NATIONAL HOUSEHOLD TRAVEL SURVEY

Compendium of Uses

June 2011 - December 2012

Introduction

This compendium contains various uses and applications of the National Household Travel Survey (NHTS) data used in transportation planning and research from June 2011 to the December 2012. Published journal articles and reports that cite the use of NHTS data were selected using the Transportation Research Board (TRB) Annual Meeting Online Portal http://amonline.trb.org/ and Google Alerts, notification emails sent by Google when new search results matched predetermined search terms pertaining to NHTS data. The key word and search engine terms used in both online sources were the **National Household Travel Survey** and **NHTS**.

The research papers were grouped into 11 categories that were created based on the **Subject Areas** and index terms identified in each abstract as well as category titles used in previous NHTS compendium databases. The categories are as follows:

1. Bicycle and Pedestrian Studies
2. Energy Consumption
3. Gas Tax and Fee Scenarios
4. Public Transportation
5. Policy and Mobility
6. Special Populations
7. Survey Design, Methodology and Other Applications
8. Traffic Safety
9. Travel Behavior
10. Trend Analysis and Market Segmentation
11. Freight Movement

A one-page description of each paper is provided which includes the **title, authors, Publication Date, abstract, Subject Areas, and availability.**

Research articles and reports in this document cover a diverse range of topics in the areas of transportation, health, safety, environment, and engineering and were published in various journals including, but not limited to, the American Journal of Public Health, the International Journal of Behavioral Nutrition and Physical Activity, and the National Center for Transit Research. Several papers were also submitted by researchers and graduate students for presentation and publication to the Transportation Research Board 91st Annual Meeting and can be found in the 2012 TRB Annual Meeting Compendium of Papers.

Please note as of December 2012, this compendium consists of approximately 210 research papers and articles. This document will be updated on an on-going basis with newly published papers that cite NHTS data. For information about adding a research paper to the NHTS compendium, please contact Adella Santos at adella.santos@dot.gov.

Outline of reports from June 2011 through December 2012 that cite the use of the National Household Travel Survey

Contents

BICYCLE AND PEDESTRIAN STUDIES

Perspectives on Seattle Women's Decisions to Bike for Transportation *Anne Broache*

Publication Date: August 2012

Abstract: A tangle of health, quality-of-life, environmental, and economic concerns has prompted Seattle and other major US cities to pursue strategies that encourage more trips by foot, bike, and transit. Yet increasing bicycling rates remains a distinct challenge, as evidenced by the extremely low share of Americans—especially women—who choose the two-wheeled mode for their everyday journeys. Even in Seattle, which has earned accolades for bikefriendliness, men compose more than 70 percent of bike commuters. An understudied research area lies in determining why these gender differences exist, to what extent they can be overcome, and, in general, how best to attract cycling skeptics. A better understanding of motives for bicycling among both genders and their nuanced subgroups is essential if planners hope to shift more trips away from motorized modes and reap the array of benefits associated with active transportation. This master's thesis contributes to the limited body of research on gender-related bicycling behavior and preferences by examining four major questions: (1) What are the major barriers associated with Seattle women's decisions to bicycle for transportation? (2) What are the key motives that may cause Seattle women to start or increase their cycling? (3) How do these barriers and motives differ among Seattle women who do or do not consider themselves daily riders? and (4) Based on these factors, what strategies might planners and other interested stakeholders employ to encourage more cycling among Seattle women? This research centers on a quantitative analysis of responses from a non-representative sample of 365 Seattle women, including 106 women who reported not riding for any of their everyday trips and 259 women who reported riding daily, collected through a survey by the Association of Pedestrian and Bicycle Professionals' Women's Cycling Project in 2010. Through a quantitative comparison of these two ridership groups, I investigated how barriers and motives vary by self-reported experience levels. My analysis was informed by the ecological model, which suggests that individual, social-environment, and physical environment factors all play roles in transportation behavior. Consistent with existing literature, safety in the presence of motorized traffic was the paramount concern for daily and non-daily riders alike. Weather, steep topography, distances between origins and destinations, route connectivity, and grooming and cargo issues also played important roles in the women's cycling decisions, especially for non-daily riders. By contrast, bike and equipment issues, presence of social supports in the community, and connectivity with transit appeared to be less relevant considerations. Based on these findings, I recommended that planners consider greater separation of bikes from motorized traffic, improve end-of-trip facilities, explore creative workarounds to steep topography, seek solutions to increase route connectivity, and enhance marketing activities that address cycling for transportation as a lifestyle.

Subject Areas: women; bicycling;

Availability: Broache, Anne. Perspectives on Seattle Women's Decisions to Bike for Transportation. Diss. University of Washington, 2012. https://digital.lib.washington.edu/xmlui/handle/1773/20790

On Accommodating Spatial Dependence in Bicycle and Pedestrian Injury Counts by Severity Level *Sriram Narayanamoorthy, Rajesh Paleti, Chandra R. Bhat*

Publication Date: July 2012

Abstract: This paper proposes a new spatial multivariate count model to jointly analyze the traffic crash related counts of pedestrians and bicyclists by injury severity. The modeling framework is applied to predict injury counts at a Census tract level, based on crash data from Manhattan, New York. The results highlight the need to use a multivariate modeling system for the analysis of injury counts by road-user type and injury severity level, while also accommodating spatial dependence effects in injury counts.

Subject Areas: pedestrian and bicycle crashes; Multivariate count data, spatial econometrics, crash analysis, composite marginal likelihood.

Availability: Narayanamoorthy, Sriram, Rajesh Paleti, and Chandra R. Bhat. On accommodating spatial dependence in bicycle and pedestrian injury counts by severity level. Diss. University of Texas, 2012. https://repositories.lib.utexas.edu/handle/2152/19698

Walking Distance by Trip Purpose and Population Subgroups *Yong Yang, PhD, & Ana V. Diez-Roux, PhD, MD*

Publication Date: July 2012

Abstract: Walking distance is an important concept in the fields of transportation and public health. A distance of 0.25 miles is often used as an acceptable walking distance in U.S. research studies. Overall, research on the distance and duration of walking trips for different purposes and across different population groups remains limited. This study examines the prevalence of walking and distances and durations of walking trips for different purposes among U.S. residents. The distances and durations of walking trips for different purposes across population groups were compared using nationally representative data from the 2009 National Household Travel Survey (NHTS). Distance decay functions were used to summarize the distribution of walking distances and durations for different purposes and population subgroups. Data were analyzed in 2011. Sixteen percent of respondents had at least one daily walking trip. The mean and median values for walking distance were 0.7 and 0.5 miles, respectively. For walking duration, the mean and median values were 14.9 and 10 minutes. About 65% of walking trips were more than 0.25 miles in distance, and about 18% of walking trips were more than 1 mile. Large variations were found among various purposes for both distance and duration. The distances and durations of walking for recreation were substantially longer than those for other purposes. People with lower versus higher household income walked longer distances for work but shorter distances for recreation. Only a small fraction of respondents walk, but trips longer than 0.25 miles are common. There is substantial variability in the distance and duration of walking trips by purpose and population subgroups. These differences have implications for developing strategies to increase physical activity through walking.

Subject Areas: Walking; public health;

Availability: Yang, Yong, and Ana V. Diez-Roux. "Walking distance by trip purpose and population subgroups." American journal of preventive medicine 43.1 (2012): 11-19.
http://www.sciencedirect.com/science/article/pii/S0749379712002401

City Cycling *Buehler, Ralph, and John Pucher*

Publication Date: October 2012

Abstract: N/A

Subject Areas: Cycling; bikeshare; public transportation integration; safety; health benefits; sustainability

Availability: Pucher, John R., and Ralph Buehler, eds. City cycling. The MIT Press, 2012. http://books.google.com/books?hl=en&lr=&id=226mCyz9JaEC&oi=fnd&pg=PA9&dq=International+Overview:+Cycling+Trends+in+Western+Europe,+North+America,+and+Australia&ots=la_vk0iH9G&sig=4ufqqmrB25IkYXQ_oAFAJB01fps

Accessibility and University Populations: Local Effects on Non-Motorized Transportation in the Tuscaloosa-Northport Area *Benjamin Lundberg*

Publication Date: October 2012

Abstract: This research examined the local bicycle and pedestrian networks through Geographic Information Systems (GIS) and survey data, using the Tuscaloosa and Northport, Alabama, area as a case study. The local non-motorized travel networks were analyzed in GIS to measure the overall network connectivity and accessibility. Results of the measures of network connectivity and modeling of accessibility indicated that areas within one mile of the UA's campus have the highest levels of bicycle and pedestrian network connectivity and accessibility. As a travel distance increases from UA, connectivity and accessibility for the bicycle and pedestrian networks decreases. An on-line survey was administered to the University of Alabama (UA) students and employees, and the results of the survey were used to formulate an understanding of how UA's population views non-motorized travel and the respective networks. Survey results show that individuals within the sample population use non-motorized travel methods to commute to UA but their use is significantly lower than automobile use. In addition, the survey data was considered alongside evaluations of network connectivity and accessibility, thus providing a powerful tool for studying the local bicycle and pedestrian travel networks.

Subject Areas: Bicycle and pedestrian networks; GIS;

Availability: Lundberg, Benjamin. Accessibility and University Populations: Local Effects on Non-motorized Transportation in the Tuscaloosa-Northport Area. Diss. The University of Alabama TUSCALOOSA, 2012.
http://acumen.lib.ua.edu/content/u0015/0000001/0001063/u0015_0000001_0001063.pdf

Pedestrian and bicycle plans and the incidence of crash-related injuries *Zachary Y. Kerra, Daniel A. Rodriguezb, Kelly R. Evensonc, Semra A. Aytur*

Publication Date: October 2012

Abstract: This study examined the association between the presence of pedestrian and bicycle plans to pedestrian and bicyclist nonfatal and fatal injuries from 1997 to 2009 among 553 North Carolina (NC) municipalities. We considered all municipal plans (n = 92; 49 pedestrian; 34 bicycle; and 9 combined plans featuring pedestrian and bicyclist components) published through 2009. Counts of pedestrian and bicyclist nonfatal and fatal injuries came from the NC Department of Transportation crash database, and the estimated number of pedestrian and bicycle trips per municipality in one year were used to calculate pedestrian and bicyclist nonfatal and fatal injury rates. In the 13-year study period, pedestrian/combined municipality plans and bicycle/combined municipality plans were present for 189 (2.6%) and 238 (3.3%) municipality-years, respectively. There were 11,795 nonfatal injuries, 9237 possible nonfatal injuries, and 1075 fatal injuries sustained by pedestrians in pedestrian–motor vehicle crashes. There were 4842 nonfatal injuries, 3666 possible nonfatal injuries, and 134 fatal injuries sustained by bicyclists in bicyclist–motor vehicle crashes. Although not statistically significant, unadjusted nonfatal and fatal injury rates among pedestrians and bicyclists were lower in those municipality-years in which plans had been published that year or in a year prior, compared to municipality-years lacking a plan. Adjusted rate ratios (RR) indicated that pedestrian nonfatal and fatal injury rates decreased in municipality-years with publication of pedestrian/combined plans (nonfatal injury RR: 0.75, 95% confidence interval (CI): 0.68, 0.82; fatal injury RR: 0.63, 95% CI: 0.46, 0.85). However, bicyclist nonfatal and fatal injury rates did not significantly change with publication of bicyclist/combined plans. Our research suggests that plan publication is associated with lower rates of nonfatal and fatal injury in pedestrians; this association was not observed for bicyclists. Further work must determine how the extent of implementation and quality of safety-related content within these plans affects changes in nonfatal and fatal injury rates.

Subject Areas: Planning; Policy; Pedestrian safety; Bicyclist safety; Master plans; Environment

Availability: Kerr, Zachary Y., et al. "Pedestrian and bicycle plans and the incidence of crash-related injuries." Accident Analysis & Prevention (2012).
http://www.sciencedirect.com/science/article/pii/S0001457512003466

Walking and Biking in California: Analysis of the CA-NHTS *McGuckin, Nancy*

Publication Date: August 2012

Abstract: California officials aim to improve the safety of non-motorized travel in California. In order to estimate the exposure of bicycles and pedestrians to crashes, the State of California purchased an add-on to the 2009 National Household Travel Survey (called the CA-NHTS in this report). Exposure rates are calculated for pedestrians and bicyclists in the state as a whole, for each California Department of Transportation District, and for each Metropolitan Planning Organizations (MPO). In addition, a few relevant areas of analysis are used to detail important aspects of walking and biking behavior in the state. While not an exhaustive presentation of CA-NHTS data, the report is an overview of the data collected on walking and biking as presented and provides control totals, margins of error, and other statistics useful for researchers and analysts interested in using the CA-NHTS.

Subject Areas: Accident rates; Bicycling; Commuters; Cyclists; Fatalities; Pedestrians; Physically handicapped persons; Statistics; Trip length; Walking; Walking distance

Availability: McGuckin, Nancy. Walking and Biking in California: Analysis of the CA-NHTS. No. UCD-ITS-RR-12-13. 2012. http://trid.trb.org/view.aspx?id=1217319

Contributions Of Individual, Physical, And Social Environmental Factors To Bicycling: A Structural Equations Modeling Study Of Six Small U.S. Cities *Yan Xing*

Publication Date: November 2012

Abstract: Bicycling is widely promoted in many countries as a sustainable means of transportation and a form of physical activity as well. However, the level of bicycling in the US is low compared to some European countries with similar economies and levels of auto ownership. Differences in the physical and social environments in these countries may explain this phenomenon. Previous research has established an association between environmental factors and bicycling. However, empirical knowledge about the influences on bicycling, and relative importance to bicycling, of the physical and social environments as well as individual factors is limited. Additionally, the majority of bicycling in the US is for recreation rather than transportation purposes but few studies have examined the question of bicycling purpose. We use data from an online survey conducted in 2006 in Davis, CA, which has a high bicycling level, and 5 comparison small cities in the western US to examine the contributions of physical and social environments to bicycling. Several aspects of bicycling are examined: bicycle ownership and regular bicycling, as well as bicycling for transportation compared to bicycling for recreation, bicycling distance and daily probability of transportation bicycling. The study employs Structural Equations Modeling to assess the complex relationships between bicycling and environment while controlling for socio-demographics, travel constraints, and attitudinal factors.

Subject Areas: physical and social environment; bicycling; Structural Equation Model

Availability: Xing, Yan. Contributions Of Individual, Physical, And Social Environmental Factors To Bicycling: A Structural Equations Modeling Study Of Six Small US Cities. 2012. University of California Davis http://pubs.its.ucdavis.edu/download_pdf.php?id=1732

pplying A Vehicle-Miles of Travel Calculation Methodology To A County-Wide of Bicycle and Pedestrian Miles of Travel *Jonathan Dowds and James Sullivan*

Publication Date: August 1, 2011

Abstract: Vehicle miles of travel are widely used in transportation planning, policy and research. In spite of the growing recognition of the importance of non-motorized travel, comparable estimates of bicycle and pedestrian miles of travel (BPMT) are rarely calculated largely due to the difficulty and expense of manually collecting bicycle and pedestrian (BP) counts. This paper uses a set of BP counts at 29 locations in Chittenden County Vermont, including three sites with more than a full year of counts, to explore the barriers to calculating reliable estimates of BPMT. Adjustment factors for converting single-day BP volumes into annual average daily BP volumes are calculated using the methodology in the Traffic Monitoring Guide (1) as well as a variation on this method that uses cluster analysis of weather patterns rather than calendar months to determine the seasonal adjustment periods. Finally, these adjustment factors are applied to four sets of BP network link classification systems resulting in eight estimates of BPMT and these estimates are compared to results from the 2009 National Household Travel Survey. The estimates based on adjustment factors ranged from 73.8 million to 295.8 million BPMT per year, far higher than the estimate of 31.5 million BPMT which is reached when only the NHTS data is used. The wide range of estimates produced demonstrates the need for more widespread BP data collection and further refinement and validation of BP link classification systems.

Subject Areas: VMT, non-motorized travel, pedestrian and bicycle counts

Availability: 2012 TRB Paper Submittal

Bicycle Ownership in the U.S: Empirical Analysis of Regional Differences *Michael Maness*

Publication Date: November 15, 2011

Abstract: Bicycle ownership is an important metric in non-motorized travel behavior. Bicycle ownership has been shown be correlated with recreational activity, propensity to travel by bicycle, and injury rates. Thus bicycle ownership may have farther reaching effects on public health, congestion, energy usage, recreation facility demand, and infrastructure investment. This paper proposes to analyze bicycle ownership on a national scale using the 2001 National Household Travel Survey. Three ordinal logit models were created which analyzed general trends in household bicycle ownership, regional effects at a micro household scale, and regional and city effects at a macro scale. This analysis showed that larger households owned more bicycles and that educated, higher income households were more likely to own bicycles. Minority households were less likely to own bicycles as well as households in rural areas. Women contributed to bicycle ownership but to a lesser degree than men. Children greatly contributed to bicycle ownership, especially between the ages of 10 and 15. Adult bicycle ownership peaked at middle age and declined rapidly beyond age 55. Divisional and city effects were also found to exist which suggest that local infrastructure investment as well as cycling culture may contribute to bicycle ownership. Further research into the behavioral causes of many of these effects is suggested.

Subject Areas: non-motorized travel, bicycle travel, travel behavior, bicycle ownership

Availability: 2012 TRB paper submittal

Examining Trip Generation and Pedestrian Behavior in Washington, DC *Jacquelyn Renée Schneider*

Publication Date: November 18, 2011

Abstract: Many factors influence travel in general – geography, socio-demographic and attitudes toward travel. In this paper, I explore the effects of demographic characteristics on travel behavior in Washington D.C. Using 2009 National Household Travel Survey (NHTS) data, I examine overall trip generation and investigate pedestrian behavior using race, income and age demographics. I also compare U.S. Census data and the NHTS sample coverage for the District and make inferences regarding overall transportation mode choice. Using single-factor analysis of variance, I examine the effect of demographics on trip generation, pedestrian distance and trip duration. Additional analysis is provided to form a deeper understanding of the statistical findings relating to race, income and age. This research determines that whites, those from high-income households and middle-aged respondents make more trips than nonwhites, lower income households and younger age groups. Contrary to planning literature, for pedestrian trips, the data supports that whites travel farther distances than non-whites. Similarly, the data suggests that non-whites and respondents from middle-income households take longer walking trips. Income and age did not affect pedestrian travel distances with statistical significance.

Subject Areas: travel behavior, trip generation, pedestrian behavior

Availability: 2012 TRB paper submittal

How Common Is Pedestrian Travel To, From, and Within Shopping Districts? *Robert J. Schneider and Swati Pande*

Publication Date: November 2011

Abstract: Growing interest in sustainable transportation systems and livable communities has created a need for more complete measures of pedestrian travel. Yet, many performance measures do not account for short pedestrian movements, such as walking between stores in a shopping district, walking from a street parking space to a building entrance, or walking from a bus stop to home. This study uses a 2009 intercept survey and the 2009 National Household Travel Survey to quantify pedestrian travel to, from, and within San Francisco Bay Area shopping districts. Overall, walking was the primary travel mode for 21% of intercept survey and 10% of NHTS tours with stops in these shopping districts. However, detailed analysis of pedestrian movements showed that walking was common on respondent tours (52% of intercept survey tours included some walking) and that walking was used on the majority of trips within these shopping districts (65% of intercept survey trips and 71% of NHTS trips within the shopping districts were made by walking). In general, Urban Core and Suburban Main Street shopping districts had higher levels of pedestrian activity than Suburban Thoroughfare and Suburban Shopping Center shopping districts. The detailed analysis in this paper provides a more complete picture of pedestrian activity than is commonly shown by national and regional household survey summaries.

Subject Areas: travel behavior, pedestrian, survey, mode share, measurement, shopping district

Availability: 2012 TRB paper submittal

More Than Just Exercise: Walking in Today's Cities *Andrew Mondschein*

Publication Date: August 1, 2011

Abstract: Transportation planners, policymakers, urban designers, and activists have expended considerable effort over the past few decades promoting walking as one of several alternatives to driving. More recently, the public health benefit of a physically active population, including a population that walks more often, has become another reason to encourage walking. Amongst all of this excitement about walking, there has so far been little exploration of the role walking plays in people's lives and cities' welfare. One little understood aspect of walking is its appeal beyond simple "derived demand" travel choice frameworks. Though we might intuitively know that people walk for more than just to get from A to B, there's been little to explain what people gain from walking beyond its potential health benefit. An investigation of pedestrian behavior using the 2009 National Household Travel Survey suggests that the reasons that people choose to walk vary considerably across place and class, and that walking in urban areas may best be explained by a dual conceptualization of walking as the mode of last resort and a highly-prized urban amenity. This seemingly self-contradictory dual role suggests that policies that want to encourage walking across a broad swath of the population will need to overcome barriers rooted in everyday lifestyles just as much as in the quality of the built environment.

Subject Areas: walking, travel choice

Availability: 2012 TRB paper submittal

Predicting Bicycle Mode Choice for Trips to/from/within Mixed Use Developments

Gail Meakins and Reid Ewing

Publication Date: N/A

Abstract: The purpose of this study is to present a methodology for predicting the bike mode share for mixed-use developments (MXDs). Datasets were generated using household travel surveys and GIS databases for 239 mixed-use developments in six large and diverse metropolitan regions. Hierarchical modeling was used to estimate the likelihood of bike trips to/from/within mixed-use developments in terms of the 7D variables (density, diversity, design, destination accessibility, distance to transit, development scale, and demographics). MXDs with dense concentrations of population and jobs, balanced land uses, and dense urban street networks generate a greater share of bicycle trips. Bicycling facility planning, traffic impact assessment, climate action planning, and health impact assessment are possible areas of application.

Subject Areas: mixed-use development, bicycling, mode choice, 7Ds

Availability: 2012 TRB paper submittal

To Bike or Not To Bike: Seasonal Factors For Bicycle Commuting *Justine Sears, Brian S. Flynn, Lisa Aultman-Hall, and Greg S. Dana*

Publication Date: N/A

Abstract: The objective of this research was to assess the impact of weather on commuting to work by bicycle among a panel of working adults in northern communities. Our participants commuted at least two miles each way and bike commuted more than twice annually. Transportation mode was recorded for four seven-day periods in 2009-2010 (each period in one of four seasons. Mode, personal characteristics, and commute length were linked to location- and time-specific weather conditions, and daylight hours on commuting days. Analyses focused on the effects of season, weather and other factors to develop binary models for commuting by bicycle. The likelihood of bike commuting increased 3% with every 1ºF increase in morning temperature and decreased by 5% with a 1mph increase in wind speed. Likelihood of biking to work was more than double on days with no morning precipitation. There was no discernible effect of hours of daylight, although study participants cited this as a barrier in the baseline survey. Distance to work negatively affected bike commuting likelihood and men were nearly twice as likely as women to bike commute on a given day. Separate models for men and women, suggested that men and women respond similarly to adverse weather conditions, although some effects were difficult to identify among women due to a smaller sample size. An appreciable portion of participants biked to work throughout the year in a variety of weather conditions suggesting that a northern climate may not necessarily preclude year-round bike commuting. Multi-modal commuting was prevalent among our sample: on 20% of the days participants reported biking to work, they reported getting home via another mode. Helping cyclists learn to deal safely with cold and dark conditions and facilitation of multi-modal bicycle commuting may promote wider use of bicycle commuting and serve to extend the northern bicycle commute season.

