there is no interactive relationship of choice and length with strain. Furthermore, the results suggest that (a) commute variability is the strongest correlate of commute strain, and that (b) once commute variability is partialled out, most of the partial correlations between impedance and strain are not significant. The paper concludes with an alternative commuting-strain model which includes the new commute-variability construct.

Taken together, the findings of the survey and the literature review raise the hypotheses that *commute length causes physiological strain, whereas commute variability causes psychological strain. The psychological strain, in turn, may have additional detrimental effects on physiological strain. Although the present survey cannot shed light on the question of causality, it is unlikely that commute variability has direct effects on physiological outcomes. These physiological outcomes are thought to be the result of the amount of cumulative exposure to vibrations and pollutants and not to variability in the exposure to these physiological stressors.* Based on the above findings and considerations, it is possible to propose a commute model that is consistent with the available data.

- 21 **Commuting Stress: Problems of Definition and Variable Identification**
Meni Koslowsky,
Applied Psychology An International Review, 1997.46 (2). 153-173

Although researchers recognise the commuting experience as a potential source of stress, findings regarding its impact on various individual and organisational outcomes have been inconclusive. In the present paper, a review of relevant studies that examined the potential influence of commuting stress on psychological, physiological, and behavioural strain measures is reported and inconsistencies noted. A model linking objective and subjective measures of the stressor directly and indirectly to outcome is described. *It is suggested that by including several critical moderators, such as control, predictability, and time urgency, predictions emanating from commuting stress stimuli can be enhanced.*

- 22 **Commuting in multi-nodal urban systems: An empirical comparison of three alternative models.**
L Van Der Laan, K. Vogelzang & R. Schalke.
Tijdschrift voor Economische en Sociale Geografie ± 1998, Vol. 89, No. 4, pp. 384±400.

This paper analyses whether the basic monocentric model of urban structure and commuting explains actual commuting in Europe, i.e. The Netherlands. As in the USA much wasteful commuting is established. The basic model has a low degree of explanatory power. In order to get more in line with actual commuting, the paper elaborates two alternatives to the basic model. Besides a deconcentrated model, a cross-traffic model is developed. Particularly the latter is quite successful in explaining actual commuting. The paper pleads for endogenising employment and stresses heterogeneity in labour demand and supply.

- 23 **Crowding and personal space invasion on the train: Please don't make me sit in the middle,**
Gary W. Evans, Richard E. Wenere,
Journal of Environmental Psychology 27 (2007) 90–94

Saferide: Research on Alternative Ways of Commuting

This paper discusses two studies of New York-bound commuters using psychological and physiological indicators of stress to determine the effects of switching from a two-seat commuter rail trip to a one-seat ride using NJ TRANSIT's Midtown Direct and Montclair Direct service. It also presents data on a third study that compared the stress levels of a sample of 122 auto commuters with those of a 164-member sample of rail commuters making similar trips to work.

Results from the studies of Midtown Direct and Montclair Direct riders showed significant reductions in stress for those commuters who switched from a two-seat to a one-seat ride. The stress reduction benefit was found to be almost twice as significant for working mothers as compared to all others in the sample. *For the study comparing auto and rail commuters, auto commuters showed significantly higher levels of reported stress, more negative mood, indicated the trip was significantly more effort, and felt that their trip was significantly less predictable compared to train commuters.*

- 25 **Evaluating Ride-sharing Programs, Massachusetts's Experience**
John Coilura, ~ Member, ASCE,
Journal of Urban Planning and Development, Vol. 120, No.1,1994

This paper presents the major results of an evaluation of Massachusetts's effort to promote ride sharing. The results suggest that serious consideration be given to refocusing the state's ride-sharing activities. An attempt should be made to work more closely with major employers in order to develop site specific, employer ride-sharing programs, and, wherever appropriate, the state should use the assistance of Transportation Management Associations (TMAs). *It is also pointed out that carpooling is increasingly unpopular, and that to reverse this trend nationally (and in Massachusetts) under existing economic conditions will challenge transportation professionals.* Qualitative and quantitative data were secured through personal interviews with participating government agencies; in addition, some 100 employers and over 2,500 commuters were interviewed. Survey instruments designed and employed in this evaluation may be of interest and use to other statewide and metropolitan ride-sharing agencies.