Subject Areas: bicycle travel, travel behavior, bicycle commuting

Availability: 2012 TRB paper submittal

Variability and Seasonality of Active Transportation in USA: Evidence From the 2001 NHTS *Yong Yang, Ana V Diez Roux, and C. Raymond Bingham*

Publication Date: September 14, 2011

Abstract: Background - Active transportation including walking and bicycling is an important source of physical activity. Promoting active transportation is a challenge for the fields of public health and transportation. Descriptive data on the predictors of active transportation, including seasonal patterns in active transportation in the US as a whole, is needed to inform interventions and policies.

Methods - This study analyzed monthly variation in active transportation for the US using National Household Travel Survey 2001 data. For each age group of children, adolescents, adults and elderly, logistic regression models were used to identify predictors of the odds of active transportation including gender, race/ethnicity, household income level, geographical region, urbanization level, and month.

Results - The probability of engaging in active transportation was generally higher for children and adolescents than for adults and the elderly. Active transportation was greater in the lower income groups (except in the elderly), was lower in the South than in other regions of the US, and was greater in areas with higher urbanization. The percentage of people using active transportation exhibited clear seasonal patterns: high during summer months and low during winter months. Children and adolescents were more sensitive to seasonality than other age groups. Women, non-Caucasians, persons with lower household income, who resided in the Midwest or Northeast, and who lived in more urbanized areas had greater seasonal variation.

Conclusions - These descriptive results suggest that interventions and policies that target the promotion of active transportation need to consider socio-demographic factors and seasonality.

Subject Areas: Active transportation; seasonality; NHTS

Availability: International Journal of Behavioral Nutrition and Physical Activity
http://www.ijbnpa.org/content/8/1/96/abstract

Active Travel in Germany and the U.S. Contributions of Daily Walking and Cycling to Physical Activity *Ralph Buehler, PhD, John Pucher, PhD, Dafna Merom, PhD, Adrian Bauman, PhD*

Publication Date: 2011

Abstract: Background - Travel surveys in Europe and the U.S. show large differences in the proportion of walking and cycling trips without considering implications for physical activity.

Purpose - This study estimates differences between Germany and the U.S. over time in population levels of daily walking and cycling at different health-enhancing thresholds across sociodemographic groups.

Methods - Uniquely comparable national travel surveys for the U.S. (NHTS 2001 and 2009) and Germany (MiD 2002 and 2008) were used to calculate the number, duration, and distance of active trips per capita. The population-weighted person and trip files for each survey were merged to calculate population levels of any walking/cycling, walking/cycling 30 minutes/day, and achieving 30 minutes in bouts of at least 10 minutes. Logistic regression models controlled for the influence of socioeconomic variables. Data were analyzed in 2010.

Results - Between 2001/2002 and 2008/2009, the proportion of "any walking" was stable in the U.S. (18.5%) but increased in Germany from 36.5% to 42.3%. The proportion of "any cycling" in the U.S. remained at 1.8% but increased in Germany from 12.1% to 14.1%. In 2008/2009, the proportion of "30 minutes of walking and cycling" in Germany was 21.2% and 7.8%, respectively, compared to 7.7% and 1.0% in the U.S. There is much less variation in active travel among socioeconomic groups in Germany than in the U.S. German women, children, and seniors walk and cycle much more than their counterparts in the U.S.

Conclusions - The high prevalence of active travel in Germany shows that daily walking and cycling can help a large proportion of the population to meet recommended physical activity levels.

Subject Areas: active travel, walking, cycling, Germany

Availability: American Journal of Preventive Medicine 2011; 41(3):241–250)

Walking and Cycling in the United States, 2001–2009:Evidence From the National Household Travel Surveys *John Pucher, Ralph Buehler, Dafna Merom, and Adrian Bauman*

Publication Date: September 2011

Abstract: Objectives. To assess changes in walking and cycling in the United States between 2001 and 2009.

Methods. The 2001 and 2009 National Household Travel Surveys were used to compute the frequency, duration, and distance of walking and cycling per capita. The population-weighted person and trip files were merged to calculate the prevalence of any walking and cycling and of walking and cycling at least 30 minutes per day.

Results. The average American made 17 more walk trips in 2009 than in 2001, covering 9 more miles per year, compared with only 2 more bike trips, and 5 more miles cycling. At the population level, the prevalence of "any walking" remained unchanged (about 18%), whereas walking at least 30 minutes per day increased from 7.2% to 8.0%. The prevalence of "any cycling" and cycling 30 minutes per day remained unchanged (1.7% and 0.9%, respectively). Active travel declined for women, children, and seniors, but increased among men, the middle aged, employed, well-educated, and persons without a car.

Conclusions. Walking increased slightly, whereas cycling levels stagnated, and the overall prevalence of active travel remained low. Improved infrastructure for walking and cycling must be combined with programs to encourage active travel among more groups, especially children, seniors, and women.

Subject Areas: walking, biking, cycling

Availability: American Journal of Public Health. Supplement 1, 2011, Vol 101, No. S1

Walking Distance by Trip Purpose and Population Subgroups *Yong Yang and Ana V. Diez-Roux*

Publication Date: July 2012

Abstract: Background - Walking distance is an important concept in the fields of transportation and public health. A distance of 0.25 miles is often used as an acceptable walking distance in U.S. research studies. Overall, research on the distance and duration of walking trips for different purposes and across different population groups remains limited.

Purpose - This study examines the prevalence of walking and distances and durations of walking trips for different purposes among U.S. residents.

Methods - The distances and durations of walking trips for different purposes across population groups were compared using nationally representative data from the 2009 National Household Travel Survey (NHTS). Distance decay functions were used to summarize the distribution of walking distances and durations for different purposes and population subgroups. Data were analyzed in 2011.

Results - Sixteen percent of respondents had at least one daily walking trip. The mean and median values for walking distance were 0.7 and 0.5 miles, respectively. For walking duration, the mean and median values were 14.9 and 10 minutes. About 65% of walking trips were more than 0.25 miles in distance, and about 18% of walking trips were more than 1 mile. Large variations were found among various purposes for both distance and duration. The distances and durations of walking for recreation were substantially longer than those for other purposes. People with lower versus higher household income walked longer distances for work but shorter distances for recreation.

Conclusion - Only a small fraction of respondents walk, but trips longer than 0.25 miles are common. There is substantial variability in the distance and duration of walking trips by purpose and population subgroups. These differences have implications for developing strategies to increase physical activity through walking.

Subject Areas: walking, trip purpose, walk trips

Availability: http://www.sciencedirect.com/science/article/pii/S0749379712002401

Vital Signs: Walking Among Adults – United States, 2005 and 2010 *David Berrigan, PhD, National Cancer Institute. Dianna D. Carroll, PhD, Janet E. Fulton, PhD, Deborah A. Galuska, PhD, David R. Brown, PhD, Joan M. Dorn, PhD, Div of Nutrition, Physical Activity, and Obesity, National Center for Chronic Disease Prevention and Health Promotion; Brian Armour, PhD, Div of Human Development and Disability, National Center on Birth Defects and Developmental Disabilities; Prabasaj Paul, PhD, EIS Officer, CDC*

Publication Date: August 10, 2012

Abstract: Background: Physical activity has numerous health benefits, including improving weight management. The *2008 Physical Activity Guidelines for Americans* recommend ≥150 minutes/week of moderate-intensity aerobic physical activity (e.g., brisk walking) for substantial health benefits. Walking is the most commonly reported physical activity by U.S. adults.

Methods: CDC used data from the 2005 and 2010 National Health Interview Surveys to assess changes in prevalence of walking (defined as walking for transportation or leisure in at least one bout of 10 minutes or more in the preceding 7 days) by sex, age group, race/ethnicity, education, body mass index category, walking assistance status, region, and physician-diagnosed chronic disease. CDC also assessed the association between walking and meeting the aerobic physical activity guideline.

Results: Overall, walking prevalence increased significantly from 55.7% in 2005 to 62.0% in 2010. Significantly higher walking prevalence was observed in most demographic and health characteristic categories examined. In 2010, the adjusted odds ratio of meeting the aerobic physical activity guideline among walkers, compared with non-walkers, was 2.95 (95% confidence interval = 2.73–3.19).

Conclusions and Implications for Public Health Practice: To sustain increases in the prevalence of walking, communities can implement evidence-based strategies such as creating or enhancing access to places for physical activity, or using design and land use policies and practices that emphasize mixed-use communities and pedestrian-friendly streets. The impact of these strategies on both walking and physical activity should be monitored systematically at the national, state, and local levels. Public health efforts to promote walking as a way to meet physical activity guidelines can help improve the health of U.S. residents.

Subject Areas: walking, physical activity, land use

Availability: Centers for Disease Control http://www.cdc.gov/mmwr/

Developing a Visualization-Based Sketch Planning Tool for Non-Motorized Travel Final Report for Phase I Study to Characterize the Market Potential for Non-Motorized Travel *Ho-Ling Hwang, Ph.D., Timothy Reuscher, Daniel Wilson, and Richard Schmoyer, Ph.D.*

Publication Date: July 2012

Abstract: The idea of livable communities suggests that people should have the option to utilize non-motorized travel (NMT), specifically walking and bicycling, to conduct their daily tasks. Forecasting personal travel by walk and bike is necessary as part of regional transportation planning, and requires fine detail not only about individual travel, but also on transportation and neighborhood infrastructure. In an attempt to characterize the "market" potential for NMT, the Office of Planning, Federal Highway Administration (FHWA) funded the Center for Transportation Analysis (CTA) of the Oak Ridge National Laboratory (ORNL) to conduct a study. The objectives of this effort were to identify factors that influence communities to walk and bike and to examine why, or why not, travelers walk and bike in their communities.

This study relied on information collected under the 2009 National Household Travel Survey (NHTS) as the major source of data, and was supplemented with data from the American Community Survey (ACS), educational survey, health, employment, and others. Initial statistical screening methods were applied to sort through over 400 potential predictor variables, and examined with various measures (e.g., walk trip per person, walk mileage per person, bike trip per person, bike mileage per person) as the dependent variables. The best geographic level of detail used in the modeling for this study was determined to be the Census block group level for walking and Census tract level for biking.

The need for additional supplemental private data (i.e., Walk Scores and Nielsen employment data), and geospatial information that reflects land use and physical environments, became evident after an examination of findings from the initial screening models. To be feasible, in terms of costs and time, the geographic scale of the study region was scaled down to nine selected NHTS add-on regions. These regions were chosen based on various criteria including transit availability, population size, and a mix of geographic locations across the nation. Given the similarities in modeling results from walk trips and walk mileages, additional modeling efforts conducted under the later part of this study were focused on walk trips per person.

Subject Areas: non-motorized travel, walking, biking

Availability: U.S. Department of Energy Information Bridge htto://www.osti.gov/bridge

Walking and Bicycling in the United States: The Who, What, Where, and Why *J. Richard Kuzmyak and Jennifer Dill*

Publication Date: June 2012

Abstract: N/A

Subject Areas: walking, biking

Availability: TR News 280 May-June 2012

Children's Cycling in Australia: A Review of Determinants, The Role of Social Connectedness and Implications for Policy and Practice *Kala Wati, Dr. Matthew Burke, Dr. Neil Sipe*

Publication Date: September 2012

Abstract: Children's physical health, their emotional health and social wellbeing is reliant on their ability to travel independently and collectively with other children. Children's bicycle riding, particularly riding to school, is increasingly recognized as important, yet in Australia very few children cycle to school. As part of a broader project on children's independent mobility, this research seeks to identify the determinants of child bicycle riding and to explore associations between cycling and social connectedness. The intent is to identify if and how social environment influence children's cycling behaviors and how, in turn, cycling may help shape children's social connections, within particular neighborhood types. Theoretical insights into the roles of lead users and opinion leaders, derived from Kratzer and Lettl (2009), are fused with early experiences in the CATCH (Children's Active Travel, Connectedness and Health) project, to explore dimensions of cycling take-up and usage amongst children. These help frame a research agenda around child cycling and social connectedness that focuses on the phase of child development (aged 7-11 years) when children first develop key social perspectives and are given 'licenses' by parents for independent mobility. The scope and parameters for this research agenda are explored in detail. The questions raised, if answered, have the potential to significantly improve bicycle promotion activities and other policies targeting children's travel behavior.

Subject Areas: cycling, youth, active travel

Availability: Australian Transport Research Forum
http://www.atrf.info/papers/2012/2012_Wati_Burke_Sipe.pdf

ENERGY CONSUMPTION

Simulation of an Extended Range Electric Vehicle Usage in a Real Environment *Lazúen Ramírez, Álvaro; Linero Jiménez, Adriano*

Publication Date: Spring 2012

Abstract: In this paper the performance of an extended range electric vehicle (EREV) already available on the market is analysed through a simulation using MATLAB. A real route has been modelled. The route, 140 km, is longer than the majority of the daily travelling distance of the population in order to show how this vehicle is capable to cover the requirements of the drivers. The importance of an adequate recharge net for electric cars has been showed through the simulation of two different scenarios; the current scenario and a hypothetical future scenario where recharge points were available in all public parking. In this second scenario, the Opel Ampera has been capable to work fully in electric mode, reducing the CO2 emissions 38%. An optimal management of the extender range of the car has been presented which reduce emissions 20%, reduce cost of the route 33%, and operating time of the range extender 30%, in the current scenario compared with the management made by the existed conduction modes of the car.

Subject Areas: Extended Range Electric Vehicle (EREV);

Availability: Lazúen Ramírez, Álvaro, and Adriano Linero Jiménez. SIMULATION OF AN EXTENDED RANGE ELECTRIC VEHICLE USAGE IN A REAL ENVIRONMENT. Diss. University of Skövde, 2012. http://his.diva-portal.org/smash/record.jsf?pid=diva2:545994

EV-Readiness in Orange County, California Assessing Electric Vehicle Opportunities in the Current Urban Infrastructures *Nicholas J. Miklinski*

Publication Date: Spring 2012

Abstract: The advancement of the Electric Vehicle (EV) industry in the United States has made leaps and bounds since its early modern day inception in the mid-1990s. Since then, the goal of reducing the dependency on foreign oil has spurred development from a variety of industries associated with alternative fuel vehicles. This report identifies the complexities associated with Orange County's physical composition of 34 cities and how currently implementing countywide standards for EV infrastructure is difficult (if not nearly impossible). At first glance, there seem to be many major players in the development of this technology in Orange County. However, with closer analysis, it is evident that Orange County's EV industry is led by Southern California Edison and the city of Irvine. This report uncovers the strengths and weaknesses associated with the current state of the local EV marketplace, its related technologies, and emerging trends. In working with CleanTech OC, this report identifies city permitting standards (or the lack thereof) and areas where opportunities lie. Establishing permitting standards for residential EVSE charging remains a challenge for some cities, but improvements have been made in many, with increased collaboration and transparency continuing to be a major focus among some local leaders. Three recommendations are made in this report. The third illustrates the importance and need for greater city-to-city collaboration (a Coordinating Council) which would better link the various municipalities and advocate for Federal, State, or Regional funding for future projects, and which would create a stronger network across Southern California. Without true precedence, Orange County is unique in that its strengths lie in its diversity, vast resources, and ability to adapt to new and emerging technologies.

Subject Areas: EV infrastructure standards;

Availability: Miklinski, Nicholas J. EV-Readiness in Orange County, California. Diss. University of California, 2012.
http://www.mikdesignstudios.com/Urban_Planning_files/Miklinski_PR%20FINAL_050412.pdf

Development of physical-based demand response-enabled residential load models

Shao, S.; Pipattanasomporn, M.; & Rahman, S.

Publication Date: October 2012

Abstract: In order to support the growing interest in demand response (DR) modeling and analysis, there is a need for physical-based residential load models. The objective of this paper is to present the development of such load models at the appliance level. These include conventional controllable loads, i.e., space cooling/space heating, water heater, clothes dryer and electric vehicle. Validation of the appliance-level load models is carried out by comparing the models' output with the real electricity consumption data for the associated appliances. The appliance-level load models are aggregated to generate load profiles for a distribution circuit, which are validated against the load profiles of an actual distribution circuit. The DR-sensitive load models can be used to study changes in electricity consumption both at the household and the distribution circuit levels, given a set of customer behaviors and/or signals from a utility.

Subject Areas: Appliance-level load model; demand response (DR) and distribution circuit; electric vehicle; physical-based

Availability: Shao, Shengnan, Manisa Pipattanasomporn, and Saifur Rahman. "Development of physical-based demand response-enabled residential load models." (2012): 1-1. http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6266721

Cost-minimized combinations of wind power, solar power and electrochemical storage, powering the grid up to 99.9% of the time *Cory Budischak, DeAnna Sewell, Heather Thomson, Leon Mach, Dana E. Veron, Willett Kempton*

Publication Date: October 2012

Abstract: We model many combinations of renewable electricity sources (inland wind, offshore wind, and photovoltaics) with electrochemical storage (batteries and fuel cells), incorporated into a large grid system (72 GW). The purpose is twofold: 1) although a single renewable generator at one site produces intermittent power, we seek combinations of diverse renewables at diverse sites, with storage, that are not intermittent and satisfy need a given fraction of hours. And 2) we seek minimal cost, calculating true cost of electricity without subsidies and with inclusion of external costs. Our model evaluated over 28 billion combinations of renewables and storage, each tested over 35,040 h (four years) of load and weather data. We find that the least cost solutions yield seemingly-excessive generation capacity—at times, almost three times the electricity needed to meet electrical load. This is because diverse renewable generation and the excess capacity together meet electric load with less storage, lowering total system cost. At 2030 technology costs and with excess electricity displacing natural gas, we find that the electric system can be powered 90%–99.9% of hours entirely on renewable electricity, at costs comparable to today's—but only if we optimize the mix of generation and storage technologies.

Subject Areas: Variable generation; Renewable energy; Electrochemical storage; High-penetration renewables

Availability: Budischak, Cory, et al. "Cost-minimized combinations of wind power, solar power and electrochemical storage, powering the grid up to 99.9% of the time." Journal of Power Sources (2012). http://www.sciencedirect.com/science/article/pii/S0378775312014759

Harnessing Demand Flexibility to Match Renewable Production Using Localized Policies *Mahdi Kefayati and Ross Baldick*

Publication Date: October 2012

Abstract: Intermittency of most renewable sources and lack of sufficient storage in the current power grid means that reliable integration of significantly more renewables will be a challenging task. Demand, on the other side, has been largely regarded as non-controllable in the current setting. However, there is strong evidence that a considerable portion of the current and future demand, such as plug-in electric vehicle (PEV) load, is flexible. That is, the instantaneous power delivered to it needs not to be bound to a specific trajectory. In this work we focus on harnessing demand flexibility as a key to enabling more renewable integration and particularly on localized policies, i.e. the ones that only use the load preferences and do not depend on the grid information. We start with a data driven analysis of the potential of PEV load. We then demonstrate that conventional charging policies suffer from high peak-to-average ratios of the aggregate demand and lack of correlation with wind generation. Finally we introduce a localized policy called the Average Rate (AR) policy and show that it reduces the undesired effects of PEV load and increases its correlation with wind generation in average sense. Our work demonstrates the potential of flexible loads in harnessing renewables by affecting the load patterns and mitigating the intermittency of renewables with merely local information. Moreover, our proposed charging policy can be implemented easily in the current PEVs.

Subject Areas: renewable energy; PEV; Average Rate

Availability: Kefayati, Mahdi, and Ross Baldick. "Harnessing demand flexibility to match renewable production using localized policies." Communication, Control, and Computing (Allerton), 2012 50th Annual Allerton Conference on. IEEE, 2012.
https://webspace.utexas.edu/mk9928/www/pub/Allerton2012.pdf

Hybrid Controls Development and Optimization of a Fuel Cell Hybrid Powertrain

Kandler Smith, Matthew Earleywine, Eric Wood and Ahmad Pesaran

Publication Date: October 2012

Abstract: The University of Waterloo Alternative Fuels Team's participation in EcoCAR: The Next Challenge provided an unparalleled opportunity to execute advanced vehicle technology research with hands on learning and industry leading mentoring from practicing engineers in the automotive industry. This thesis investigates the optimization of the hybrid operating strategy on board the EcoCAR development vehicle. This investigation provides the framework to investigate the pros and cons of different hybrid control strategies, develop the model based design process for controls development in a student team environment and take the learning of this research and apply them to a mule development vehicle. A primary controls development model was created to simulate software controls before releasing to the vehicle level and served as a tool to evaluate and compare control strategies. The optimization routine was not directly compatible with this model and so a compromise was made to develop a simplified vehicle model in the MATLAB environment that would be useful for observing trends but realizing that the accuracy of the results may not be totally consistent with the real world vehicle. These optimization results were then used to create a new control strategy that was simulated in the original vehicle development model. This new control strategy exhibited a 15% gain in fuel economy over the best case from the literature during an Urban Dynamometer Driving Schedule (UDDS) drive cycle. Recommendations for future work include adding charge depletion operation to the simulation test cases and improving the accuracy of the optimization model by removing the simplifications that contributed to faster simulation time. This research has also illustrated the wide variability of drive cycles from the mildly aggressive UDDS cycle having 5 kilowatts average propulsion power to the very aggressive US06 cycle having 19 kilowatts average propulsion power and their impact on the efficiency of a particular control strategy. Understanding how to adapt or tune software for particular drive cycle or driver behaviour may lead to an interesting area of research

Subject Areas: Hydrogen, Fuel Economy, Fuel Consumption, PHEV, HEV, EV, Batteries, Lithium Ion, Fuel Cells, Powertrain, Controls, Software, Vehicle, Optimization, Modeling, Simulations, Electric Motors, DCDC Converters, Mechanical Engineering

Availability: Koch, Alexander Karl. "Hybrid Controls Development and Optimization of a Fuel Cell Hybrid Powertrain." (2012). http://www.uwspace.uwaterloo.ca/handle/10012/7115

Battery wear from disparate duty-cycles: Opportunities for electric-drive vehicle battery health management *Kandler Smith, Matthew Earleywine, Eric Wood and Ahmad Pesaran*

Publication Date: November 2012

Abstract: Electric-drive vehicles utilizing lithium-ion batteries experience wholly different degradation patterns from conventional vehicles, depending on geographic ambient conditions and consumer driving and charging patterns. A semi-empirical life-predictive model for the lithium-ion graphite/nickel-cobalt-aluminum chemistry is presented, accounting for physically justified calendar and cycling fade mechanisms. An analysis of battery life for plug-in hybrid electric vehicles considers 782 duty-cycles from travel survey data, superimposed with climate data from multiple geographic locations around the United States. Based on predicted wear distributions, opportunities for extending battery life including modification of battery operating limits, thermal and charge control are discussed.

Subject Areas: Electric Vehicle; batteries

Availability: Smith, Kandler, et al. "Battery Wear from Disparate Duty-Cycles: Opportunities for Electric-Drive Vehicle Battery Health Management." American Control Conference 2012. No. NREL/CP-5400-54698. 2012. http://www.nrel.gov/docs/fy13osti/54698.pdf

Unit commitment problem of power system with plug-in electric vehicles *Gaowang Li, Bin Qian, Dongyuan Shi, Xianzhong Duan*

Publication Date: September 2012

Abstract: The electric vehicle (EV) has become a popular topic because of the increasing scarcity of energy sources and growing environmental pollution. Unit commitment (UC) with plug-in hybrid electric vehicle (PHEV) for cost optimization is presented in this paper. The profile of charging load and vehicle-to-grid (V2G) power of PHEV is forecasted, and various scenarios with different PHEV control strategy are simulated. Quantum inspired binary particle swarm optimization algorithm with heuristic strategy has been employed to solve the UC problem. Results show that PHEVs will significantly affect the UC problem. PHEVs bring on new load demand to power system, which will increase the generation cost. However, the coordinated charging strategy and reasonable usage of V2G power can reduce the generating cost.

Subject Areas: electric vehicle; unit commitment; PHEV

Availability: Li, Gaowang, et al. "Unit commitment problem of power system with plug-in electric vehicles." Constraints 6.24 (2012): 24. http://pe.org.pl/articles/2012/11a/67.pdf

Study on the proportional allocation of electric vehicles with conventional and fast charge methods when in distribution network *Xu Guojun, Liu Yongsheng, Hu Xiaoqin*

Publication Date: September 2012

Abstract: This paper studies the hierarchical classification of electric vehicles (EV) by analyzing the differences of charging behaviors of different types of EVs. According to the different proportions of conventionally-charged EVs and fast-charged EVs, four indexes (the increment of peak load, the duration of peak load, the maximum smoothing index of load curve and the average smoothing index) are proposed to evaluate the impact on the distribution network. Then a method is established to configure the proportion of EV in different charging methods. Finally, based on the field data of a distribution network and the IEEE-34 node example, the optimal proportion of EV in different charging methods are made combined with the Monte Carlo simulation of charging load. Results show that suitable ratio of EV with different charging methods can make the load curve smoother and the grid's difference between peak and valley loads decrease significantly.

Subject Areas: electric vehicle, distribution network, charging power, proportional allocation, Monte Carlo simulation

Availability: Guojun, Xu, et al. "Study on the proportional allocation of electric vehicles with conventional and fast charge methods when in distribution network." http://www.csee-conference.org/cd_exp/pdf/CP0398_FF.pdf

Impacts of Charging Choices for Plug-In Hybrid Electric Vehicles in 2030 Scenario

Amgad Elgowainy, Yan Zhou, Anant D. Vyas, Matthew Mahalik, Danilo Santini, Michael Wang

Publication Date: November 2012

Abstract: This study systematically examined the potential impacts of recharging scenarios for multiple plug-in hybrid electric vehicles (PHEVs) in the western United States—in particular, the service area of the Western Electricity Coordinating Council (WECC)—in 2030. The goal of the study was twofold: to examine the impact of scenarios for market penetration and charging of PHEVs on the electric utilities and transmission grid and to estimate the potential reductions in petroleum use and greenhouse gas (GHG) emissions attributable to PHEV miles traveled on primarily grid electricity. Three charging scenarios for PHEVS were examined: (a) begin recharging upon arrival at home at the end of the last daily trip, (b) complete recharging of batteries just before the start of the first daily trip, and (c) any additional charging opportunity during the daytime. The three charging scenarios produced distinct hourly electric load profiles, with the opportunity-charging scenario resulting in a significant increase in load during the daytime. However, when the utility dispatch simulations were run for these charging scenarios in the WECC area, they all exhibited similar marginal-generation mixes (dominated by the natural gas combined-cycle technology) to satisfy the PHEV load, and GHG emissions were within 2% of each other. A well-to-wheel analysis revealed that the marginal-generation mixes produced 40% to 45% lower GHG emissions by PHEVs than did conventional gasoline internal combustion engine vehicles.

Subject Areas: PHEV, GHG

Availability: Elgowainy, Amgad, et al. "Impacts of Charging Choices for Plug-In Hybrid Electric Vehicles in 2030 Scenario." Transportation Research Record: Journal of the Transportation Research Board 2287.1 (2012): 9-17. http://trb.metapress.com/index/R8T4270U4444043N.pdf

Travel Demand and Charging Capacity for Electric Vehicles in Rural States *Lisa Aultman-Hall, Justine Sears, Jonathan Dowds, Paul Hines*

Publication Date: November 2012

Abstract: As the number of electric vehicles (EVs) increases, planners must consider not only how this fuel switch may affect the electrical power infrastructure but also mobility. The suitability and charging requirements of these vehicles may differ in rural areas, where the electrical grid may be less robust and the number of miles driven higher. Although other studies have examined issues of regional power requirements of EVs, none has done so in conjunction with the spatial considerations of travel demand. For the forecast of both the future spatial distribution of EVs and the ability of these vehicles to meet current daily travel demand, this work used three data sets: the National Household Travel Survey, geocoded Vermont vehicle fleet data, and a geocoded data set of every building in the state. The authors considered spatial patterns in daily travel and home-based tours to identify optimal EV-charging locations and any area types that are unsuited for widespread electric vehicle adoption. Hybrid vehicles were found to be more likely to be adjacent to other hybrids than were conventional vehicles. This apparent clustering of current hybrid vehicles, in both urban and rural areas, suggests that the distribution of future EVs may also cluster. The analysis estimated that between 69% and 84% of the state's vehicles could be replaced by EVs with a 40-mi range, but that estimate was dependent on the availability of workplace charging. Problematic areas for EV adoption may be suburban areas, where both residential density (and potential clustering of hybrids) and miles driven are high. The results suggest that EVs are viable for rural mobility demand but require special consideration for power supply and vehicle-charging infrastructure.

Subject Areas: EV, Rural, vehicle charging infrastruction

Availability: Aultman-Hall, Lisa, et al. "Travel Demand and Charging Capacity for Electric Vehicles in Rural States." Transportation Research Record: Journal of the Transportation Research Board 2287.1 (2012): 27-36. http://trb.metapress.com/index/T123R6N0H3727858.pdf

Charging rate optimization for plug-in hybrid electric vehicles in smart grid *Darabi, Zahra, and Mehdi Ferdowsi*

Publication Date: September 2012

Abstract: This paper defines an optimization problem which intends to find a time-variant optimal charging rate for plug-in hybrid electric vehicles (PHEVs). The main objective is to maximize the energy delivered to the PHEV fleet while considering the power grid and drivers' constraints. The decision variable is the charging rate at each 30 minutes while the constraints are the maximum generation capacity of the power grid, the maximum delay tolerance of the customers, and the charging rate boundaries. In order to solve the optimization problem, a simulation framework modeling the interactions between the power grid and drivers is designed. Finally, the optimization problem is applied to a region of the North American Electric Reliability Corporation (NERC) and the results are discussed.

Subject Areas: PHEV; smart power grid; optimization

Availability: Darabi, Zahra, and Mehdi Ferdowsi. "Charging rate optimization for plug-in hybrid electric vehicles in smart grid." Energy Conversion Congress and Exposition (ECCE), 2012 IEEE. IEEE, 2012. http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6342357

Smart Grid to Balance Renewable Energies- Contributing Distributed Energy Resources *David Beauvais & Alexandre Prieur*

Publication Date: March 2012

Abstract: The electricity markets are making a number of adjustments in order to integrate renewable energies. Indeed, variable production creates certain integration problems, which require increased levels of operating reserves. Furthermore, it is critical that these reserves have dynamic characteristics, which can support and counter generation variability. While major power grids have countered capacity problems with increased production, there are other emerging approaches to grid management. Use of load management, distributed generation or storage provides support for networks coping with energy surplus but capacity deficits.

The current study investigated various resources, focused on networks or customers, which would be capable of offsetting fluctuations in renewable energies or supply reserve on the markets. Air conditioning, water and air heating are applications that lend well to management, due to the thermal inertia inherent to these loads. The development of the smart grid, and adding communication in particular, encourages development of this potential. With the progressive addition of demand-side management technologies, smart household appliances, distributed generation and energy storage, the distribution grids will be the hub for future energy exchange. A major trend related to smart grid development supports deployment of distributed energy resources to reduce grid stress and potentially promote the use of micro grids in cities. Furthermore, the smart grid is an integral part of more intelligent systems aiming, among other things, to improve urban environments (smart city) and road transport (smart transportation).

Developing business models favourable to deployment of distributed energy resources would require significant changes in the power industry structure and regulation. A change of paradigms towards more decentralized solutions is attractive in many respects. However, there is an important political aspect that requires support from a number of stakeholders, industry players, traditional industry, governmental and non-governmental agencies and consumers.

Subject Areas: smart grid; ITS

Availability: Beauvais, D., A. Prieur, and F. Bouffard. "Smart Grid for balancing renewable energies–Contributing Distributed Energy Resources." (2012). http://canmetenergy.nrcan.gc.ca/sites/canmetenergy.nrcan.gc.ca/files/files/pubs/2012-177-eng.pdf

Technical and Economical Feasibility of the Hybrid Adsoption Compression Heat Pump Concept for Industrial Applications *M. van der Pal, a. Wemmers, S. Smeding, R. de Boer*

Publication Date: December 2012

Abstract: A massive focus has recently been made on demand response (DR) programs, aimed to the electricity price reduction, reliability improvement, and energy efficiency. Basically, DR programs are divided into twofold main categories, namely incentive-based programs and price- or time-based programs. The focus of this paper is on priced-based DR programs including consumer responses to the time differentiated pricing. Home load management (HLM) program is designed to control responsive appliances and charging/discharging cycles of plug-in hybrid electric vehicles (PHEVs) by the consumer. Uncertain parameters associated with PHEV, i.e. its departure/travelling time and energy consumption as well as the grid unavailability in serving the loads are incorporated in the proposed probabilistic HLM model. Numerical simulations are conducted to illustrate the investigated notions and to verify the advantages of the developed model.

Subject Areas: Hybrid; Heat pump

Availability: van der Pal, Michel, et al. "Technical and economical feasibility of the hybrid adsorption compression heat pump concept for industrial applications." Applied Thermal Engineering (2013). http://www.sciencedirect.com/science/article/pii/S1359431113003190

Impacts of plug-in hybrid electric vehicle uncertainty and grid unavailability on home load management *Rastegar, M; Safdarian, A. ; Fotuhi-Firuzabad, M. ; Aminifar, F.*

Publication Date: June 2012

Abstract: A massive focus has recently been made on demand response (DR) programs, aimed to the electricity price reduction, reliability improvement, and energy efficiency. Basically, DR programs are divided into twofold main categories, namely incentive-based programs and price- or time-based programs. The focus of this paper is on priced-based DR programs including consumer responses to the time differentiated pricing. Home load management (HLM) program is designed to control responsive appliances and charging/discharging cycles of plug-in hybrid electric vehicles (PHEVs) by the consumer. Uncertain parameters associated with PHEV, i.e. its departure/travelling time and energy consumption as well as the grid unavailability in serving the loads are incorporated in the proposed probabilistic HLM model. Numerical simulations are conducted to illustrate the investigated notions and to verify the advantages of the developed model.

Subject Areas: Demand response (DR); Home load management (HLM); Plug-in hybrid electric vehicle (PHEV); Uncertainty

Availability: Rastegar, Mohammad, et al. "Impacts of plug-in hybrid electric vehicle uncertainty and grid unavailability on home load management." Environment and Electrical Engineering (EEEIC), 2012 11th International Conference on. IEEE, 2012.

Sensitivity of plug-in hybrid electric vehicle economics to drive patterns, electric range, energy management, and charge strategies *Jeremy Neubauer, Aaron Brooker, and Eric Wood*

Publication Date: August 2012

Abstract: Plug-in hybrid electric vehicles (PHEVs) offer the potential to reduce oil imports, greenhouse gases, and fuel costs, but high upfront costs discourage many potential purchasers. Making an economic comparison with conventional alternatives is complicated in part by sensitivity to drive patterns, vehicle range, available energy management, and charge strategies that affect battery wear and gasoline consumption. Identifying justifiable battery replacement schedules adds further complexity to the issue. The National Renewable Energy Laboratory developed the Battery Ownership Model to address these and related questions. The Battery Ownership Model is applied here to examine the sensitivity of PHEV economics to drive patterns, vehicle range, available energy management, and charge strategies when a high-fidelity battery degradation model and financially justified battery replacement schedules are employed. We find that energy management methodology, all-electric range, maximum beginning-of-life state of charge, and basic charge timing generally have a small impact on the total cost of ownership of PHEVs; however, PHEV economics do prove sensitive to drive patterns and the availability of an at-work charger.

Subject Areas: PHEV; battery ownership model; energy management

Availability: Neubauer, Jeremy, Aaron Brooker, and Eric Wood. "Sensitivity of plug-in hybrid electric vehicle economics to drive patterns, electric range, energy management, and charge strategies." Journal of Power Sources (2012).

The Development of a Decision Tool for Greenhouse Gas Emissions Reduction Strategies: The Role of NHTS Data in GreenSTEP Model Development *Kelly J. Clifton and Brian J. Gregor*

Publication Date: July 2011

Abstract: The National Household Travel Survey provides important information for the development of local and regional modeling to support decision making related to climate change and sustainability goals. This paper documents the use of NHTS data in the development of The Greenhouse gas Statewide Transportation Emissions Planning model (GreenSTEP), a model that forecasts estimates of greenhouse gas (GHG) emissions at the county and urbanized area levels. The model was developed in response to an initial request from Oregon's Global Warming Commission and subsequent climate change legislation (OR Senate Bill 1059) mandating the development of a statewide transportation strategy for reducing transportation sector GHG emissions. The model was developed to be sensitive to a broad number of policy variables and other factors that were not addressed in existing models. Moreover, GreenSTEP needed to provide household-level responses to these policy levers while at the same time, providing forecast output for a large number of scenario options within reasonable computer run time. Lacking a local and current source of information about individuals, households, and their vehicle ownership patterns and travel behavior, GreenSTEP made use of the information in the national sample of the 2001 NHTS to estimate several model modules. Specifically, the NHTS data were useful in developing modules of: a) land use characteristics, b) vehicle ownership, c) vehicle use (Daily Vehicle Miles Traveled – DVMT), d) impacts of vehicle travel costs on DVMT, e) lightweight vehicle model (bicycles, mopeds, electric bikes, etc.), and f) vehicle fleet models (type and age). The NHTS data were particularly important for modeling the adoption and usage of (limited-range) electric vehicles, as they enabled estimates of trip length distributions. These modules work in a larger modeling framework to produce fuel consumption and GHG emissions for passenger vehicles, including household vehicles, bus, train and trucks. The paper will highlight the utility of the NHTS data for this modeling framework, the modifications and augmentation necessary, the limitations, and the potential for wider dissemination and use of this tool, given that the initial estimation was done with a national sample. Opportunities for the NHTS to address greenhouse gas emissions in future surveys will also be discussed.

Subject Areas: National Household Travel Survey, greenhouse gas emissions, emissions models

Availability: TRB 2012 paper submittal

Time-Dependent Plug-in Hybrid Electric Vehicle Charging Based on National Driving Patterns and Demographics *Jarod C. Kelly, Jason S. MacDonald, Gregory A. Keoleian*

Publication Date: March 3, 2012

Abstract: Plug-in hybrid electric vehicles (PHEVs) are one promising technology for addressing concerns around petroleum consumption, energy security and greenhouse gas emissions. However, there is much uncertainty in the impact that PHEVs can have on energy consumption and related emissions, as they are dependent on vehicle technology, driving patterns, and charging behavior. A methodology is used to simulate PHEV charging and gasoline consumption based on driving pattern data in USDOT's National Household Travel Survey. The method uses information from each trip taken by approximately 170,000 vehicles to track their battery state of charge throughout the day, and to determine the timing and quantity of electricity and gasoline consumption for a fleet of PHEVs. Scenarios were developed to examine the effects of charging location, charging rate, time of charging and battery size. Additionally, demographic information was examined to see how driver and household characteristics influence consumption patterns. Results showed that a compact vehicle with a 10.4 kW h useable battery (approximately a 42 mile [68 km] all electric range) travels between 62.5% and 75.7% on battery electricity, depending on charging scenario. The percent of travel driven electrically (Utility Factor, UF) in a baseline charging scenario increased from 64.3% using 2001 NHTS data to 66.7% using 2009 data. The average UF was 63.5% for males and 72.9% for females and in both cases they are highly sensitive to age. Vehicle charging load profiles across charging scenarios and demographics show a varying effect on summertime peak load, which can be useful for PHEV market segmentation and electric utility planning.

Subject Areas: hybrid electric vehicles, emissions, energy consumption, driving patterns, demographics

Availability: http://www.sciencedirect.com/science/article/pii/S0306261912000931

The Impact of Center City Economic and Cultural Vibrancy on Greenhouse Gas Emissions From Transportation *Matthew J. Holian and Matthew E. Kahn*

Publication Date: February 12, 2012

Abstract: Urban planners and scholars have focused a great deal of attention on understanding the relationship between the built-environment and transportation behavior. However other aspects of the urban environment, including the vibrancy and quality of life of urban areas, have received little attention. This report seeks to close this gap, by analyzing the effect of both land use and urban vibrancy on transportation patterns. Analysis of data from a variety of sources suggests that in addition to the built-environment, the vibrancy of the urban environment also affects transportation behavior. Moreover, vibrancy affects land-use patterns. By integrating objective measures of center city quality of life into transportation choice models, our new statistical results inform public policy. We discuss specific public policy options for reducing greenhouse gas emissions and increasing public transit use.

Subject Areas: Urban transportation (Afn), Exhaust gases (Jfgsge), Land use planning (Epdum) , Public transit (Aet).

Availability: http://www.sjsu.edu/faculty/matthew.holian/vibrancy.pdf

Prediction Performance of Carbon Dioxide (CO2) Emissions Models Incorporating Land Use, Trip, Socioeconomic, and Demographic Characteristics *Judith L. Mwakalonge, Judy A. Perkins, and Saidi Siuhi*

Publication Date: November 2011

Abstract: This study investigated the relationship between CO2 emissions with land use, trip characteristics, socioeconomic, and demographic characteristics for two time-periods (2001 and 2009). A carbon dioxide (CO2) emissions model was formulated and estimated using disaggregate travel data incorporating land use, socioeconomic, and demographic characteristics for both total and five common trip purposes. Further, the study investigated the predictive performance of all models in their estimation data and a different dataset for 2001 models. The study results show that the increase in urbanization reduces CO2 emissions and the increase in population density decreases CO2 emissions. Specifically, on average, urban trips produced relatively less amount of CO2 compared to rural trips. Of all the vehicle types, sport utility and recreational vehicles were found to have higher impact on CO2 emissions than other vehicles. In addition, automobile/car/station wagon were found to have the lowest effect on CO2 emissions compared to other vehicle types. Despite of the increase in vehicle fuel efficiency and use of alternative fuels, the 2001 models were able to explain CO2 emissions in the 2009 dataset satisfactorily.

Subject Areas: carbon dioxide emissions, land use, population density, National Household Travel Survey

Availability: 2012 TRB paper submittal

Do Mobility-Based Performance Measures Reflect Emissions Trends? *Alexander Y. Bigazzi and Miguel A. Figliozzi*

Publication Date: January 2012

Abstract: Given the commonly assumed association between traffic congestion and emissions, this paper addresses the question of whether mobility-based performance measures are associated with emissions performance measures. We address two facets of the roadway congestion-emissions relationship by investigating: (a) whether congestion performance measures are good indicators of trends in roadway emissions and (b) what transportation performance measures are better suited to portray macroscopic trends in emissions. In order to answer these research questions we estimate macroscopic transportation and emissions performance measures at metropolitan and corridor levels. Comparing several measures, we calculate the correlation between transportation performance measures and emissions. We also present an analytical framework to understand emissions trends as a function of mobility and travel demand variables. Results show that Vehicle Miles Traveled (VMT) and Vehicle Hours Traveled (VHT) are key factors to understanding emissions trends. Mobility measures (such as travel speed and delay) and related congestion measures (such as percent of travel in congestion) are only weakly correlated with emissions.

Subject Areas: performance measures, congestion, emissions, travel demand, National Household Travel Survey

Availability: 2012 TRB paper submittal

Optimal Design and Allocation of Electrified Vehicles and Dedicated Charging Infrastructure for Minimum Greenhouse Gas Emissions and cost *Elizabeth Traut, Chris Hendrickson, Erica Klampfl, Yimin Liu, and Jeremy J. Michalek*

Publication Date: January 25, 2011

Abstract: Electrified vehicles, including plug-in hybrid electric vehicles (PHEVs) and battery electric vehicles (BEVs), have the potential to reduce greenhouse gas (GHG) emissions from personal transportation by shifting energy demand from gasoline to electricity. GHG reduction potential depends on vehicle design, adoption, driving and charging patterns, charging infrastructure, and electricity generation mix. We construct an optimization model to study these factors by determining optimal design of conventional vehicles (CVs), hybrid electric vehicles (HEVs), PHEVs, and BEVs and optimal allocation of vehicle designs and charging infrastructure in the fleet for minimum lifecycle GHG emissions over a range of scenarios. We focus on vehicles with similar size and acceleration to a Toyota Prius under urban EPA driving conditions. We find that under today's U.S. average grid mix, the vehicle fleet allocated for minimum GHG emissions includes HEVs and PHEVs with ~30 miles (48 km) of electric range. Allocating only CVs, HEVs, PHEVs, or BEVs will produce 86%, 1%, 0%, or 13+% more life cycle GHG emissions, respectively. Unlike BEVs, PHEVs do consume some gasoline; however, PHEVs can power a large portion of vehicle miles on electrical energy while accommodating infrequent long trips without need for a large battery pack, with its corresponding production and weight implications. Availability of workplace charging for 90% of vehicles optimistically reduces optimized GHG emissions by 0.5%. Under decarbonized grid scenarios, larger battery packs are more competitive and reduce life cycle GHG emissions significantly. Future work will relax modeling assumptions and address life cycle cost and cost-effectiveness of GHG reductions.