- 26 **Ronald G. Burns and Michael A. Katovich Examining Road Rage / Aggressive Driving: Media Depiction and Prevention Suggestions, Environment and Behavior 2003; 35; 621**

Reports on roadrage/aggressive driving imply that most everyone who drives could be involved and affected by such emotions. As victims, witnesses, perpetrators, or protectors, many drivers are confronted with at least some type of aggression and violence on the road ways. Despite inconsistent definitions and subsequent questionable measurements of roadrage/aggressive driving, formal social control efforts directed at problematic drivers seem to be the preferred approach for prevention. The present study used newspaper accounts for issue identification regarding the proposed causes of roadrage/aggressive driving. *It was found that personal/ individual factors are more often noted than environmental cues regarding the causes of roadrage.* In contrast to the more popular crime control approach, a nontraditional application of crime prevention through environmental design, which focuses on *traffic facilitation, is offered to address violent and aggressive drivers.*

- 27 **Living in Two Worlds: A Review of Home-to-Work Decisions**
Jan Rouwendal and Peter Nijkamp
Growth and Change, Vol. 35 No. 3 (Summer 2004), pp. 287-303

This paper discusses various aspects of the economic analysis of commuting behavior. It starts with a review of two difficulties associated with urban economics models: the empirically falsified prediction of the relation between commuting time and income, and the presence of substantial excess commuting. Notwithstanding these anomalies, research that focuses directly on the value of travel time provides

evidence that there is substantial resistance against commuting among large groups of workers.

However, *commuting costs are just one among many other explanatory variables for actual commuting behavior, and commuting itself has become much less onerous over time. This suggests that commuting costs play a much more limited role than has been assumed in the past.* On the other hand, empirical evidence suggests that space is more important than one would be inclined to think on the basis of the considerations just given. These empirical regularities suggest that other space-related aspects of the functioning of urban labor and housing markets are more important than was previously thought.

- 28 **Mode Choice, Commuting Cost, and Urban Household Behavior**
Joseph S. DeSalvo,
Journal of Regional Science, VOL. 45, No. 3, 2005, pp. 493–517

In this paper, we extend the partial equilibrium urban model of DeSalvo (1985) to include mode choice. DeSalvo demonstrated that the urban model of Muth (1969) was robust to the extension to leisure choice. We show that the model is robust to mode choice as well. In addition, *we derive the comparative static results that commuters choose higher speed modes for longer commutes, at higher wage rates, with greater tastes for housing, and with lower housing prices. Also, for a given distance commuted, we derive the comparative static result that commuters chose shorter duration commutes at higher wage rates.* Whereas it is typically assumed that marginal commuting cost is positive and non-increasing with distance, we derive these results. Moreover, we derive the results that marginal commuting cost rises with an exogenous increase in housing price and falls with increased tastes for housing. We also explore the effects of exogenous commuting-cost changes on the endogenous variables of the model. The remaining comparative static results on housing consumption and location are qualitatively the same as in DeSalvo.

- 29 **The Morning Rush Hour: Predictability and Commuter Stress**
Gary W. Evans, Richard E. Wener and Donald Phillips,
Environment and Behavior 2002; 34; 521

Although it is obvious that commuting to work is stressful, it is not at all clear why this is so. This study examined the potential role of commute *unpredictability in the stressfulness of the daily journey to work among a population of rail commuters. Men and women who perceived their commute to work as more unpredictable felt greater levels of stress and evidenced higher elevations of salivary cortisol.*

Expected differences in motivation in task performance did not occur. Limitations of these cross-sectional findings are discussed along with future research needs. The possible roles of commute predictability and stress in transportation mode choice are also delineated.

- 30 **Stress Perception and Commuting,**
Georg Gottholmseder, Klaus Nowotny, Gerald J. Pruckner, and Engelbert Theurl, Health Economics, (2008)
Published online in Wiley InterScience (www.interscience.wiley.com).

This paper analyzes the determinants of the perceived stress level of workers with a special focus on the effects of commuting, while controlling for personal and work-related characteristics. Using ordered logistic regression we find that several dimensions of the commuting situation, such as impedance, control and predictability of commuting, significantly influence the perceived stress level. Therefore, stress and stress-related health problems should be taken into consideration when analyzing the

This paper analyzes the determinants of the perceived stress level of workers with a special focus on the effects of commuting, while controlling for personal and work-related characteristics. Using ordered logistic regression we find that several dimensions of the commuting situation, such as impedance, control and predictability of commuting, significantly influence the perceived stress level. Therefore, stress and stress-related health problems should be taken into consideration when analyzing the economic costs of commuting.

- 31 **Stress that Doesn't Pay: The Commuting Paradox**
Alois Stutzer, Bruno S. Frey, Scand. J. of Economics 110(2), 339–366, 2008

People spend a lot of time commuting and often find it a burden. According to standard economics, the burden of commuting is chosen when compensated either on the labor or on the housing market so that individuals' utility is equalized. However, in a direct test of this strong notion of equilibrium with panel data, we find that people with longer commuting time report systematically lower subjective well-being. This result is robust with regard to a number of alternative explanations. We mention several possibilities of an extended model of human behavior able to explain this "commuting paradox".