Subject Areas: environment, energy consumption, electrified vehicles, electric vehicles, plug-in hybrid vehicles, hybrid vehicles, United States, 2001 National Household Travel Survey, greenhouse gas emissions, vehicle charging infrastructure

Availability: TRB-11-3484 in the Transportation Research Board 90th Annual Meeting Compendium of Papers DVD or Transportation Research Board 90th Annual Meeting Online: http://amonline.trb.org/

Estimating and Modeling Soak Time Distributions with the 2009 National Household Travel Survey Data *Lei Zhang, Xiaojie Cong, Xiang He, and Chenfeng Xiong*

Publication Date: July 5, 2011

Abstract: Vehicle soak time is defined as the duration of time a vehicle's engine is at rest prior to being started. The distribution of soak time is a key input for mobile-source emission models, such as the EPA MOVES. This paper estimates various soak time distributions, and develops statistical models of those distributions. The data source is the National Household Travel Surveys (NHTS) in 2009, which contains information about person and vehicle trips in a 24-hour period for all sampled households. When the weights are introduced, the total vehicle trips for the national level are 467,505,568. We first develop a comprehensive methodology for extracting vehicle soak time distribution information from NHTS data files including the day trip file, person file, vehicle file and household file. The obtained soak time information is then employed in the development of a series of statistical models that can directly provide inputs to mobile-source emission models. Vehicle emission rates are heavily influenced by soak time distributions due to their impact on vehicle start emissions and evaporative emissions. Since the distribution and duration of soak periods preceding the first vehicle start of day is quite different from those of soak periods preceding non-first starts, we analyze these two types of soak period with separate models. Results show that time of day, day of week, trip purpose, vehicle type, gas price, metropolitan statistical area size and several interaction variables have significant impacts on soak time durations.

A model analyzing the start mode fraction is built with logistic regression methods. The model rho-squared is 0.88 based on more than 0.41 million observations. Again, time of day, trip purpose, day of week and their interactions are found to be the main factors explaining the differences between soak periods prior to first start and those of non-first starts. Following the start mode fraction model, a statistical model on non-first start soak time durations is also established. After fitting the data with several parametric distributions, the generalized Gamma model is chosen for its superior goodness of fit. This model enables emission modelers and analysts to predict soak time distributions based on several demographic, socioeconomic and travel behavior characteristics. The impact of fuel price on soak time is also considered in the model.

Subject Areas: soak time, vehicle emissions, National Household Travel Survey

Availability: 2012 TRB paper submittal

Assessing Energy Impact of Plug-In Hybrid Electric Vehicles: Significance of Daily Distance Variation over Time and Among Drivers *Zhenhong Lin and David L. Greene*

Publication Date: February 6, 2012

Abstract: Accurate assessment of the impact of plug-in hybrid electric vehicles (PHEVs) on petroleum and electricity consumption is a necessary step toward effective policies. Variations in daily vehicle miles traveled (VMT) over time and among drivers affect PHEV energy impact, but the significance is not well understood. This paper uses a graphical illustration, a mathematical derivation, and an empirical study to examine the cause and significance of such an effect. The first two methods reveal that ignoring daily variation in VMT always causes underestimation of petroleum consumption and overestimation of electricity consumption by PHEVs; both biases increase as the assumed PHEV charge-depleting (CD) range moves closer to the average daily VMT. The empirical analysis based on national travel survey data shows that the assumption of uniform daily VMT over time and among drivers causes nearly 68% underestimation of expected petroleum use and nearly 48% overestimation of expected electricity use by PHEVs with a 40-mi CD range (PHEV40s). Also for PHEV40s, consideration of daily variation in VMT over time but not among drivers—similar to the way the utility factor curve is derived in SAE Standard SAE J2841—causes underestimation of expected petroleum use by more than 24% and overestimation of expected electricity use by about 17%. Underestimation of petroleum use and overestimation of electricity use increase with larger-battery PHEVs.

Subject Areas: plug-in hybrid electric vehicles, PHEVs, VMT, electricity consumption, petroleum consumption

Availability: Transportation Research Record: Journal of the Transportation Research Board, No. 2252, Transportation Research Board of the National Academies, Washington, D.C., 2011, pp. 99–106. DOI: 10.3141/2252-13 http://trb.metapress.com/content/0215331762j34028/

The Vermont Transportation Energy Report *Justine Sears and Karen Glitman*

Publication Date: August 2011

Abstract: N/A

Subject Areas: transportation energy, policy, Vermont, travel behavior, vehicle expenditures

Availability: University of Vermont Transportation Research Center, UVM TRC Report #11-007
http://www.uvm.edu/~transctr/research/trc_reports/UVM-TRC-11-007.pdf

The Impact of Residential Density on Vehicle Usage and Fuel Consumption: Evidence from National Samples *Jinwon Kim and David Brownstone*

Publication Date: April 23, 2012

Abstract: This paper investigates the impact of residential density on household vehicle usage and fuel consumption. We estimate a simultaneous equations system to account for the potential residential self-selection problem. While most previous studies focus on a specific region, this paper uses national samples from the 2001 National Household Travel Survey. The estimation results indicate that residential density has a statistically significant but economically modest influence on vehicle usage, which is similar to that in previous studies. However, the joint effect of the contextual density measure (density in the context of its surrounding area) and residential density on vehicle usage is quantitatively larger than the sole effect of residential density. Moving a household from a suburban to an urban area reduces household annual mileage by 18%. We also find that a lower neighborhood residential density induces consumer choices toward less fuel-efficient vehicles, which confirms the finding in Brownstone and Golob (2009).

Subject Areas: Household vehicle choice, simultaneous equations systems, residential density

Availability: University of California, Irvine
http://sites.uci.edu/jinwonkim/files/2012/05/paper_0423.pdf

Electric Vehicle model for Estimating Distribution Transformer Load for Normal and Cold-Load Pickup Conditions *C. Desbiens*

Publication Date: April 3, 2012

Abstract: This paper presents a method to estimate the normal load and the cold-load pickup caused by the recharging of electric vehicle (EV) on the distribution transformers. The Monte Carlo simulation method is used to make the estimate in both conditions. The model can calculate the charging load profile with different numbers of customers and different ratios of battery capacity, chargers and car penetration. The model establishes a forecast of the power on transformer and helps for designing strategy that enables electric utilities to avoid new investments on distribution grid, especially during the restoration after a power failure.

Subject Areas: electric vehicles

Availability: Innovative Smart Grid Technologies (ISGT), 2012 IEEE PES

Potential For Electric Vehicles to Provide Power System Reserve *E. Keane and D. Flynn*

Publication Date: April 3, 2012

Abstract: Electric vehicles (EVs) are a promising source of power system services. This paper looks at the ability of EVs to provide power system reserve by studying the potential driving and charging profiles of EVs. The Irish power system is considered as a case study. The results show that the potential for EVs to provide contingency reserve is strongly dependent on the time of day, day of week and the seasonal effect of climate control on EV energy consumption. The driving and charging patterns are more variable on the weekends than weekdays, which adds uncertainty to the availability of contingency reserve. There is significant daily variation in EV charging however there may be potential to fill these troughs in reserve availability through aggregation with other household loads through demand side management.

Subject Areas: electric vehicles

Availability: Innovative Smart Grid Technologies (ISGT), 2012 IEEE PES

Assessment of Impacts of PHEV Charging Patterns on Wind-Thermal Scheduling by Stochastic Unit Commitment *Cong Liu , Jianhui Wang ; Botterud, A., Yan Zhou ; and Vyas, A.*

Publication Date: April 3, 2012

Abstract: Light duty plug-in hybrid electric vehicle (PHEV) technology holds a promising future due to its "friendliness" to the environment and potential to reduce dependence on fossil fuels. However, the likely significant growth of PHEVs will bring new challenges and opportunities for power system infrastructures. This paper studies the impacts of PHEV charging patterns on power system operations and scheduling. The stochastic unit commitment model described in this paper considers coordination of thermal generating units and PHEV charging loads, as well as the penetration of large-scale wind power. The proposed model also addresses ancillary services provided by vehicle-to-grid techniques. Daily electricity demands by various types of PHEVs are estimated on the basis of a PHEV population projection and transportation survey. The stochastic unit commitment model is used to simulate power system scheduling with different charging patterns for PHEVs. The results show that a smart charging pattern can reduce the operating costs of a power system and compensate for the fluctuation in wind power. The proposed model also can serve as a foundation and tool to perform long-term cost-benefit analysis and to assist policy making.

Subject Areas: hybrid electric vehicle, PHEV

Availability: Smart Grid, IEEE Transactions

Energy and Urban Form: An Analysis of Energy and Population Density in Atlanta *Sinan Sinharoy*

Publication Date: May 1, 2012

Abstract: The Metropolitan Atlanta region is one of the fastest growing areas of the county—it grew by over 1 million people and by more than 24% from 2000 to 2007 (Population Change). It also encompasses a total land area of almost 8,400 square miles covering 28 counties (Metro Atlanta). Assuming similar growth patterns in the future, Atlantans can expect a dramatic increase in energy consumption due to more residences, commercial buildings, transportation, and other infrastructure requirements that result from urban growth. Further increases in energy consumption, especially in electricity used in homes and businesses, could be problematic for residents of Georgia, especially metro Atlantans.

The state of Georgia relies heavily on coal-fired power plants for electricity production, which emit millions of tons of carbon dioxide (CO2) and other pollutants each year that contribute to climate change and health complications for the residents of the state (Environmental Impacts of Coal Power). If planners and policy makers have an understanding of the relationship between urban form and energy consumption, they can shape future development to be as energy efficient as possible, thus preventing further pollution and saving households considerable amounts of money in both transportation and energy bills.

This paper reviews previous studies that focus on the connection between urban form and energy consumption and analyzes the variations in energy use due to transportation and residential electricity between the City of Atlanta and a typical suburb. The study results in an expected annual overall energy difference measured in million British Thermal Units (MMBtu) along with the expected difference in cost and carbon dioxide emissions per household. Transportation and electricity were chosen as the main energy sectors to analyze because they are two of the largest energy consumers and pollution emitters.

Subject Areas: urban form, population density, Atlanta

Availability: http://sinansinharoy.com/wp-content/uploads/2012/05/Energy-and-Urban-Form.pdf

A Simulation-Optimization Model for Location of a Public Electric Vehicle Charging Infrastructure *Xiaomin Xi, Ramteen Sioshansi, and Vincenzo Marano*

Publication Date: N/A

Abstract: We develop a model that optimizes the location of a public electric vehicle (EV) charging infrastructure. Our approach consists of a simulation model that determines the relationship between charging service levels and the number of chargers at each station, and an optimization model that determines where to locate chargers to maximize total EV service. Applying this model to the central-Ohio region, we develop an infrastructure deployment that maximizes the amount of charging provided to EV owners under different budget constraints. We further show that although the optimal location is sensitive to the specific optimization criterion considered, overall services rates are less sensitive to the optimization strategy.

Subject Areas: electric vehicles; infrastructure location; optimization; simulation

Availability: Transportation Science
http://ise.osu.edu/isefaculty/sioshansi/papers/charge_infra.pdf

Linear Optimization Methods For Vehicle Energy and Communication Networks *Nicole Anahita Taheri*

Publication Date: June 2012

Abstract: Over the few next decades, the personal vehicle may evolve into a device distinct from what exists today. This thesis considers energy and communication systems among vehicles that utilize two developing technologies: battery-powered drive trains and accurate sensors. We use linear optimization to construct separate algorithms for networks of Plug-in Electric Vehicles (PEVs) and networks of Sensor-equipped Vehicles (SVs).

Plug-in electric vehicles will have flexible charging options, and may be capable of transmitting electricity back to the grid (i.e., discharging). We construct an automated mechanism for a fleet of PEVs that efficiently organizes distributed energy trading to benefit both the consumers and the electric utilities. A linear programming model of the fleet provides a *composite valuation*, which can be used in an online environment managed by a fleet aggregator to allocate feasible energy exchange schedules that decrease the peak electricity demand and reduce the cost to consumers. The resulting charging and discharging schedules are assigned to tens of thousands of vehicles instantly as they plug into the grid and are robust to unexpected events in driving patterns. We give empirical results based on electricity and gasoline pricing, electricity demand, vehicle characteristics, and driving behaviors.

Sensor-equipped vehicles use accurate sensors to detect their surroundings; such technology has been used to help improve traffic flow and safety. We consider a network of SVs that measure the distances between one another. In this framework, a semidefinite programming (SDP) relaxation is an efficient computational method to solve the sensor network localization problem of determining the locations of vehicles on the road given some of the pair-wise distances between them. We present two results about the SDP relaxation that can be applied to localizing sensor-equipped vehicles. First, we provide the first non-asymptotic bound on the required sensor communication range to ensure a unique localization of the sensors. Second, we show that if the graph induced from a network of n sensors in dimension d is a (d + 1)-lateration graph with points in general position, then the graph admits a positive semidefinite stress matrix with rank n, and hence the SDP relaxation will produce the correct localization of the points.

Subject Areas: plug in vehicles, PEV

Availability: http://www-leland.stanford.edu/group/SOL/dissertations/onlinecopy-ntaheri_thesis.pdf

Factor Analysis of the Aggregated Electric Vehicle Load Based on Data Mining *Qinglai Guo, Yao Wang, Hongbin Sun *, Zhengshuo Li, Shujun Xin and Boming Zhang*

Publication Date: June 21, 2012

Abstract: Electric vehicles (EVs) and the related infrastructure are being developed rapidly. In order to evaluate the impact of factors on the aggregated EV load and to coordinate charging, a model is established to capture the relationship between the charging load and important factors based on data mining. The factors can be categorized as internal and external. The internal factors include the EV battery size, charging rate at different places, penetration of the charging infrastructure, and charging habits. The external factor is the time-of-use pricing (TOU) policy. As a massive input data is necessary for data mining, an algorithm is implemented to generate a massive sample as input data which considers real-world travel patterns based on a historical travel dataset. With the input data, linear regression was used to build a linear model whose inputs were the internal factors. The impact of the internal factors on the EV load can be quantified by analyzing the sign, value, and temporal distribution of the model coefficients. The results showed that when no TOU policy is implemented, the rate of charging at home and range anxiety exerts the greatest influence on EV load. For the external factor, a support vector regression technique was used to build a relationship between the TOU policy and EV load. Then, an optimization model based on the relationship was proposed to devise a TOU policy that levels the load. The results suggest that implementing a TOU policy reduces the difference between the peak and valley loads remarkably.

Subject Areas: load model; electric vehicle; linear regression; support vector regression; travel dataset

Availability: Energies ISSN 1996-1073
www.mdpi.com/journal/energies

Exploring the Influence of Urban Form On Travel and Energy Consumption, Using Structural Equation Modeling *Chao Liu*

Publication Date: 2012

Abstract: This dissertation has contributed to the current knowledge by gaining additional insights into the linkages of different aspects of the built environments, travel behavior, and energy consumption using Structural Equation Modeling (SEM) that provides a powerful analytic framework for a better understanding of the complex relationships of urban form, travel and energy consumption. Several urban form measurements (density, mixed land use index, street network connectivity, regional accessibility, and distance to transit) were gathered from multiple external sources and utilized for both trip/tour origins and destinations. This dissertation also contributed to the analysis framework by aggregating trips into tours to test whether the tour-based analysis generates better results than the trip-based analysis in terms of model fit, significance, and coefficient estimations. In addition to that, tour-based samples were also stratified into three different classification schemes to investigate the variations of relationship of urban form and travel among auto and transit modes and among various travel types.: (1) by modes (i.e. auto and transit); (2) by travel purposes (i.e. work, mixed, and non-work tours); and (3) by modes and purposes (first by modes, then by purpose). Stratification by purposes and modes provided an in-depth investigation of the linkages of urban form and travel behavior.

The research findings are many: (1) urban form does have direct effects on travel distance for all tour types modeled; (2) urban form at the destination ends has more influence than on the origin ends; (3) Urban form has indirect effects on travel distance and energy consumption through affecting driving patterns, mode choice, vehicle type and tour complexity; (4) People tend to drive when they have complicated travel patterns; (5) The effects of intermediate variables (driving patterns, tour complexity, mode choice, and vehicle type) are stronger than the direct effects generated from urban form; (6) Tour-based analyses have better model fit than trip-based analysis; (7) Different types and modes of travel have various working mechanisms for travel behavior. No single transportation technology or land use policy action can offer a complete checklist of achieving deep reductions of travel and energy consumption while preserving mobility of driving.

Subject Areas: structural equation modeling, travel behavior, built environments, energy consumption

Availability:
http://drum.lib.umd.edu/bitstream/1903/12714/3/Chao_Liu_Dissertation_final.pdf

Estimating the Rebound Effect: A Quasi-experiment with Hybrid Pairs *David Brownstone and Alicia Lloro*

Publication Date: May 2012

Abstract: This paper estimates the rebound effect with respect to increased fuel efficiency for automobiles. The rebound effect describes the phenomenon whereby increasing efficiency induces increased use. For example, as vehicles become more fuel efficient, the cost per mile of driving decreases and people have an incentive to drive more. To estimate the rebound effect, we consider a hybrid pairs quasi-experiment, where the hybrid and gasoline variants of the same make and model are referred to as a hybrid pair. Propensity score matching is used to compare the vehicle miles traveled (VMT) for hybrids vs. non-hybrids and to compute the elasticity of VMT with respect to cost per mile (CPM). To control for selection bias - households who expect to drive often may be more likely to purchase a hybrid vehicle - households are matched on their estimated probability of choosing a hybrid. We use household level data from the 2009 National Household Travel Survey (NHTS) and vehicle attribute data from Ward's Automotive Group. Since the trim line of the household vehicles is not observed, a partially observed choice model is implemented to produce estimates of each household's probability of choosing a hybrid. Based on the matching results from Honda Civics, we find a rebound effect of 26.5% with a standard error of 11.8% and an induced demand for VMT of 1300 miles with a standard error of 487 miles.

Subject Areas: VMT, hybrid, hybrid vehicles

Availability: http://www.alicialloro.com/research/Lloro2012.pdf

Evaluating New Policy Instruments of the Corporate Average Fuel Economy Standards: Footprint, Credit Transferring, and Credit Trading *Takahiko Kiso*

Publication Date: November 2012

Abstract: The new U.S. Corporate Average Fuel Economy (CAFE) standards not only tighten the target fuel economy to be achieved by automakers, but also make significant changes to the structure of the standards. Three important policy instruments introduced are footprint-based targets, intra-firm transferring of fuel efficiency credits between passenger cars and light trucks, and inter-firm trading of fuel efficiency credits. While there are a number of previous studies on the impact of tightening CAFE standards, economists have paid little attention to the structure of CAFE standards. In particular, no previous study has analyzed a case in which all of the three instruments above are simultaneously in effect, as in the actual new CAFE standards. This paper aims to evaluate these instruments by way of counterfactual simulations. First, I model and estimate the demand- and supply-sides of the U.S. vehicle market using various data sets. Then, based on the estimation results, I simulate the vehicle market and the demand for driving under different counterfactual CAFE standards, and examine the impacts of introducing the three instruments. Simulation results suggest: (1) footprint-based targets have little impact on market shares, producer profits, consumer surplus, and gasoline use; (2) inter-firm credit trading substantially reduces production costs to achieve a given level of market average fuel economy and thus increases social welfare; and (3) allowing intra-firm credit transferring (but not inter-firm credit trading) is effective in reducing aggregate gasoline consumption.

Subject Areas: fuel economy, fuel efficiency, footprint, Corporate Average Fuel Economy, CAFE

Availability: https://sites.google.com/site/takahikokiso/files/JMP.pdf

Cost-Effectiveness of Plug-in Hybrid Electric Vehicle Battery Capacity and Charging Infrastructure Investment for Reducing US Gasoline Consumption *Scott B.Peterson and Jeremy J. Michalek*

Publication Date: September 2012

Abstract: Federal electric vehicle (EV) policies in the United States currently include vehicle purchase subsidies linked to EV battery capacity and subsidies for installing charging stations. We assess the cost- effectiveness of increased battery capacity vs. nondomestic charging infrastructure installation for plug-in hybrid electric vehicles as alternate methods to reduce gasoline consumption for cars, trucks, and SUVs in the US. We find across a wide range of scenarios that the least-cost solution is for more drivers to switch to low-capacity plug-in hybrid electric vehicles (short electric range with gasoline backup for long trips) or gasoline-powered hybrid electric vehicles. If more gasoline savings are needed per vehicle, nondomestic charging infrastructure installation is substantially more expensive than increased battery capacity per gallon saved, and both approaches have higher costs than US oil premium estimates. Cost effectiveness of all subsidies are lower under a binding fuel economy standard. Comparison of results to the structure of current federal subsidies shows that policy is not aligned with fuel savings potential, and we discuss issues and alternatives.

Subject Areas: Plug-in hybrid, electric vehicle, charging infrastructure, battery size

Availability: Energy Policy www.elsevier.com/locate/enpol

Impacts of Charging Choices for Plug-In Hybrid Electric Vehicles in 2030 Scenario

Amgad Elgowainy, Yan Zhou, Anant D. Vyas, Matthew Mahalik, Danilo Santini, and Michael Wang

Publication Date: 2012

Abstract: This study systematically examined the potential impacts of recharging scenarios for multiple plug-in hybrid electric vehicles (PHEVs) in the western United States— in particular, the service area of the Western Electricity Coordinating Council (WECC)— in 2030. The goal of the study was twofold: to examine the impact of scenarios for market penetration and charging of PHEVs on the electric utilities and transmission grid and to estimate the potential reductions in petroleum use and greenhouse gas (GHG) emissions attributable to PHEV miles traveled on primarily grid electricity. Three charging scenarios for PHEVS were examined: (*a*) begin recharging upon arrival at home at the end of the last daily trip, (*b*) complete recharging of batteries just before the start of the first daily trip, and (*c*) any additional charging opportunity during the daytime. The three charging scenarios produced distinct hourly electric load profiles, with the opportunity-charging scenario resulting in a significant increase in load during the daytime. However, when the utility dispatch simulations were run for these charging scenarios in the WECC area, they all exhibited similar marginal-generation mixes (dominated by the natural gas combined-cycle technology) to satisfy the PHEV load, and GHG emissions were within 2% of each other. A well-to-wheel analysis revealed that the marginal-generation mixes produced 40% to 45% lower GHG emissions by PHEVs than did conventional gasoline internal combustion engine vehicles.

Subject Areas: plug-in vehicles, hybrid vehicles, greenhouse gas, emissions

Availability: *Transportation Research Record: Journal of the Transportation Research Board, No. 2287,* Transportation Research Board of the National Academies, Washington, D.C., 2012, pp. 9–17.DOI: 10.3141/2287-02

A Statistical Approach to Estimating Acceptance of Electric Vehicles and Electrification of Personal Transportation *Michael A. Tamor, Chris Gearhart , Ciro Soto*

Publication Date: 2012

Abstract: The environmental and economic impact of electric vehicles (EVs) will depend on the fraction of users that can accept an EV of a given capability, and then in turn on how those EVs are actually used. Historically, estimates of the fraction of total travel that could be electrified as a function of EV range are based on vehicle usage data for large populations of vehicles, most often the National Household Travel Survey (NHTS). Two assumptions implicit in such estimates are subject to question: (1) that any user could accept an EV as a primary vehicle and would use it for all trips within its range, and (2) that the usage patterns of any individual EV user are the same as that exhibited by entire population. The first assumption is clearly unrealistic; willingness to accept an EV is dependent on the transportation needs and alternatives readily available to each individual user. As a surrogate for *a priori* knowledge of individual preferences, we use a crude metric of acceptance defined as a threshold frequency of need for alternative transportation above which all users would not accept the inconvenience. To test the validity of the second assumption and better estimate market and electrification potential, we analyze roughly 1 year of usage data for each of 133 instrumented vehicles in Minneapolis–St. Paul. We find a characteristic individual usage pattern that does not resemble the average over a large number of vehicles. Using the surrogate metric of EV acceptance and a simple payback model, we show that although the market acceptance and electrification potential of EVs are severely limited by battery cost, it is possible to determine an optimal EV range. Using the same usage data and payback model, we show that plug-in hybrid electric vehicles (PHEVs) can be much more effective than all-electric vehicles in electrifying personal transportation.

Subject Areas: Electric vehicle; Plug-in hybrid; Hybrid electric vehicle; Driving range; Electric range; Acceptance

Availability: Transportation Research Part C: Emerging Technologies, Volume 26, January 2013, Pages 125–134 http://dx.doi.org/10.1016/j.trc.2012.07.007

A Temporal Assessment Of Vehicle Use Patterns and Their Impact On The Provision Of vehicle-To-Grid Services *Chioke B Harris and Michael E Webber*

Publication Date: September 18, 2012

Abstract: With the emerging nationwide availability of battery electric vehicles (BEVs) at prices attainable for many consumers, electric utilities, system operators and researchers have been investigating the impact of this new source of energy demand. The presence of BEVs on the electric grid might offer benefits equivalent to dedicated utility-scale energy storage systems by leveraging vehicles' grid-connected energy storage through vehicle-to-grid (V2G) enabled infrastructure. It is, however, unclear whether BEVs will be available to provide needed grid services when those services are in highest demand. In this work, a set of GPS vehicle travel data from the Puget Sound Regional Council (PSRC) is analyzed to assess temporal patterns in vehicle use. These results show that vehicle use does not vary significantly across months, but differs noticeably between weekdays and weekends, such that averaging the data together could lead to erroneous V2G modeling results. Combination of these trends with wind generation and electricity demand data from the Electric Reliability Council of Texas (ERCOT) indicates that BEV availability does not align well with electricity demand and wind generation during the summer months, limiting the quantity of ancillary services that could be provided with V2G. Vehicle availability aligns best between the hours of 9 pm and 8 am during cooler months of the year, when electricity demand is bimodal and brackets the hours of highest vehicle use.

Subject Areas: energy storage, vehicle-to-grid, ancillary services, wind energy integration

Availability: IOPScience http://iopscience.iop.org/1748-9326/7/3/034033/

Fuel Economy and Greenhouse Gas Emissions Labeling for Plug-In Hybrid Vehicles from a Life Cycle Perspective *Nathan D. MacPherson, Gregory A. Keoleian, Jarod C. Kelly*

Publication Date: September 2012

Abstract: Fuel economy has been an effective indicator of vehicle greenhouse gas (GHG) emissions for conventional gasoline-powered vehicles due to the strong relationship between fuel economy and vehicle life cycle emissions. However, fuel economy is not as accurate an indicator of vehicle GHG emissions for plug-in hybrid (PHEVs) and pure battery electric vehicles (EVs). Current vehicle labeling efforts by the U.S. Environmental Protection Agency (EPA) and Department of Transportation have been focused on providing energy and environmental information to consumers based on U.S. national average data. This article explores the effects of variations in regional grids and regional daily vehicle miles traveled (VMT) on the total vehicle life cycle energy and GHG emissions of electrified vehicles and compare these results with information reported on the label and on the EPA's fuel economy Web site. The model results suggest that only 25% of the life cycle emissions from a representative PHEV are reflected on current vehicle labeling. The results show great variation in total vehicle life cycle emissions due to regional grid differences, including an approximately 100 gram per mile life cycle GHG emissions difference between the lowest and highest electric grid regions and up to a 100% difference between the state-specific emission values within the same electric grid regions. Unexpectedly, for two regional grids the life cycle GHG emissions were higher in electric mode than in gasoline mode. We recommend that labels include stronger language on their deficiencies and provide ranges for GHG emissions from vehicle charging in regional electricity grids to better inform consumers.

Subject Areas: energy consumption; industrial ecology; life cycle assessment (LCA); regional electric grids; utility factor; vehicle and fuel cycles

Availability: World of Industrial Ecology

Estimating the Impact of Fuel-Switching Between Liquid Fuels and Electricity Under Electricity-Sector Carbon-Pricing Schemes *Jonathan Dowds , Paul D.H. Hines, Seth Blumsack*

Publication Date: September 2012

Abstract: Switching from liquid fuels to electricity in the transportation and heating sectors can result in greenhouse gas emissions reductions. These reductions are maximized when electricity-sector **carbon emissions are constrained through policy measures. We use a linear optimization, generation** expansion/dispatch model to evaluate the impact of increased electricity demand for plug-in electric vehicle charging on the generating portfolio, overall generating fuel mix, and the costs of electricity generation. We apply this model to the PJM Interconnect and ISO-New England Regional Transmission Organization service areas assuming a CO_2 pricing scheme that is applied to the electricity sector but does not directly regulate emissions from other sectors. We find that a shift from coal toward natural gas and wind generation is sufficient to achieve a 50% reduction in electricity-sector CO_2 emissions while supporting vehicle charging for 25% of the vehicle fleet. The price impacts of these shifts are sensitive to demand side price responsiveness and the capital costs of new wind construction.

Subject Areas: Fuel switching; Cap-and-trade; Electric vehicles; Dispatch; Capacity expansion; NHTS

Availability: Socio-Economic Planning Sciences

http://www.sciencedirect.com/science/article/pii/S0038012112000523

On the Business Value of ICT-Controlled Plug-in Electric Vehicle Charging in California

Christoph Goebel

Publication Date: November 2012

Abstract: The increasing penetration of variable renewable energy, such as wind and solar, requires the deployment of large scale energy storage or dynamic demand side management. Leveraging the intrinsic energy storage potential of certain electric loads could be the key for an efficient transition to green power generation.

Plug-in electric vehicles (PEVs) are about to be introduced on a large scale. In this paper, we investigate the savings potential of electricity retailers resulting from the ability to control the charging behavior of a fleet of PEVs using Information and Communication Technology (ICT). This savings potential is important as it could jumpstart the development of advanced control infrastructures for dynamic demand side management.

The paper makes three major contributions: first, it applies a novel car usage model based on data from the National Household Travel Survey (NHTS). Second, it develops and evaluates several charging scheduling algorithms with low computational requirements. Third, it identifies several key parameters influencing the relative and absolute savings potential of ICT-controlled PEV charging.

We obtain a relative savings potential of up to 45%. The absolute yearly savings per PEV, however, are rather small, which could limit the economic incentives of electricity retailers to deploy the required infrastructure.

Subject Areas: Plug-in electric vehicles; Electricity markets; ICT business value

Availability: Energy Policy http://www.sciencedirect.com/science/article/pii/S0301421512005630

GAS TAX AND FEE SCENARIOS

Planning for Sustainable Alternate Transportation Programs: Gasoline Prices and Behavior in Humboldt County, CA *Anna Rose Schwarzbach*

Publication Date: August 2012

Abstract: Since Humboldt County is a somewhat isolated region, community members may feel limited by their ability to access available modes of transportation, which can be restricted by high gasoline prices and fixed annual incomes. During the last several years, the price of gasoline has fluctuated across the country. This trend was consistently prominent, even more so for a rural area like Humboldt County, as consumers willingly, or reluctantly, accept higher-priced gasoline to power their automobiles. Using a socio-psychological framework that looks at behavioral intention, this research explores the relationships between gasoline prices and behavioral intention within a rural area. More particularly, the research question asks: How do people change their behavior in response to high gasoline prices in the rural area of Humboldt County; and at what price might people begin to make alternate transportation choices? By drawing on the Theory of Planned Behavior (Ajzen, 1991; Fishbein & Ajzen, 1980), it is understood that by measuring individuals' intentions, we obtain the most accurate predictor of behavior. This research will use Fishbein & Ajzen's framework to determine if Humboldt County resident's intentions and behavior parallel their response to high gasoline prices in Humboldt County. I postulate that as gasoline prices remain high, people's intention to purchase less gasoline and use alternate modes of transportation locally will become more prominent. However, considering the rural isolation of Humboldt County, these behavior changes may not necessarily be feasible for everyone. Data will be collected via survey that will be distributed to local organizations, city institutions and by hand to study how past and current behaviors, personal costs, accessibility, affordability and sustainability plays a role regarding individuals' behavior intention and choices in transportation is determined by gasoline prices. This exploratory research can provide insight into whether or not high gasoline prices have an effect upon local commuting behavior among community members. Once behavior among individuals have been analyzed, it will be more clear on whether or not individuals will continue to use their automobiles or will transition towards the use of alternate modes of transportation. If that is the case, efforts for promoting more local alternate transportation options can be emphasized.

Subject Areas: behavior change, gasoline prices, consumption, alternative modes of transportation, exploratory research, Theory of Planned Behavior, behavioral intention, sustainable transportation

Availability: Schwarzbach, Anna Rose. Planning for sustainable alternate transportation programs: gasoline prices and behavior in Humboldt County, CA. Diss. Humboldt State University, 2012. http://humboldt-dspace.calstate.edu/handle/2148/1038

Does the Substitutability of Public Transit Affect Commuters' Response to Gasoline Price Changes? *Elisheba Spiller; Heather Stephens; Christopher Timmins; Allison Smith*

Publication Date: July 2012

Abstract: This paper determines the extent to which gasoline price elasticity is affected by the availability of a substitute for driving — public transportation. Measuring the substitutability of public transportation presents an important practical difficulty. To address this, we predict individuals' commute times by private and public transit conditional upon their observable characteristics and create a measure of substitutability between the two modes based on transit times. This allows us to measure the effect of public transportation on commuters' sensitivity to gasoline prices. The interaction of gasoline price with our constructed substitutability measure is found to have a significant effect on annual vehicle miles traveled (VMT), indicating that investments in public transit could play an important role in altering motorists' sensitivity to gasoline prices and increasing the effectiveness of a gasoline tax. However, we find evidence to support a policy of increasing public transit accessibility only in the presence of increased gasoline taxes.

Subject Areas: public transportation, elasticity, commuting, gasoline prices

Availability: Spiller, Elisheba, et al. "Does the Substitutability of Public Transit Affect Commuters' Response to Gasoline Price Changes?." Resources for the Future Discussion Paper 12-29 (2012). http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2113581

The Heterogeneous Effects of Gasoline Taxes: Why Where We Live Matters *Elisheba Spiller and Heather M. Stephens*

Publication Date: July 2012

Abstract: Using disaggregated confidential household data, we estimate spatial variation in household-level gasoline price elasticities and the welfare effects of gasoline taxes. A novel approach allows us to model a discrete-continuous household choice of vehicle bundles, while disaggregating the choice set and including vehicle-specific fixed effects and unobserved consumer heterogeneity. The mean elasticity of demand for gasoline is -0.67, but with tremendous variation across location and income. We find that rural households have 30 percent more negative welfare impacts than urban households from gasoline taxes. Finally, we explore different policies that can help to mitigate welfare inequalities due to these taxes.

Subject Areas: gasoline taxes, welfare, elasticity, rural, commuting, transportation

Availability: Spiller, Elisheba, and Heather Stephens. "The Heterogeneous Effects of Gasoline Taxes: Why Where We Live Matters." Resources for the Future Discussion Paper 12-30 (2012). http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2113594

Speed *Victor Couture; Gilles Duranton; Matthew A. Turner*

Publication Date: June 2013

Abstract: We investigate the determinants of driving speed in large us cities. We first estimate city level supply functions for travel in an econometric framework where both the supply and demand for travel are explicit. These estimations allow us to calculate a city level index of driving speed and to rank cities by driving speed. Our data suggest that a congestion tax of, on average, about 3 cents per kilometer yields welfare gains of about 80 billion dollars per year, that centralized cities are slower, that cities with ring roads are faster, and that the provision of automobile travel in cities is subject to decreasing returns to scale.

Subject Areas: roads, vehicle kilometers; traveled, public transport, congestion, travel time.

Availability: Couture, Victor, Gilles Duranton, and Matthew A. Turner. "Speed." University of Toronto (2012). http://faculty.haas.berkeley.edu/couture/download/Speed.pdf

A Projection of Motor Fuel Tax Revenue and Analysis of Alternative Revenue Sources in Georgia *Phillip W. Cherry*

Publication Date: June 2013

Abstract: Motor fuel tax revenue currently supplies the majority of funding for transportation agencies at the state and federal level. Georgia uses excise and sales taxes to generate revenue for the Georgia Department of Transportation (GDOT). Inflation and increases in vehicle fuel efficiency have reduced the effectiveness of these taxes in recent years. These changes have resulted in drivers purchasing less fuel and generating less fuel tax revenue, which weakens GDOT's ability to maintain Georgia's transportation assets. This thesis uses literature from regional and state agencies, academic reports, and databases to identify factors that affect motor fuel tax revenue and then creates a model to predict Georgia's fuel tax receipts in 2020 and 2030. It also discusses and evaluates other transportation funding mechanisms that could replace or supplement the fuels tax and recommends how best to implement these strategies

Subject Areas: Fuel tax; GDOT

Availability: Meyer, Michael, and Phillip Cherry. "A Projection of Motor Fuel Tax Revenue and Analysis of Alternative Revenue Sources in Georgia." (2012).
http://trid.trb.org/view.aspx?id=1246693

Estimating the impact of fuel-switching between liquid fuels and electricity under electricity-sector carbon-pricing schemes *Jonathan Dowds, Paul D.H. Hines, Seth Blumsack*

Publication Date: June 2013

Abstract: Switching from liquid fuels to electricity in the transportation and heating sectors can result in greenhouse gas emissions reductions. These reductions are maximized when electricity-sector carbon emissions are constrained through policy measures. We use a linear optimization, generation expansion/dispatch model to evaluate the impact of increased electricity demand for plug-in electric vehicle charging on the generating portfolio, overall generating fuel mix, and the costs of electricity generation. We apply this model to the PJM Interconnect and ISO-New England Regional Transmission Organization service areas assuming a CO2 pricing scheme that is applied to the electricity sector but does not directly regulate emissions from other sectors. We find that a shift from coal toward natural gas and wind generation is sufficient to achieve a 50% reduction in electricity-sector CO2 emissions while supporting vehicle charging for 25% of the vehicle fleet. The price impacts of these shifts are sensitive to demand side price responsiveness and the capital costs of new wind construction.

Subject Areas: Fuel switching; Cap-and-trade; Electric vehicles; Dispatch; Capacity expansion; NHTS

Availability: Dowds, Jonathan, Paul Hines, and Seth Blumsack. "Estimating the impact of fuel-switching between liquid fuels and electricity under electricity-sector carbon-pricing schemes." Socio-Economic Planning Sciences (2012).
http://www.sciencedirect.com/science/article/pii/S0038012112000523

Equity Evaluation of Vehicle Miles Traveled Fees in Texas *Lisa Larsen, Mark Burris, David Pearson, Patricia Ellis*

Publication Date: November 14, 2011

Abstract: The Texas state gas tax has been 20.0 cents per gallon since 1991, and the federal gas tax has been 18.4 cents per gallon since 1993. The gas tax is not only stagnant, but depreciating in value due to inflation. Thus, damage is being done to the infrastructure but the money needed to maintain and improve roadways is not being adequately generated. One proposed alternative to the gas tax is the creation of a vehicle miles traveled (VMT) fee; with equity being a crucial issue to consider. This research used Texas data from the 2009 National Household Travel Survey (NHTS) to consider the equity impacts surrounding four VMT fee scenarios. Data were filtered and weighted to reflect results representative of Texas vehicle-owning households in 2008. Each scenario was run both statically and dynamically under the assumption that the VMT fee would replace the state gas tax. Based on quantitative measures, the vertical equity of all of the proposed VMT fee scenarios and the current state gas tax were very similar. In terms of horizontal equity, Scenario 4 was designed to be inherently horizontally equitable; charging different rates for travel on urban roadways and rural roadways corresponding to funding needs associated with that roadway type. Scenario 3, which favors fuel-efficient vehicles, was found to be the least horizontally equitable scenario—causing rural households to contribute the highest percentage of revenue of all scenarios considered. All other scenarios were found to be more horizontally equitable than the current state gas tax.

Subject Areas: VMT fee, gas tax

Availability: 2012 TRB paper submittal

Marginal-Cost Vehicle Mileage Fee *Lei Zhang, Yijing Lu*

Publication Date: 2012

Abstract: With the declining purchasing power of fuel tax revenue, emergence of hybrid and electric vehicles, more restrictive CAFE standard, and rapidly increasing cost, there is a major funding gap in surface transportation financing in the United States. Politicians, transportation professionals, and concerned citizens are actively seeking alternative revenue sources to supplement and/or replace fuel taxes. Among other options, vehicle mileage fee has emerged to be one of the strong candidates. This paper computes vehicle mileage fee based on marginal cost of travel, internalizing various externalities such as congestion, infrastructure deterioration, and pollution emissions, and greenhouse gas (GHG) emissions. Multiple regression models and discrete choice models are developed based on the 2009 NHTS data to analyze the impacts of the proposed marginal-cost vehicle mileage fee on vehicle ownership, fuel efficiency, vehicle miles traveled, energy consumption, emissions, and equity. In addition, the sensitivity of these impacts with respect to exogenous fuel price volatility is also estimated quantitatively. Results show that with consideration for all aforementioned externalities, the marginal-cost vehicle mileage fee would range from 7.7 cents/mile to 9.1 cents/mile (varying by vehicle make and model), which is much higher than the per-mile equivalent of the current fuel taxes (about 1.2 cents/mile). Household vehicle use behavior is much more sensitive to marginal-cost vehicle mileage fee than vehicle ownership decisions. Consequently, the implementation of marginal-cost vehicle mileage fee would cause significant (27.1%) reduction in vehicle miles traveled, but just minor increase in vehicle fuel efficiency (up to 4.2%). Nevertheless, marginal-cost vehicle mileage fee can reduce energy consumption and pollution/GHG emissions by about a quarter. These sustainability benefits are even more significant if fuel prices continue to increase. As expected, lower-income households (consumer surplus decrease by 3.6% without considering the benefits from revenue redistribution) would be hurt more than higher-income households (1.3%). It is hypothesized that if the much higher revenue (four to five times higher than fuel tax revenue) from marginal-cost vehicle mileage fee is properly redistributed through strategized investment and/or subsidies to the poor, all can benefit. This hypothesis remains to be tested in future research. A less aggressive and partial marginal-cost vehicle mileage fee scheme that just produces necessary revenue, however defined, is probably more practical and politically feasible.

Subject Areas: economic analysis; fees; marginal costs; revenues; road pricing; user charges; vehicle miles of travel

Availability: Transportation Research Board Annual Meeting 2012 Paper #12-4609

A Projection of Motor Fuel Tax Revenue and Analysis of Alternative Revenue Sources in Georgia *Phillip W. Cherry*

Publication Date: May 2012

Abstract: Motor fuel tax revenue currently supplies the majority of funding for transportation agencies at the state and federal level. Georgia uses excise and sales taxes to generate revenue for the Georgia Department of Transportation (GDOT). Inflation and increases in vehicle fuel efficiency have reduced the effectiveness of these taxes in recent years. These changes have resulted in drivers purchasing less fuel and generating less fuel tax revenue, which weakens GDOT's ability to maintain Georgia's transportation assets. This thesis uses literature from regional and state agencies, academic reports, and databases to identify factors that affect motor fuel tax revenue and then creates a model to predict Georgia's fuel tax receipts in 2020 and 2030. It also discusses and evaluates other transportation funding mechanisms that could replace or supplement the fuels tax and recommends how best to implement these strategies.

In Georgia, fuel tax revenue is based on fuel consumption, which is directly affected by vehicle miles traveled (VMT) and fuel efficiency, and fuel price. Several forces influence VMT and fuel efficiency including demographic factors such as population density and persons per household, economic factors such as, income distribution and GDP, and technological factors such as alternative vehicle development. The model incorporates these factors and their interactions by segmenting vehicles into four classes: personal vehicles, single-unit trucks, combination trucks, and transit vehicles, and then creating unique forecasting frameworks for each segment.

Subject Areas: motor fuel, tax revenue

Availability: Georgia Institute of Technology
http://smartech.gatech.edu/bitstream/handle/1853/43679/cherry_phillip_p_201205_mast.pdf?sequence=1

Mileage-Based User Fee Winners and Losers: An Analysis of the Distributional Implications of Taxing Vehicle Miles Traveled, With Projections, 2010--2030 *Brian Weatherford*

Publication Date: May 2012

Abstract: The mileage-based user fee (MBUF) is a leading alternative to the gasoline tax. Instead of taxing gasoline consumption, the MBUF would directly tax drivers based on their vehicle miles traveled (VMT). Equity is a commonly raised public acceptance concern regarding MBUFs. This study uses household-level survey data of travel behavior and vehicle ownership from the 2001 and the 2009 National Household Travel Survey (NHTS) to estimate changes in annual household demand for VMT in response to changes in the cost of driving that result from adopting MBUF alternatives. Distributional implications are estimated for an equivalent flat-rate MBUF, an increased fuel tax rate and it's equivalent flat-rate MBUF, and three alternative MBUF rate structures: a 1 cent MBUF added to the current fuel tax, a tiered rate MBUF based on vehicle fuel economy, and a much increased MBUF rate. The distributional implications are then projected over the years 2015–2030 under eight different macroeconomic and policy scenarios.