- 32 **Social context, personal norms and the use of public transportation: Two field studies**
Sebastian Bamberg, Marcel Hunecke, Anke Blobaum
Journal of Environmental Psychology 27 (2007) 190–203

The paper concentrates on the role personal norms play in the decision to use public transportation means instead of the car. An integrative theoretical framework is presented from which hypotheses concerning the social and psychological processes activating personal norms and mediating their impact on behavior are derived. These hypotheses are tested and cross-validated with two independent data sets collected in two German urban agglomerations with different economic and social-cultural backgrounds. In both samples, *personal norm is a significant predictor of PT-use intention even after checking for the impact of attitude and perceived behavioral control. Furthermore, there is evidence that the reported personal norms are based on two related but distinct processes: anticipated feelings of guilt and perceived social norms.* These two processes provide an explanation how different social contexts may influence people's judgment of PT as well as their actual PT-use.

- 33 **Commuting by car or public transportation? A social dilemma analysis of travel mode judgements,**
Mark Van Vugt, Paul A.M. Van Lange, Ree M. Meertens
European Journal of Social Psychology, Vol. 26, 373-395 (1996)

The current paper analyses judgements regarding the decision to commute by car versus public transportation in terms of a conflict between immediate self-interest and long-term collective interest (i.e. social dilemma). Extending traditional formulations of rational choice theory, the present study revealed that preferences for public transportation (i.e. the presumed cooperative option) in a standard commuting situation were enhanced not only by the belief that public transportation provided a shorter average travel time than car (i.e. the presumed non-cooperative option), but also by the belief that public transportation was at least as reliable (i.e. an equal or lower variability in travel time compared to car). Moreover, paralleling prior research on experimental social dilemmas, preferences were found to be affected by a pro-social concern - the belief regarding the impact of cars on the level of environmental pollution.

Our findings indicated that any combination of two such considerations (i.e. travel time, variability, and

- 34 **Acceptability of travel demand management measures: The importance of problem awareness, personal norm, freedom, and fairness**
Louise Eriksson, Jorgen Garvill, Annika M. Nordlund,
Journal of Environmental Psychology 26 (2006) 15–26

Acceptability of travel demand management (TDM) with the aim of reducing private car use is modeled following a hierarchical set of beliefs. In a two-part model, *pro-environmental orientation, problem awareness, personal norm, and willingness to reduce car use* are linked to beliefs about to which extent the specific TDM measure is perceived to influence freedom to choose travel mode, own reduction of car use, effectiveness, fairness, and subsequently acceptability. Data were collected through a mail survey in Sweden, and the model was tested in a sample of car users for three TDM measures; improved public transport, an information campaign, and increased tax on fuel. First, the models were tested and modified in a randomly selected sub-sample (N 1/4 462), then the modified models were validated in the remaining sub-sample (N 1/4 460).

We conclude that *problem awareness and personal norm, in combination with evaluations of specific TDM measures, are underlying the acceptability of TDM measures. Moral considerations and perceived fairness were important for the acceptability of increased tax on fuel, while freedom aspects and problem awareness were of importance for the acceptability of improved public transport.* Because acceptability often is important for the implementation of TDM measures, policy makers may draw on these results when attempting to increase the acceptability of various TDM measures.

- 35 **Who Cares about the Environmental Impact of Cars?: Those with an Eye toward the Future**
Jeffrey A. Joireman, Paul A. M. Van Lange and Mark Van Vugt
Environment and Behavior 2004; 36; 187

This study examines preference for commuting to work by car or public transportation (PT) within an expanded social dilemma framework (i.e., one that recognizes the importance of both social and temporal concerns). Commuters completed scales assessing commuting preferences, beliefs regarding the environmental impact of cars, social value orientation (SVO), and the consideration of future consequences (CFC). Preference for PT was higher among commuters who believed that commuting by car harms the environment and among those scoring high in CFC. Most important, a significant two-way interaction revealed that preference for commuting by PT was positively related to beliefs regarding the harmful environmental consequences of commuting by car only among those high in CFC. SVO was unrelated to commuting preferences. In sum, a future orientation may be more important than a prosocial orientation in shaping commuting preferences.

- 36 **How habits interfere with norm-directed behaviour: A normative decision-making model for travel mode choice, Christian A. Klockner, Ellen Matthies** **Journal of Environmental Psychology 24 (2004) 319–327**

This paper deals with the question how habits can be integrated into a model of normative decision-making based on the work of Schwartz and Howard (1981). A field study was conducted in Bochum, Germany, involving 160 participants. After a personal interview the participant had to protocol the travel mode choice on their trips to work in a logbook for the period of 4 weeks. The data illustrates that on the trip to work there is no direct effect of car-choice habits on travel mode choice additional to the personal norm, but a moderating effect of habit strength on the relation between personal norm and travel mode choice. It is argued that different levels of specificity of habit lead either to a moderating effect of habit (strong specific habit) or an additional direct effect (weak specific habit).