The research finds that a flat-rate MBUF would be no more or less regressive than fuel taxes, now or in the future. An increase in the tax rate, whether an MBUF or a fuel tax, causes transportation revenue collection to become less regressive because low income households have a more elastic response to changes in price than middle and high income households. MBUF "winners" include retired households and households located in rural areas. On average, an MBUF would reduce the tax burdens of these groups. MBUF "losers" are households in urban and suburban areas. The projections suggest that the distributional implications of MBUFs are unlikely to change in future years. Changes in the cost of driving, either from a higher tax rate, or other factors, appears to have a greater impact on the equity of transportation finance than whether the tax is collected by the gallon or by the mile. These results are robust to alternative sources of data and model assumptions.

The findings are significant because they suggest that equity considerations based on ability to pay will not be a significant reason to oppose or support the adoption of MBUFs. While the equity implications of MBUFs are minimal, however, some groups, especially rural states, may find that the potential equity benefits of MBUFs could be overwhelmed by an increase in the tax rate to cover the higher costs of collecting and administering them. Concerns about the impacts of flat-rate MBUFs on vehicle fuel efficiency and greenhouse gas emissions are valid but, at current oil prices, the tax rate is a small percentage of the total cost of gasoline. Therefore, the overall price signals still encourage fuel efficiency. Regardless, it is possible to structure an MBUF that provides incentives for fuel efficiency while maintaining other favorable qualities of MBUFs such as their economic efficiency and fiscal sustainability.

Subject Areas: VMT, gasoline tax

Availability: ProQuest Publication: 3506695 http://gradworks.umi.com/35/06/3506695.html

POLICY AND MOBILITY

Leveraging Socially Networked Mobile ICT Platforms for the Last-Mile Delivery Problem *Kyo Suh, Timothy Smith, and Michelle Linhoff*

Publication Date: August 2012

Abstract: Increasing numbers of people are managing their social networks on mobile information and communication technology (ICT) platforms. This study materializes these social relationships by leveraging spatial and networked information for sharing excess capacity to reduce the environmental impacts associated with "last-mile" package delivery systems from online purchases, particularly in low population density settings. Alternative package pickup location systems (PLS), such as a kiosk on a public transit platform or in a grocery store, have been suggested as effective strategies for reducing package travel miles and greenhouse gas emissions, compared to current door-to-door delivery models (CDS). However, our results suggest that a pickup location delivery system operating in a suburban setting may actually increase travel miles and emissions. Only once a social network is employed to assist in package pickup (SPLS) are significant reductions in the last-mile delivery distance and carbon emissions observed across both urban and suburban settings. Implications for logistics management's decades-long focus on improving efficiencies of dedicated distribution systems through specialization, as well as for public policy targeting carbon emissions of the transport sector are discussed.

Subject Areas: Information and communication technology (ICT), Pickup location systems (PLS); current door-to-door delivery models (CDS); carbon emissions

Availability: Suh, Kyo, Timothy Smith, and Michelle Linhoff. "Leveraging Socially Networked Mobile ICT Platforms for the Last-Mile Delivery Problem." Environmental science & technology 46.17 (2012): 9481-9490. http://pubs.acs.org/doi/abs/10.1021/es301302k

Shop 'Till We Drop: A Historical and Policy Analysis of Retail Goods Movement in the United States *Laura B. Schewel and Lee J. Schipper*

Publication Date: August 2012

Abstract: The movement of retail goods is central to modern economies and is a significant—but understudied—fraction of our overall energy footprint. Thus, we propose a new category for energy analysis called Retail Goods Movement (RGM) that draws its boundaries around the portion of freight dedicated to retail goods and the portion of driving dedicated to shopping. Historically, the components of RGM have not enjoyed policy priority. However, the net payoff from energy research and policy directed at RGM may now be high enough relative to other options to deserve increased investment. We combine a quantitative decomposition of the dynamics of RGM energy use with a qualitative discussion of what trends could have contributed to them. The RGM sector's energy use grew from 1.3 EJ (2.8% U.S.) in 1969 to 7.0 EJ (6.6% U.S.) in 2009. The major drivers were increases in population, freight tonnage (before 1990), distance freighted per tonne and driven per shopping trip (after 1990), and weekly shopping trips per household (before 1995). RGM energy intensity increased per capita (180%), per constant dollar GDP (60%), and per retail expenditure (140%). Finally, we describe policy recommendations that could become the basis of a sound RGM resource plan.

Subject Areas: Retail Goods Movement (RGM);

Availability: Schewel, Laura B., and Lee J. Schipper. "Shop 'Till We Drop: A Historical and Policy Analysis of Retail Goods Movement in the United States." Environmental Science & Technology 46.18 (2012): 9813-9821. http://pubs.acs.org/doi/abs/10.1021/es301960f

Challenges Facing Housing Markets in the Next Decade: Developing a Policy-Relevant Research Agenda *Vicki Been and Ingrid Gould Ellen*

Publication Date: April 2012

Abstract: Although policymakers are still working to mitigate the immediate effects of the dramatic downturn in the U.S. housing market, they also must prepare for the challenges that lie ahead. We propose a research agenda that can help federal policymakers better understand the implications those challenges have for housing and community development programs and policies and design cost-effective responses to the challenges. We organize this paper around four major challenges: The long-term effects of the housing market crisis on today's households and on the next generation Increasing poverty coupled with persistently high income inequality and volatility Continued concentration of poor and minority households in low-quality housing and low-opportunity neighborhoods The growing need for sustainable and resilient buildings and communities

In each case, we consider how these challenges may alter the residential choices of housing consumers and shape the behavior of suppliers. We then explore what existing research tells us about the implications each issue has for housing policy and assess what questions remain unexplored or unanswered. Finally, we suggest a series of research studies that can help to fill these important gaps.

Subject Areas: housing; community development; sustainability

Availability: Been, Vicki. "Challenges Facing Housing Markets in the Next Decade, Developing a Policy-Relevant Research Agenda." (2012). http://www.urban.org/url.cfm?ID=412556

Benefits of Recent Improvements in Vehicle Fuel Economy on Overall Fuel Consumption and Emissions *Michael Sivak and Brandon Schoettle*

Publication Date: September 2012

Abstract: For the past several years, we have calculated (on a monthly basis) the average, salesweighted fuel economy of all light-duty vehicles (cars, pickup trucks, vans, and SUVs) sold in the U.S. The results indicate that, from October 2007 to September 2012, the average fuel economy has improved by 18%, from 20.1 mpg to 23.8 mpg. This brief note quantifies the consequences of this improvement on overall fuel consumption and vehicle emissions. Because of their improved fuel economy, the vehicles sold since October 2007 saved a cumulative total of about 6.1 billion gallons of fuel—equivalent to the current total consumption of all vehicles in the U.S. for about 13 days. This reduction in the amount of fuel translates to a reduction of about 120 billion pounds of carbon-dioxide emissions. In terms of the current savings, for the most recent month—September 2012—the savings amount to 293 million gallons of fuel, or about 5.7 billion pounds of carbon dioxide. These savings are equivalent to about 2.9% of the average monthly consumption of fuel and of carbon-dioxide emissions from all light-duty vehicles on the road.

Subject Areas: vehicle fuel economy, vehicle emissions, fuel consumption, recent trends

Availability: Sivak, Michael. "Benefits of recent improvements in vehicle fuel economy on overall fuel consumption and emissions." (2012).
http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6338814

Assessing economic impacts of implementing a vehicle miles traveled fee in Nevada

Paz, A., Nordland, A. & Khan, A.

Publication Date: September 2012

Abstract: This study develops a linear regression model to estimate the number of miles driven by households in Nevada, using data from the 2009 National Household Travel Survey. The regression model is designed to be sensitive to changes in the cost to drive. Hence, the model is used to evaluate different mechanisms used to charge for the use of the highway system. In particular, two alternative Vehicle Miles of Travel (VMT) Fees are compared with the existing fuel tax system. In each case, it was estimated how different houses experience different effects on charges as a consequence of different fuel efficiencies. The analysis performed considers the average changes in the household tax burden and VMT as well as the aggregated change in VMT and the corresponding change in revenue collected.

Subject Areas: Data models; Equations; Fuels; Mathematical model; Sociology; Vehicles

Availability: Paz, Alexander, Andrew Nordland, and Alauddin Khan. "Assessing economic impacts of implementing a vehicle miles traveled fee in Nevada." Intelligent Transportation Systems (ITSC), 2012 15th International IEEE Conference on. IEEE, 2012.
http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6338814

Valuing the Consumption Benefits of Urban Density *Victor Couture*

Publication Date: November 2012

Abstract: Density is a defining feature of cities, yet there is little evidence as to how consumers benefit from urban density. This paper investigates the consumption value of density by combining travel data with local business data from Google Places. I first show that increased density enables consumers to both realize gains from variety and save time through shorter trips. I then estimate the gains from density in the restaurant industry, identifying the value of access to a preferred location from an individual's willingness to incur extra travel costs to reach it. The results reveal wide disparities across areas in a variety-adjusted restaurant price index, leading to significant geographic welfare differentials. Within large metropolitan areas, the price index generally drops by more than 20% from a city's periphery to the denser downtown core. This decrease represents yearly gains of about $400 for an average household, considering restaurants only. The model predicts a key feature of the data, that increasing the density of destinations generates little reduction in trip times. Most of the gains from density are therefore gains from variety, not savings on travel time. Americans' aggregate welfare gains from access to a variety of eating options beyond the one restaurant closest to them amount to approximately 2% of consumer expenditures, the first estimate of the gains from variety in the service sector.

Subject Areas: consumer cities, gains from variety, urban density, accessibility, travel demand

Availability: Couture, Victor. "Valuing the Consumption Benefits of Urban Density." http://individual.utoronto.ca/vcoutu/download/JMP.pdf

Residential Mobility and Local Civic Engagement in Japan and the United States Divergent Paths to School *Leonard Schoppa*

Publication Date: November 2012

Abstract: What drives differences across countries in levels of civic engagement? Both the United States and Japan have been described as having high levels of civic engagement, but a variety of measures show that the type of involvement that is most common varies. Americans join and contribute to national political groups, but membership in PTAs and volunteer firefighting units is low and declining. Japanese participate at a much lower level in national advocacy organizations, but they join local neighborhood associations at very high rates, participate extensively in PTAs, and volunteer to clean up neighborhood parks. This article seeks to unravel why Japanese have such high rates of local civic engagement by examining how parents and volunteers have mobilized to maintain high rates of walking to and from school during a period in which walk-to-school rates have plummeted in the United States. The higher rate of Japanese local engagement in this area, I argue, is motivated by housing markets that limit residential mobility to much lower levels than in the United States. High cost of residential "exit" in Japan drives citizens to exercise "voice" to maintain the safety and walkability of their neighborhoods.

Subject Areas: transportation policy, land use, housing market

Availability: Schoppa, Leonard. "Residential Mobility and Local Civic Engagement in Japan and the United States Divergent Paths to School." Comparative Political Studies (2012). http://cps.sagepub.com/content/early/2012/11/15/0010414012463896.abstract

Evaluating New Policy Instruments of the Corporate Average Fuel Economy Standards: Footprint, Credit Transferring, and Credit Trading *Takahiko Kiso*

Publication Date: December 2012

Abstract: The new U.S. Corporate Average Fuel Economy (CAFE) standards not only tighten the target fuel economy to be achieved by automakers, but also make significant changes to the design/structure of CAFE standards by introducing three policy instruments (footprint-based targets, intra-firm transferring of fuel efficiency credits between passenger cars and light trucks, and inter-firm trading of fuel efficiency credits). While there are a number of previous studies on the impact of tightening CAFE standards, economists have paid little attention to the design of CAFE standards. This paper uses policy simulation to evaluate these policy instruments relating to the design of CAFE standards. First, I model and estimate the demand- and supply-sides of the U.S. vehicle market using various data sets. Then, based on the estimation results, I simulate the vehicle market and the demand for driving under four counterfactual CAFE policies with different designs, and examine the impacts of the three policy instruments. Simulation results suggest: (1) footprint-based targets have little impact on market shares, producer profits, consumer surplus, and gasoline use; (2) inter-firm credit trading lowers overall compliance costs by about $110-$140 million, and thus increases social welfare; and (3) allowing intra-firm credit transferring (but not inter-firm credit trading) reduces aggregate gasoline consumption by 0.1-0.25%.

Subject Areas: CAFÉ standards

Availability: Kiso, Takahiko. "Evaluating New Policy Instruments of the Corporate Average Fuel Economy Standards: Footprint, Credit Transferring, and Credit Trading." (2012). http://www.arec.umd.edu/sites/default/files/_docs/job-market-paper/JMP_Kiso.pdf

2011 Job Gap Report: Searching for Work that Pays- A five-state study of the wages an individual needs to make to meet basic needs *Ben Henry, Julie Chinitz, and Dennis Osorio*

Publication Date: November 2012

Abstract: Wage and income equity are issues of pressing public importance. The 2011 Job Gap Study contributes to the discussion of these issues by examining the availability of living wage jobs in Colorado, Idaho, Montana, Oregon, and Washington. This report provides calculations of: a living wage for Colorado, Idaho, Montana, Oregon, and Washington; the percentage of job openings that pay a living wage in each of these states; and the ratio of the number of living wage job openings to the number of people looking for work. If they hope to promote a stable and growing economy, policymakers must understand the difficult tradeoffs people must make when full-time work does not pay a living wage or when living wage jobs are not available.

Subject Areas: cost of living; living wage

Availability: PAYS, WHAT GAP. "Gap."
http://allianceforajustsociety.org/wp-content/uploads/2012/11/2011-Job-Gap-Report.pdf

Should My Car Move or Should We? A Model of Residential and Commuting Choices
Christopher Clapp

Publication Date: November 2012

Abstract: I develop a discrete choice structural model of the joint decisions of family residence and individual commuting modes, given the characteristics of the housing market and commuting options. The model uses the collective model of the household to account for the fact that spouses rarely commute to the same work location. I estimate the model using individual level, restricted-access data from the American Community Survey (ACS) and a unique dataset of individual commute options and characteristics that I create using geographic information system (GIS) network analysis. I use model estimates to simulate the effects of transportation policies that alter the financial and time costs of commuting. These policies include congestion pricing schemes, fuel or carbon taxes, and increased parking fees.
Subject Areas: discrete choice model; congestion pricing; carbon tax; parking fees

Availability: Clapp, Christopher M. "Should My Car Move or Should I? A Model of Residential and Commuting Choices." University of Virginia
http://people.virginia.edu/~cmc8dp/files/2013_01_28-Clapp-Job_Market_Paper.pdf

Ask the Builders: Finding Consensus Among Development Industry Stakeholders for Greenhouse Gas Reduction Strategies *Benjamin David Lichty*

Publication Date: December 2012

Abstract: One of the government's primary roles is to step in when a market failure exists and correct it. Externalities create market failure, and economists consider pollution the best real world example of a market failure. California's Assembly Bill (AB) 32 and Senate Bill (SB) 375 are both examples of public policy attempting to correct a market failure known as global warming or climate change, from greenhouse gas (GHG) emissions, a form of air pollution. AB 32 and SB 375 seek to reduce greenhouse gas (GHG) emissions. Creating new laws in California is difficult, and understanding what GHG reduction strategies are agreeable across party lines is valuable. The success of efforts to pass new legislation to reduce GHGs and slow global warming depends greatly on finding consensus among stakeholders. While existing legislation may have some impact on reducing GHG emissions, new strategies are imperative to meet current objectives of curbing climate change.

Subject Areas: GHGs; global warming

Availability: Lichty, Benjamin David. Ask the builders: finding consensus among development industry stakeholders for greenhouse gas reduction strategies. Diss. California State University, 2012. http://www.csus.edu/uld/thesis-project/bank/2012/Lichty.pdf

The time cost of access to food – Distance to the grocery store as measured in minutes

Karen S. Hamrick and David Hopkins

Publication Date: December 2012

Abstract: Time use diaries are rich in information, including where and when respondents travel from place to place. Travel estimates, as well as variety of contextual information on travel, can be generated from time use data. However, using the data for travel analysis is difficult and involves detailed understanding of how the data are coded. Presented here is a methodology for estimating travel time using the time diaries from the 2003-07 American Time Use Survey. As an illustration of the methodology, the authors estimate travel time to grocery shopping. These estimates are of interest as a policy concern in the United States is whether or not some poor areas of the country have access to supermarkets that offer the variety of foods needed for a healthy diet, and in particular, fresh fruits and vegetables. Neighborhoods that have limited access to supermarkets are referred to as "food deserts." The authors found that individuals living in low-income areas with limited supermarket access spend significantly more time (an average of 19.5 minutes) traveling to grocery shopping than the national average (15 minutes), and in addition, they grocery shop less frequently, and they are more likely to be accompanied by children during travel to grocery shopping.

Subject Areas: Food Deserts; time diaries;

Availability: Hamrick, Karen S., and David Hopkins. "The time cost of access to food–Distance to the grocery store as measured in minutes." electronic International Journal of TTime Use ResearchT: 28. http://ffb.uni-lueneburg.de/eijtur/pdf/volumes/eIJTUR-9-1-1_Motiram_Osberg.pdf#page=29

Development and implementation of a monitoring and assessment tool for CO2 emissions in inland transport to facilitate climate change mitigation *Lei Zhang, Frank Southworth, Chenfeng Xiong & Anthon Sonnenberg*

Publication Date: April 2012

Abstract: The Transport Division of the United Nations Economic Commission for Europe (UNECE), together with all UN Regional Commissions, initiated a new project to enhance international cooperation and planning towards sustainable transport policies that facilitate climate change mitigation.

The project is funded by the UN Development Account (UNDA) for 3 years, from January 2011 to December 2013.

The project aims at developing an information and analysis modelling tool based on a uniform methodology for the evaluation of the emissions of carbon dioxide (CO2). Since the tool is meant to pave the way "For Future Inland Transport Systems", it was named ForFITS. It focuses on the inland transport sector (road, rail and inland waterways), while CO2 emissions caused by international aviation and maritime transport are excluded from its scope.

In order to define the features of ForFITS, this report illustrates the main data requirements associated with the estimation of inland transport CO2 emissions, it looks at the overarching strategies and targets set by countries for mitigating GHG emissions as a whole, it considers in more detail transport-specific policy measures suitable and frequently adopted for CO2 emission mitigation, and it reviews the methodologies and modelling tools currently used for the estimation of CO2 emissions. Building on this information, this report also provides recommendations for the improvement of statistics related to transport, energy and CO2 emissions and the development of the ForFITS model.

Subject Areas: GHGs; emissions; sustainable transport

Availability: Tranche, UNDA Seventh. "CO2 emissions from inland transport: statistics, mitigation polices, and modelling tools." (2012).
http://www.unece.org.unecedev.colo.iway.ch/fileadmin/DAM/trans/doc/themes/2012_-_UNECE_-_Global_Status_Report__May_2012_.pdf

Methodological Options and Data Sources for the Development of Long-Distance Passenger Travel Demand Models: A Comprehensive Review *Lei Zhang, Frank Southworth, Chenfeng Xiong & Anthon Sonnenberg*

Publication Date: April 2012

Abstract: Since the passage of the Intermodal Surface Transportation Efficiency Act in 1991, a significant number of state highway agencies have started to develop and implement statewide travel demand models to meet policy and legislative development needs. Currently, however, a lack of up-to-date multimodal and inter-regional passenger travel data hampers analysts' ability to conduct quantitative assessments of long-distance travel infrastructure investment needs, at both the national and statewide levels. Despite these data limitations, but also largely shaped by them, long-distance travel modelling has become an increasingly popular topic in recent years. This paper reviews several methodologies for multimodal inter-regional travel demand estimation, drawing examples from both state-specific modelling within the USA and from fully national models being developed and applied in other parts of the world, notably in Europe.

Subject Areas: ISTEA; statewide travel demand model;

Availability: Zhang, Lei, et al. "Methodological Options and Data Sources for the Development of Long-Distance Passenger Travel Demand Models: A Comprehensive Review." Transport Reviews 32.4 (2012): 399-433. http://www.tandfonline.com/doi/abs/10.1080/01441647.2012.688174

Policy and Design Considerations for Accommodating Low-Speed Vehicles and Golf Carts in Community Transportation Networks *Jana Lynott, Amanda Taylor Poncy, Hannah Twaddell*

Publication Date: September 2011

Abstract: N/A

Subject Areas: low-speed vehicles, golf carts

Availability: AARP Public Policy Institute

http://www.aarp.org/home-garden/transportation/info-09-2011/insight-54.html

On The Move: State Strategies for 21st Century Transportation Solutions *Douglas Shinkle, Jaime Rall, and Alice Wheet*

Publication Date: July 2012

Abstract: N/A

Subject Areas: VMT fees, fuel taxes, HOV Lanes, alternative fuels, HOT Lanes, VMT, transit, transit ridership, transportation, transportation legislation, legislation

Availability: National Conference of State Legislators

http://www.ssti.us/wp/wp-content/uploads/2012/08/NCSL-2012-ON-THE-MOVE.pdf

PUBLIC TRANSPORTATION

Demand for Public Transport in Germany and the USA: An Analysis of Rider Characteristics *Ralph Buehlera & John Pucherb*

Publication Date: June 2012

Abstract: This paper first provides a brief review of trends in public transport demand from 1980 to 2010 in 16 countries in Europe, North America, and Australia. The focus, however, is on a detailed analysis of public transport demand in Germany and the USA, using uniquely comparable national travel surveys from 2001/2002 and 2008/2009 for both countries. Public transport has been far more successful in Germany than in the USA, with much greater growth in overall passenger volumes and trips per capita. Even controlling for differences between the countries in demographics, socio-economics, and land use, logistic regressions show that Germans are five times as likely as Americans to use public transport. Moreover, public transport in Germany attracts a much broader cross-section of society and for a greater diversity of trip purposes. The success of German public transport is due to a coordinated package of mutually supportive policies that include the following: (1) more and better service, (2) attractive fares and convenient ticketing, (3) full multimodal and regional integration, (4) high taxes and restrictions on car use, and (5) land-use policies that promote compact, mixed-use developments. It is the integrated package of complementary policies that explains why public transport in Germany can compete so well with the private car, even among affluent households. Conversely, it is the lack of complementary policies that explains the continuing struggle of public transport in the USA.

Subject Areas: public transport demand; Germany

Availability: Buehler, Ralph, and John Pucher. "Demand for public transport in Germany and the USA: An analysis of rider characteristics." Transport Reviews 32.5 (2012): 541-567. http://www.tandfonline.com/doi/abs/10.1080/01441647.2012.707695

Getting on the Bus: Marketing San Luis Obispo's Regional Transit Authority *Jenna Higgins*

Publication Date: June 2012

Abstract: A new trend is emerging, seeking to recognize the benefits of and encourage the use of public transportation. In the past, public transit agencies have not directed much energy or focus at marketing, seeking to use limited funds elsewhere. "The common perception is that money spent on marketing would be better spent on transit systems themselves…over time, a sustained investment in marketing increases the number of people who use transit. Increased ridership leads to increased revenue, and ideally, an increase in service to match the new demand" (Arpi, 2009). Even as marketing gains importance in the public transit world, questions remain as to how to make effective marketing choices for the public transit market. This report explores public transit marketing, and its application to the San Luis Obispo Regional Transit Authority. The San Luis Obispo Regional Transit Authority (RTA) provides regional public transportation service throughout San Luis Obispo County. Case study interviews, conversations with RTA, and review of academic and professional sources have supplied information and guidance on these questions. An interview with RTA was conducted to establish goals and guiding research questions for the exploration of marketing. A literature review provided a context of the field, through professional, academic, news, and media pieces. The research questions were explored through case study examples, in the form of interviews with Intercity Transit (Olympia, WA) and Orange County Transportation Authority (Orange County, CA). Further analysis of 2011 ridership survey data provided an additional level of information to consider. The research methods resulted in a range of findings that are applicable to RTA. The report concludes with the following recommendations for marketing RTA: 1. Focus on consistent branding. 2. Establish a system of more detailed ridership information. 3. Identify segments and direct messages. 4. Further develop new technology and social media tools.

Subject Areas: public transport; transit marketing

Modelling Public Transport Potential in Relation to Area Characteristics *Wannes Poesen*

Publication Date: October 2012

Abstract: The process of mode choice comprises different aspects. In this paper, models are developed linking area origin- and destination characteristics with reasons why people don't choose to take the bus to determine public transport (PT) potential. The need for this kind of research lies in the fact that PT providers need insights into PT potential to optimize their services. In order to know what characteristics to use, a brief overview of a literature is presented. This part focuses on area characteristics but also includes choice theories describing the process underlying mode choice behaviour. Hereafter, the ROVBECO research, for which the data used in this study was collected, is described. The independent variables for the models can be categorized into origin- (dwelling type and family status), destination- (employment size and building density) and travel mode (mode choice and speed) related characteristics. Two models determine the dependent variables: First, the mentioning of reasons of not taking the bus for a commuting is modelled. Second, if a reason was mentioned, the chance of the respondent switching from car/bike to bus for commuting trips when measures were to be taken to resolve the issue is modelled. The model type used in this study is binary logit. The main conclusion of the research is that the PT-potential model delivers interesting but rather limited results: building density seems to have the most significant influence followed by mode choice. Recommendations to increase model performance are the addition of more variables with more levels.

Subject Areas: public transport potential; binary logit

Availability: Poesen, Wannes. "Modelling Public Transport Potential in Relation to Area Characteristics." (2012). https://uhdspace.uhasselt.be/dspace/handle/1942/14171

Development and Application of a Rural Intercity Demand Model *Fravel, Frederic D., and Reyes Barboza Jr.*

Publication Date: November 2012

Abstract: This paper describes the development of a demand model to estimate ridership for rural intercity bus services in the United States. The need for such a model and the approach used in developing it are described. Two models were developed, one a regression equation calibrated on data from a survey of rural intercity services, and the other using a trip rate developed from National Household Travel Survey data. Both models are included in a toolkit that also includes user information and population data. The paper then compares the ridership predictions made using the model with actual experience on rural intercity routes in Washington State and illustrates how it can be used as part of a statewide assessment for Vermont. Conclusions about its applicability and directions for future research are presented.

Subject Areas: demand model; rural intercity bus service;

Availability: Fravel, Frederic D., and Reyes Barboza Jr. "Development and Application of a Rural Intercity Demand Model." Journal of Public Transportation 15.3 (2012): 25-41. http://www.nctr.usf.edu/wp-content/uploads/2012/10/jpt_15.3.pdf#page=32

Statewide Rural-Urban Bus Travel Demand and Network Evaluation: An Application in Tennessee

Hongtai Yang and Christopher R. Cherry

Publication Date: November 2012

Abstract: This paper examines the characteristics of intercity bus riders within Tennessee and proposes methods to identify service gaps and prioritize network expansion, particularly focusing on rural-urban connections. Data were collected through an on-board survey and compared with intercity auto trips. Compared to personal auto users, intercity bus riders are more likely to be of minority races, unemployed, unable to drive, and from low-income households. Five demand levels were determined based on the population distribution with these characteristics. The service areas of existing bus stops were identified and compared with the high demand areas. The result shows that an insufficient number of stops are located in high demand area. Still, approximately 80 percent of stops connect to meaningful destinations such as hospitals. The results imply that bus stations are well-connected to destinations but poorly connected to potential riders. Changes to the current network could better cover high-demand areas.

Subject Areas: intercity bus riders; service gaps; rural-urban connections

Availability: Yang, Hongtai, and C. Cherry. "Statewide Rural-Urban Bus Travel Demand and Network Evaluation: An Application in Tennessee." Journal of Public Transportation 15.3 (2012): 97-111. http://www.nctr.usf.edu/wp-content/uploads/2012/10/15.3_Yang.pdf

An Assessment of Public Transportation Market Using NHTS Data *Xuehao Chu*

Publication Date: March 16, 2012

This study assesses a range of public transit markets for Florida and the U.S. as a whole. Data from the 2009 National Household Travel Survey are used. The public transit markets are defined with trip purpose and seven personal, household, and travel characteristics of persons in these transit markets, including driver status, immigration status, existence of medical conditions that make it difficult to travel out of the home, household income, vehicle availability, race and ethnicity, and monthly frequency of transit use. Based on an approach of cross tabulations, this study assesses these transit markets from five perspectives:

1. Market Size - how the overall transit market is distributed across these transit sub-markets.

2. Modal Share - how people within each transit market travel using various modes, including transit.

3. Attitudes - how people within each transit market feel about a set of transportation issues.

4. Socio-Demographics - personal, household, location, and travel characteristics of transit markets.

5. Trip Characteristics - transit-specific and general trip characteristics of transit markets.

The assessment for Florida is limited to the first three perspectives due to sample size issues. The results presented are useful to operating agencies for strategic planning and to other government bodies for developing policies and funding programs for improving mobility of those who are transportation and economically disadvantaged and for improving the transportation system in general.

Subject Areas: Public transit, National Household Travel Survey, Person-trips, Modes, Trip Purposes

Availability: National Center for Transit Research - **http://www.nctr.usf.edu/2012/03/an-assessment-of-public-transportation-markets-using-nhts-data/**

Sustainable Transport Data Collection and Application: China Urban Transport Database *Tian Jiang, Zhongyi Wu, Yu Song, Xianglong Liu, Haode Liu, Haozhi Zhang*

Publication Date: June 25, 2012

Transport policy making process of national and local governments should be supported by a comprehensive database to ensure sustainable and healthy development of urban transport. China Urban Transport Database (CUTD) has been built to play such a role. This paper is to make an introduction of CUTD framework including user management, data warehouse and application modules. Considering the urban transport development features of Chinese cities, sustainable urban transport development indicators are proposed to evaluate public transport service level in Chinese cities. International urban transport knowledge base is developed as well. CUTD has been applied in urban transport data processing, urban transport management and urban transport performance evaluation in national and local transport research agencies, operators and governments in China, and it will be applied to a broader range of fields.

Subject Areas: urban transport; database; public transport

Availability: China Urban Sustainable Transport Research Center: Jiang, Tian, et al. "Sustainable Transport Data Collection and Application: China Urban Transport Database." http://downloads.hindawi.com/journals/mpe/aip/879752.pdf

SPECIAL POPULATIONS

Mobility and Aging: New Directions for Public Health Action *William A. Satariano, PhD, MPH, Jack M. Guralnik, MD, PhD, Richard J. Jackson, MD, MPH, Richard A. Marottoli, MD, Elizabeth A. Phelan, MD, and Thomas R. Prohaska, PhD*

Publication Date: August 2012

Abstract: Optimal mobility, defined as relative ease and freedom of movement in all of its forms, is central to healthy aging. Mobility is a significant consideration for research, practice, and policy in aging and public health. We examined the public health burdens of mobility disability, with a particular focus on leading public health interventions to enhance walking and driving, and the challenges and opportunities for public health action. We propose an integrated mobility agenda, which draws on the lived experience of older adults. New strategies for research, practice, and policy are needed to move beyond categorical promotion programs in walking and driving to establish a comprehensive program to enhance safe mobility in all its forms.

Subject Areas: Mobility; elderly

Availability: William A. Satariano, Jack M. Guralnik, Richard J. Jackson, Richard A. Marottoli, Elizabeth A. Phelan, and Thomas R. Prohaska. Mobility and Aging: New Directions for Public Health Action. American Journal of Public Health: August 2012, Vol. 102, No. 8, pp. 1508-1515. http://ajph.aphapublications.org/doi/abs/10.2105/AJPH.2011.300631

Work, family and daily mobility: a new approach to the problem through a mobility survey *Marta Olabarria, Katherine Pérez, Elena Santamariña-Rubio, Josep Maria Aragay. Mayte Capdet, Rosana Peiró, Maica Rodríguez-Sanz, Lucía Artazcoz, Carme Borrell*

Publication Date: October 2012

Abstract: Objectives: To analyze gender inequalities in socioeconomic factors affecting the amount of time spent travelling for work-related and home-related reasons among working individuals aged between 30 and 44 years old during a weekday in Catalonia (Spain). Methods: A cross-sectional study was conducted. Data were obtained from employed individuals aged between 30 and 44 years of age who reported travelling on the day prior to the interview in the Catalan Mobility Survey 2006 (N = 23,424). Multivariate logistic regression models were adjusted to determine the factors associated with longer time spent travelling according to the reason for travelling (work- or home-related journeys). Odds ratios and 95% confidence intervals are presented. Results: A higher proportion of men travelled and spent more time travelling for work-related reasons, while a higher proportion of women travelled and spend more time travelling for home-related reasons. A higher educational level was associated with greater time spent travelling for work-related reasons in both men and women but was related to an increase in travelling time for home-related reasons only in men. In women, a larger household was associated with greater travel time for home-related reasons and with less travel time for work-related reasons. Conclusion: This study confirms the different mobility patterns in men and women, related to their distinct positions in the occupational, family and domestic spheres. Gender inequalities in mobility within the working population are largely determined by the greater responsibility of women in the domestic and family sphere. This finding should be taken into account in the design of future transport policies.

Subject Areas: Inequalities; Transportation; Gender roles; Family relations; Public policies

Availability: Olabarria, Marta, et al. "Work, family and daily mobility: a new approach to the problem through a mobility survey." Gaceta Sanitaria (2012). http://www.researchgate.net/publication/253272547_gac_sanit_olabarria2012/file/9c96051f7d29da11e5.pdf

Men Shape a Downward Trend in Car Use among Young Adults—Evidence from Six Industrialized Countries *Tobias Kuhnimhof, Jimmy Armoogum, Ralph Buehler, Joyce Dargay, Jon Martin Denstadli & Toshiyuki Yamamoto*

Publication Date: October 2012

Abstract: This paper investigates trends in the travel behaviour of young adults in Germany, France, Great Britain, Japan, Norway, and the USA over the past few decades with a focus on car availability and car travel. The trend analysis relies on micro-data from over 20 National Travel Surveys from the study countries dating back to the mid-1970s. The analysis of the survey data is supplemented by official statistics on licence holding. On this basis, this paper compiles a body of evidence for changes in mobility patterns among young adults in industrialized countries over the past few decades. The findings indicate that since the turn of the millennium, access to cars, measured in terms of drivers' licences and household car ownership, has decreased in most study countries—especially for men. Moreover, average daily car travel distance has decreased in most study countries, again especially for men. In France, Japan, and most significantly in the USA, the decrease in car travel has led to a reduction in total everyday travel by young travellers. In Great Britain, the decline in car travel was partly, and in Germany fully, compensated by an increased use of alternative modes of transport.

Subject Areas: VMT; vehicle ownership; driver's license

Availability: Kuhnimhof, Tobias, et al. "Men shape a downward trend in car use among young adults—evidence from six industrialized countries." Transport Reviews 32.6 (2012): 761-779. http://www.tandfonline.com/doi/abs/10.1080/01441647.2012.736426

Investigation into suitability of current ATDs to represent ageing drivers *Acar, B. Serpil, J. Feng, and V. Esat*

Publication Date: November 2012

Abstract: Ageing car occupants are expected to become a larger part of the driver and passenger population in developed countries in the future. Currently, Anthropomorphic Test Devices (ATDs) are essential tools to assess safety of automobiles; however, they do not fully embody the features of all occupant groups in the world population. This study investigates the features of ageing drivers. The data are collected and analysed with respect to age and gender. Information particularly on driver–automobile interaction is provided in the form of distances and angles measured in-car. The physical characteristics of existing ATDs are investigated and compared with the anthropometric data of ageing drivers. Comparisons indicate that the current ATDs do not incorporate some of the features of ageing drivers. The requirements of future ATDs such as sitting height, abdominal depth and posture are discussed. These specifications are essential for the development of new ATDs representing ageing drivers.

Subject Areas: ageing, ageing driver, anthropometric measurements, in-car measurements, ATD

Availability: Acar, B. Serpil, J. Feng, and V. Esat. "Investigation into suitability of current ATDs to represent ageing drivers." International Journal of Crashworthiness 18.1 (2013): 1-10. http://www.tandfonline.com/doi/abs/10.1080/13588265.2012.730211

Female Drivers in the United States, 1963–2010: From a Minority to a Majority?

Michael Sivaka

Publication Date: December 2012

Abstract: This study examined the changes in the relative proportions of male and female drivers between 1963 and 2010. The analysis used data from the Federal Highway Administration. During the period examined, the proportion of male drivers has gradually decreased. In 1963, males represented 60.4 percent of all drivers. Males became a minority in 2005. In 2010, they constituted 49.7 percent. A consideration of both the percentage of drivers by gender and the average annual miles driven by gender revealed that in 1963 about 76 percent of drivers on the road were males, which dropped to about 59 percent by 2010. Currently, females with a driver's license are slightly outnumbering males. However, because females drive less than males, the overall likelihood that a given driver on the road today is a female is still less than 50 percent.

Subject Areas: driver licensing, male drivers, female drivers

Availability: Sivak, Michael. "Female Drivers in the United States, 1963–2010: From a Minority to a Majority?." Traffic injury prevention 14.3 (2013): 259-260.

Senior population's transportation preferences to access health care services– Insights from the 2009 National Household Travel Survey (NHTS) *Xiaohong Pan*

Publication Date: November 2011

Abstract: Population aging is now progressing rapidly in the U.S., which brings significant social and economic challenges to each and every stakeholder in the society. As seniors age, their health care needs surge and they more likely need alternative means of transportation. Considering the increasing burden of population aging that lays on the U.S. health care system, it is important to improve seniors' transportation access to health care services. However, before planners and policy makers can provide any appropriate and effective assistance, it is crucial to first understand seniors' transportation preferences to access health care services. Utilizing the most recent National Household Travel Survey (2009 NHTS) data, this paper examines how different socio-demographic, spatial, and transportation attributes affect seniors' transportation choices to access health care services. The study results indicate that, many seniors are still driving, and they prefer auto travel than public transportation; increasing density alone might not be a powerful and effective strategy to change seniors' travel mode choices, at least not for the current generation; mode choice of health care trips are inelastic to some transportation attributes, such as travel distance. In addition, the results suggest that, although improving traditional public transportation is important, helping seniors, especially those live in suburban and rural area, to travel using their preferred means is essential as well.

Subject Areas: senior population, travel behavior, health care services, National Household Travel Survey (NHTS)

Availability: 2012 TRB paper submittal # 12-3251

Integrating Parental Attitudes in Research on Children's Active School Commuting: Evidence from a Community School Travel Survey *Yizhao Yang, and Ezra Markowitz*

Publication Date: N/A

Abstract: Current active school travel research emphasizes travel distance and neighborhood walkability as major environmental conditions affecting the occurrences of children walking or biking to school. The impacts of how parental travel attitudes on children's school travel behavior remain understudied. This paper outlines a conceptual framework that incorporates the relationships of attitudes, environment conditions, and children's walking or biking to school. The framework recognizes the predictive power that attitudinal factors have for children's walking or biking to school; it also highlights the moderating effects of parental travel attitudes on the predictive power of some environment conditions. Using data (1197 cases) from a school travel survey conducted in a mid-sized school district in Oregon, this paper reports that parental attitudes toward walking/biking to school and car-use are significant explanatory variables in models predicting occurrence of children walking or biking to school when important environmental variables are controlled for. The analysis also reveals that important built environment variables – school-travel distance and neighborhood walkability – exhibit varying levels of impacts on the probability of children walking or biking to school when parents demonstrate different attitudes toward active school commuting and car-use. The paper discusses implications of the research findings for the challenges facing Safe Routes to School Programs, and explores approaches that can make these programs more effective.

Subject Areas: active school commuting, travel attitude, Safe Routes to School Program, built environment, National Household Travel Survey

Availability: 2012 TRB paper submittal

Immobility Levels and Mobility Preferences among Elderly in the United States: Evidence from the 2009 National Household Travel Survey (NHTS) *Sujan Sikder and Abdul Rawoof Pinjari*

Publication Date: N/A

Abstract: Transportation mobility is critically important to the well-being of the elderly population. Using data from the 2009 National Household Travel Survey, this paper proposes a metric to measure immobility among elderly over different time frames. Specifically, short-term immobility is defined as immobility over a single day, while long-term immobility refers to immobility over a week, and medium-term immobility lies in between. In addition, long-term immobile elderly are divided into two mobility-preference groups based on whether they prefer going out of home or not. Using this immobility metric, and respondent-stated mobility preferences, descriptive analysis and discrete choice models are used to analyze the correlates of immobility among American elderly. African American elderly are found to be more likely to be long-term immobile compared to those from other racial groups. Such racial differences are not readily apparent in immobility over shorter time frames. This result explains why most previous studies did not find any racial differences in elderly mobility - due to shorter time frames of analysis. Presence of another elderly companion in the household is found to have a significant positive influence on a persons' mobility. Medical conditions may impose physical constraints on the ability to travel but do not seem to curb the desire for mobility among elderly. However, in ability to drive is associated with a strong preference against going out of home, suggesting that auto-centric land-use transportation system can potentially curb the desire of non-driving elderly to travel out of home.

Subject Areas: mobility, immobility levels, elderly mobility, National Household Travel Survey

Availability: 2012 TRB paper submittal

U.S. School Travel 2009: An Assessment of Trends *McDonald, N., A. Brown, L. Marchetti, and M. Pedroso*

Publication Date: 2011

Abstract: Background: The White House Task Force on Childhood Obesity has set a goal of increasing walking and biking to school by 50% within 5 years. Meeting the goal requires a detailed understanding of the current patterns of school travel.

Purpose: To document nationally representative estimates of the amount of school travel and the modes used to access school in 2009 and compare these levels with 1969, 1995, and 2001.

Methods: The National Household Travel Survey collected data on the travel patterns of 150,147 households in 2008 and 2009. Analyses, conducted in 2010, documented the time, vehicle miles traveled, and modes used by American students to reach school. A binary logit model assessed the influence of trip, child, and household characteristics on the decision to walk to school.

Results: In 2009, 12.7% of K–8 students usually walked or biked to school compared with 47.7% in 1969. Rates of walking and biking to school were higher on the trip home from school in each survey year. During the morning peak period, school travel accounted for 5%–7% of vehicle miles traveled in 2009 and 10%–14% of all private vehicles on the road.

Conclusions: There have been sharp increases in driving children to school since 1969 and corresponding decreases in walking to school. This increase is particularly evident in the number of vehicle trips generated by parents dropping children at school and teens driving themselves. The NHTS survey provides a unique opportunity to monitor these trends in the future.

Subject Areas: travel behavior, walk to school, bike to school

Availability: McDonald, N., A. Brown, L. Marchetti, M. Pedroso. 2011. U.S. School Travel 2009: An Assessment of Trends. *American Journal of Preventive Medicine* 41(2): 146-151.

http://dx.doi.org/10.1016/j.amepre.2011.04.006

Automobile Ownership and Travel of the Poor: Evidence from the 2009 National Household Travel Survey *Evelyn Blumenberg (Corresponding Author), and Gregory Pierce*

Publication Date: November 14, 2011

Abstract: Income—or the lack of it—influences household transportation decisions and the ways in which individuals travel. Low-income households are less likely to own cars and more likely to travel by modes other than the automobile. Less is known, however, about the specific determinants of travel among the poor, which is the purpose of this analysis. In this study we, first, use data from the 2009 National Household Travel Survey to examine the relationship between income and automobile ownership and the role of automobile ownership in explaining personal miles traveled. We then examine whether these determinants vary by income group. We find that low-income adults rapidly convert rising income into additional mobility, at faster rates than for higher-income adults. Further, automobile ownership increases personal miles traveled for all adults; however, it is particularly influential in increasing the travel of low-income adults. Households accrue greater marginal benefits by moving from zero to one vehicle rather than by purchasing additional vehicles when they already own a vehicle. The findings underscore the importance of automobile ownership to the mobility of low-income households and suggest an important role for policy in facilitating low-income auto ownership.

Subject Areas: automobile ownership, person miles traveled, National Household Travel Survey

Availability: 2012 TRB paper submittal

Investigating the Impacts of Policy on School Travel *Jessica Ann Van Ristell*

Publication Date: November 2011

Abstract: Millions of children travel to and from school each day as part of their daily routine. A large percentage of children make this journey by car, and the numbers are steadily rising and this is leading to many environmental and health implications for children.

The current economic climate has persuaded the British Government to look again at policies relating to all school travel funding to highlight areas where savings and cuts can be made. This is interesting because the home-to-school transport provision policy has been in place since the Education Act 1944 and this policy costs local authorities in England over £1 billion a year. Therefore, the focus of this thesis is threefold.

Firstly, it seeks to determine the main issues within school travel and reports on the views of current professionals in the school travel industry. Structured in-depth interviews were carried out with 16 UK and US school travel experts. The questions focused on the current stakeholders of school travel, issues regarding school travel, bus use in school travel, and the challenges faced by transport planners to ensure school pupils have a safe and pleasant journey to school. Secondly this thesis quantifies the traffic and environmental impacts of the school choice policy in England. It achieves this by analyzing School Census data from 2009 from the Department for Education. Multinomial logit modeling and mixed multinomial logit modeling are used to illustrate the current travel behavior of English children in their journey to school and examine how there can be a significant reduction in vehicle miles travelled, CO2 emissions and fuel consumption if the 'school choice' policy is removed. The results suggest that if all children attended their nearest school, this would result in reductions in their personal mobility, vehicle miles travelled and CO2 emissions.

Finally, this thesis examines the policies relating to the funding criteria of home-to-school public school transport provision. Specifically, the paper employs a multilevel modeling technique to develop a series of relationships between bus usage by school and the level of spending by local education authorities on home-to-school bus travel provision while controlling for other factors such as school quality, land-use patterns and various proxies for household incomes. The results suggest that there is a significant effect of funding on the total school-level bus passenger mileage for primary (aged less than 11), secondary (aged 11 to 16) and Post 16 schools.

Subject area: school travel, travel behavior

Availability:
http://www.staff.lboro.ac.uk/~cvmpe/img/Jessica_van_Ristell_thesis_final_version.pdf

Travel by University Students in Virginia. Is This Travel Different from Travel by the General Population? *Asad Khattak, Xin Wang, Sanghoon Son, Paul Agnello*

Publication Date: November 2011

Abstract: To improve regional travel demand models, transportation engineers and planners want to represent subpopulations appropriately. A key segment of the population is university students, and their behavior is neither well understood nor well represented in travel demand models. Furthermore, universities provide a unique context for behavioral research because they are livable, are friendly to alternative travel modes, have a higher density than other contexts, and offer mixed travel modes. This study collected and analyzed data on the travel behavior of university students. With the use of an Internet-based survey instrument, the study collected data on travel behavior, socio-demographics, and context variables at four major universities in Virginia. This paper provides information about the design and implementation of the survey, the instrument structure, and a descriptive analysis of students' personal and travel characteristics. The results indicated that the socio-demographics and travel behavior of university students were different from those of the general population. Moreover, differences in travel behavior were found between students living on campus and students living off campus and between students attending urban campuses and those attending suburban campuses. The insights gained from this study serve as a basis for further such surveys and help provide an understanding of travel behavior in and around university campuses.

Subject Areas: school travel, travel behavior, Virginia, socio-demographics, university students, urban campuses

Availability: http://trb.metapress.com/content/j5x85k643q87r0m1/

Rural Veteran Access to Healthcare Services: Investigating the Role of Information and Communication Technologies in Overcoming Spatial Barriers *Benjamin L. Schooley, MBA, PhD; Thomas A. Horan, PhD; Pamela W. Lee, PhD; and Priscilla A. West, MPH*

Publication Date: N/A

Abstract: This multi-method pilot study examined patient and practitioner perspectives on the influence of spatial barriers to healthcare access and the role of health information technology in overcoming these barriers. The study included a survey administered to patients attending a Department of Veterans Affairs (VA) health visit, and a focus group with VA care providers.

Descriptive results and focus group findings are presented. Spatial distance is a significant factor for many rural veterans when seeking healthcare. For this sample of rural veterans, a range of telephone, computer, and Internet technologies may become more important for accessing care as Internet access becomes more ubiquitous and as younger veterans begin using the VA health system. The focus group highlighted the negative impact of distance, economic considerations, geographic barriers, and specific medical conditions on access to care. Lack of adequate technology infrastructure was seen as an obstacle to utilization. This study discusses the need to consider distance, travel modes, age, and information technology infrastructure and adoption when designing health information technology to care for rural patients.

Subject Areas: rural, veterans, technology, healthcare, transportation, access

Availability: Perspectives in Health Information Management (Spring 2010): 1-20

Has The Time Come For An Older Driver Vehicle? *David W. Eby and Lisa J. Molnar*

Publication Date: February 2012

Abstract: The population of the world is growing older. As people grow older they are more likely to experience declines that can make operating a personal automobile more difficult. Once driving abilities begin to decline, older adults are often faced with decreased mobility. Due to the preference for and pervasiveness of the personal automobile for satisfying mobility needs, there is a global necessity to keep older adults driving for as long as they can safely do so. In this report we explore the question: Has the time come for an older driver vehicle? Great gains in safe mobility could be made by designing automobiles that take into account, and help overcome, some of the deficits in abilities common in older people. The report begins by providing a background and rationale for an older driver vehicle, including discussions of relevant trends, age-related declines in functional abilities, and the adverse consequences of decreased mobility. The next section discusses research and issues related to vehicle design and advanced technology with respect to older drivers. The next section explores crashworthiness issues and the unique requirements for older adults. The following section discusses the many issues related to marketing a vehicle that has been designed for older drivers. The report concludes that there is a clear global opportunity to improve the safety, mobility, and quality of life of older adults by designing vehicles and vehicle technologies that help overcome common age-related deficits. The marketing of these vehicles to older consumers, however, will be challenging and will likely require further market research. The development of vehicle design features, new automotive technologies, and crashworthiness systems in the future should be guided by both knowledge of the effects of frailty/fragility of the elderly on crash outcomes, as well as knowledge of common driving related declines in psychomotor, visual, and cognitive abilities. Design strategies that allow for some degree of customization may be particularly beneficial. It is clear that training and education efforts for using new vehicle features will need to be improved.

Subject Areas: older adults, vehicle design, crashworthiness, marketing

Availability: University of Michigan, Sustainable Worldwide Transportation - Report No. UMTRI-2012-5

Travel Behavior of Hispanic Immigrants of Southern California – Impact Analysis of Future Growth Based On Parcel-Based Sketch Planning Model *Hsi-Hwa Hu, Ph.D. and Simon Choi, Ph.D.*

Publication Date: October 2011

Abstract: N/A

Subject Areas: immigrants, Hispanic immigrants, 2009 National Household Travel Survey, travel behavior, Southern California

Availability: http://onlinepubs.trb.org/onlinepubs/conferences/2012/4thITM/Papers-A/0117-000117.pdf

Female Drivers In the U.S., 1963–2010: From A Minority To A Majority? *Michael Sivak*

Publication Date: November 2012

Abstract: *Objective:* This study examined the changes in the relative proportions of male and female drivers between 1963 and 2010.

Method: The analysis used data from the Federal Highway Administration.

Result: During the period examined, the proportion of male drivers has gradually decreased. In 1963, males represented 60.4% of all drivers. Males became a minority in 2005. In 2010, they constituted 49.7%. A consideration of both the percentage of drivers by gender and the average annual miles drive by gender reveals that in 1963 about 76% of drivers on the road were males, which dropped to about 59% by 2010.

Conclusions: Currently, females with a driver's license are slightly outnumbering males. However, because females drive less than males, the overall likelihood that a given driver on the road today is a female is still less than 50%.

Subject Areas: driver licensing, male drivers, female drivers

Availability: Taylor and Francis
http://www.tandfonline.com/doi/abs/10.1080/15389588.2012.755736

SURVEY DESIGN, METHODOLOGY, AND OTHER APPLICATIONS

Smartphone-Based Travel Experience Sampling and Behavior Intervention among Young Adults *Yingling Fan, Qian Chen, Chen-Fu Liao, Frank Douma*

Publication Date: May 2012

Abstract: This research project aims to develop a data collection application that enables real-time tracking and reporting of the health-related impacts of travel behavior. Using computing, communication, and sensing capabilities of smartphones, an Android phone application named UbiActive was developed to collect real-time travel-related physical activity and psychological well-being data from phone users. The application was tested on multiple Android phones, among which Nexus S and HTC Magic were found to produce comparable physical activity outputs with the commercially available accelerometer. The application was further tested in a three-week field study for its viability for real-time data collection and behavior intervention against unhealthy travel behavior. Twenty-three young adults were recruited and randomized into intervention and control groups. Both groups were asked to install UbiActive on their phone and wear their phone on their right hip during all waking hours for three consecutive weeks. The intervention group was provided information on impacts of their travel behavior on physical activity and psychological well-being. No information was provided to the control group. After the field study, all participants were asked to complete a web-based exit survey that was comprised of questions about their general participation experience and specific concerns about the study design, application, compliance requirements, and privacy issues. Findings from the field study show that UbiActive has high potential in collecting travel-related physical activity and psychological experience data, but limited effectiveness in behavior intervention. Findings from the exit survey provide useful insights into potential improvement areas of the study and the UbiActive application.

Subject Areas: Smartphones; mobility data;

Availability: Chen, Qian, Frank Douma, and Chen-Fu Liao. Smartphone-Based Travel Experience Sampling and Behavior Intervention among Young Adults. No. CTS 12-11. Intelligent Transportation Systems Institute, Center for Transportation Studies, University of Minnesota, 2012. http://conservancy.umn.edu/bitstream/132726/1/CTS12-11.pdf

A Strategy on How to Utilize Smartphones for Automatically Reconstructing Trips in Travel Surveys *Philippe Nitsche, , Peter Widhalm, Simon Breuss, Peter Maurer*

Publication Date: May 2012

Abstract: The acquisition of travel data is currently based on cost- and time-intensive questionnaires and yields mostly an incomplete picture due to limited coverage and inadequate updates. There is an urgent need for technologically supported data acquisition tools. This paper introduces a novel approach to developing a large-scale travel survey by intelligently employing data from smartphones. Based on signals of the embedded accelerometers and GPS reveivers, an ensemble of probabilistic classifiers is trained for automatically reconstructing the individual trips composing a tour, including the mode choice. In the region of Vienna, Austria, 266 hours of travel data were collected to train and evaluate the models. Using a set of 72 features, the best classification results are achieved for detecting walks (92%) and bike rides (98%). Railway modes were correctly identified in 80% of all cases, which is subject to further research. In case of GPS losses only accelerometer data are used, which still shows promising results. This allows the method to incorporate places where there is normally only a weak or no GPS signal. Future smartphone applications are intended to spread the tool among traffic users, while the effort for them should be kept to a minimum i.e. no manual entries or questionnaires are necessary. Due to the increasing popularity of smartphones, the tool has the potential to be used on a wide-spread basis.

Subject Areas: Smartphones; mobility data; travel survey; accelerometer; GPS; transport modes; mode detection

Availability: Nitsche, Philippe, et al. "A strategy on how to utilize smartphones for automatically reconstructing trips in travel surveys." Procedia-Social and Behavioral Sciences 48 (2012): 1033-1046. http://www.sciencedirect.com/science/article/pii/S1877042812028169

Transportation Planning Survey Methodologies for the Proposed Study of Physical and Socio-economic Development of Deprived Rural Regions: A Review

Mir Aftab Hussain Talpur, Madzlan Napiah, Imtiaz Ahmed Chandio & Shabir Hussain Khahro

Publication Date: May 2012

Abstract: Transportation is considered as an essential part of human life and backbone of national, regional and local economy. Transportation sector plays a crucial role in boosting up the life styles of common men by providing facilities and accessibilities as required to them. Deprived rural regions are always struggling from services and facilities aspects due to their remote and scattered locations. Transportation is a tool, which can mitigate rural regional problems by providing proper accessibilities and links to employment, health, education and services. The proposed study objective is to provide accessibility and proper transportation services to these rural regions. For this purpose regional transportation policy plan is required, which can't be formulated without relevant and quality data. The purpose of this paper is to review different surveys methodologies, which are essential for data collection. Different techniques have been reviewed including face-to-face interviews, telephonic interviews, web and postal survey methodologies, pilot survey, participatory rural appraisals and household surveys. It is concluded that during study primary as well as secondary data can be used. This exercise can save time and other crucial resources. The data can be used for the development of transportation policy for the study area. This plan can be helpful in bringing prosperity, mitigating poverty and uplifting the living standards of common men in these deprived regions.

Subject Areas: rural regions, regional economy, accessibility, quality data, surveys methodologies, transportation policy plan

Availability: Talpur, Mir Aftab Hussain, et al. "Transportation Planning Survey Methodologies for the Proposed Study of Physical and Socio-economic Development of Deprived Rural Regions: A Review." Modern Applied Science 6.7 (2012): p1.
http://ccsenet.org/journal/index.php/mas/article/view/16925

Synthesis of Spatially & Temporally Disaggregate Person Trip Demand: Application for a Typical New Jersey Weekday *Talal R. Mufti*

Publication Date: November 2012

Abstract: With the advent of technologies such as autonomous taxis and large-scale personal rapid transit networks drawing nearer to the present reality, serious studies must be made with regard to what levels of demand and opportunity exist for the degree of accessibility that such technologies can provide in urban areas. With a lack of high resolution information available from conventional surveying methods, this thesis looks to generate synthetic data regarding person trips at a highly disaggregated level, in space and in time, across the entire state of New Jersey. The model used produces an output of 32.6 million trips where the average trip distance, after removing outliers, is 12.4 miles and the average travel time to work is 21 minutes—figures that are reasonably near to New Jersey benchmarks. The thesis documents the model's methodologies and results and proceeds to display limitations as well as suggest improvements for future iteration.

Subject Areas: autonomous vehicles; disaggregate person demand

Availability: Mufti, T. Synthesis of Spatially & Temporally Disaggregate Person Trip Demand: Application for a Typical New Jersey Weekday. Diss. Master's thesis, Princeton University, 2012. http://www.princeton.edu/~alaink/Orf467F12/MuftiTripSynthesizer_v.1.pdf

Socioeconomic Forecasting *Yingge Xiong, Jon D. Fricker, Kevin T. McNamara and Joseph W. Longley*

Publication Date: May 2012

Abstract: The role of the REMI Policy Insight+ model in socioeconomic forecasting and economic impact analysis of transportation projects was assessed. The REMI PI+ model is consistent with the state of the practice in forecasting and impact analysis. REMI PI+, like its competitors, is vulnerable to the trends contained in the historical data it uses, especially recent trends. After the most recent periodic update in data, the performance of the REMI PI+ model improved, that is, it produced long-term forecasts that were more credible. Zonal-level population and employment forecasts for direct input to the Indiana Statewide Travel Demand Model (ISTDM) can be achieved by applying disaggregation regression methods. Indiana University's Center for Econometric Model Research (CEMR) model is also a sound forecasting model. Because of the knowledge of in-state economists, the CEMR-IBRC model could provide forecasts of the Indiana economy that reflect characteristics not known to out-of-state forecasters. The researchers also examined economic impact analysis models that are possible alternatives to REMI PI+. Acquiring a new economic impact analysis package does not seem necessary for INDOT, if REMI forecasts can be adjusted to (a) accommodate recent and reasonable expected trends in the Indiana economy, and (b) meet the geographic (TAZ) needs of the ISTDM. MCIBAS—which is currently used by the Indiana Department of Transportation—is a good hybrid system to use in the economic impacts analysis of transportation projects. Indiana University's CEMR is capable of conducting economic impact analyses, with local knowledge of the Indiana economy, at a cost lower than REMI's. However, INDOT would have to decide whether these potential advantages justify changing the present relationship with REMI. In cases where the credibility of data, forecasts, and/or impact analyses needs to be verified, an INDOT version of an expert panel along the lines of Michigan's Transportation Technical Committee could be convened.

Subject Areas: socioeconomic data, ISTDM, REMI, economic impact analysis, expert panel

Availability: Xiong, Yingge, et al. "Socioeconomic Forecasting." (2012). Purdue University http://docs.lib.purdue.edu/jtrp/1509/

Household Travel Analysis Using Bayesian Negative Binomial Models

Dapeng Zhang; Xiaokun Wang

Publication Date: November 10, 2011

Abstract: One critical component in transportation planning is the relationship between household travel patterns and socioeconomic factors. The 2009 National Household Travel Survey in the U.S. provides data to characterize such a relationship. Although NHTS is considered the most informative dataset for house travel patterns on national level, the depth and frequency of the survey are constrained by available budget. The goal of this study is to develop a better model to produce more reasonable parameter estimations and better prediction performance. This paper examines the conventional negative binomial regression model for household trips production analysis. This approach incorporates prior information, has optimal small-sample properties and allows for tractable inference. Using Markov Chain Monte Carlo simulation, parameters are estimated a randomly sampled dataset. It is found that Bayesian negative binomial model is effective in enhancing model estimation performance when sample size is limited but reliable prior information is available.

Subject Areas: Markov Chain Monte Carlo;

Availability: Zhang, Dapeng, and Xiaokun Cara Wang. "Household Travel Analysis Using Bayesian Negative Binomial Models." CICTP 2012@ sMultimodal Transportation Systems—Convenient, Safe, Cost-Effective, Efficient. ASCE, 2012. http://ascelibrary.org/doi/pdf/10.1061/9780784412442.367

An Evaluation of Key Design Elements of the Front Range Travel Counts Long Distance Survey

Stacey Bricka and Erik Sabina

Publication Date: November 10, 2011

Abstract: This paper documents an evaluation of two key design aspects of a long distance survey conducted as part of the 2009-2012 Front Range Travel Counts effort. The Front Range Travel Counts project is a cooperative effort across four adjacent Colorado metropolitan regions to document travel behavior within and across regions. The effort included household, commercial vehicle, and external station surveys.

Consistent with state-of-the-practice in the U.S., the long distance survey was administered as a supplement to the household survey sample. Respondents were asked to record all trips made to a location 50-miles or more from home during the two-week period prior to the 24-hour travel day. Households reporting no long distance travel were asked to report details of their most recent long distance trip, regardless of when it occurred.

The analysis in this paper focuses on two design aspects: (1) the selection of a 2-week recall period, with the request for a "most recent trip" from those who reported zero long distance trips and (2) the definition of a long distance trip. The results suggest that future surveys should use a longer recall period. In addition, the practice of asking for "most recent trip" from only respondents who reported zero long distance trips within the recall travel period should be expanded to ask that question of all respondents. Finally, the definition as used resulted in the capture of shorter-distance trips, suggesting refinement is needed.

Subject Areas: National Household Travel Survey, long distance survey

Availability: Submitted to 2012 TRB for presentation and consideration for publication. Paper # 12-3096

National Household Travel Survey Add-On Program: Experience of Stakeholders and Best Practices for Maximizing Program Benefits *Stephanie S. Ivey, (Corresponding Author), Daniel A. Badoe, Stephen Edwards*

Publication Date: November 1, 2011

Abstract: The National Household Travel Survey (NHTS) is conducted by the Federal Highway Administration (FHWA) every 5 to 7 years to determine the travel characteristics of the American public. In 1990, the FHWA began offering the add-on program, which allows State Departments of Transportation (DOT) and Metropolitan Planning Organizations (MPO) to purchase additional sample data for their local area. In the 2009 NHTS, Tennessee Department of Transportation (TDOT) purchased add-on sample data for the state that will be used by both TDOT and MPOs in Tennessee. To derive the most benefit from the data, TDOT sponsored a study to determine how add-on samples have been used by previous add-on program participants and lessons learned in these applications, and to identify best practices for maximizing program benefits. A literature review along with Internet and phone surveys were used to ascertain this information. The major findings of the study include, first, add-on participants find the program to be a cost-effective way of obtaining data that is consistent at the local, state, and national levels. Second, the data have been used in a wide variety of transportation planning applications. Third, there have been challenges, but the majority can be addressed through greater communication between add-on participants and FHWA, particularly during the survey planning phase. Finally, a set of best practices for improving the add-on experience is outlined.

Subject Areas: survey methodology, add-on sample data, best practices, National Household Travel Survey

Availability: 2012 TRB paper submittal

Using GPS Data Collected in Households Travel Surveys to Assess Physical Activity

Michelle Lee, Anthony Fucci, Paul Lorenc, and William Bachman

Publication Date: November 2011

Abstract: Transportation planners have an increasing interest in identifying transportation investment solutions that encourage healthy living. Once the domain of health professionals, physical activity studies are being considered by transportation agencies. The use of Global Positioning System (GPS) data collection in tandem with traditional travel survey methods and physical activity studies has become commonplace in each discipline over the past decade as researchers and practitioners seek technology solutions to address issues associated with increasing respondent burden and decreasing response rates. GPS technology used as a passive, objective measure of both travel and physical activity results in the collection of highly accurate, incredibly detailed data that could never be supported by self-report survey methods. The level of detail provided by GPS, while incapable of identifying some instances of physical activity, provides an accurate and useful assessment of active transport. Agencies wishing to encourage healthy living can use research results regarding active transport to evaluate the effectiveness of certain transportation investments. To demonstrate, GPS travel data from the Massachusetts Statewide Travel Survey are used to identify and evaluate segments of active transport. The GPS travel data is then used to evaluate whether the presence of transit options near home, work and/or school locations have a positive impact on health.

Subject Areas: data collection, GPS, household travel surveys, survey methods, physical activity, National Household Travel Survey

Availability: 2012 TRB paper submittal #12-3805

Studying Patterns of Use Transport Modes Through Data Mining: An Application to the US National Household Travel Survey Dataset *Marco Diana*

Publication Date: November 8, 2011

Abstract: Travel-related data collection activities require high amounts of financial and human resources to be successfully carried out. In a context where the available resources are scarce, there is a need to exploit the information that is hidden in these dataset, to increase their added value and gain support among decision makers not to discontinue such efforts. The present research assesses the use of a data mining technique, Association Analysis, to better understand the patterns of mode uses from the 2009 U.S. National Household Travel Survey. Only variables related to self reported levels of use of the different transportation means are considered, along with those useful to the socioeconomic characterization of the respondents. It has been possible to mine association rules that potentially show in economic terms a substitution effect between cars and public transportation, whereas such effect was not observed between public transportation and non-motorized modes (bike, feet). This is a policy relevant finding, since transit marketing should be targeted to car drivers rather than to bikers or walkers to really improve the environmental performances of any transportation system. Modal diversion from car to transit is seldom observed in practice, given the competitive advantage of private modes that has been extensively discussed in the literature. However, if we control for such factor, then our results suggest that modal diversion should mainly occur from cars to transit, rather than from non-motorized modes to transit.

Subject Areas: association rules, frequent item sets, data mining, mode levels of use, National Household Travel Survey

Availability: 2012 TRB paper submittal

Effectiveness of Bayesian Updating Attributes in Data Transferability Applications

Taha H. Rashidi (Corresponding Author), Joshua Auld, Abolfazl (Kouros) Mohammadian

Publication Date: N/A

Abstract: This paper presents the findings from an analysis of several Bayesian updating scenarios in the context of data transferability. Bayesian updating has been recognized as having great potential for use in the transportation field, especially in the simulation of travel demand and other transportation-related data. For local areas where comprehensive data collection is too costly and infeasible, Bayesian updating can be used to synthesize travel demand data in a process generally referred to as data transferability. Bayesian updating has been occasionally employed for transferring travel data; however, various aspects and disadvantages of its use have been insufficiently studied. This work addresses some issues regarding Bayesian updating techniques in data transferability, including a comparison of the use of conjugate and nonconjugate formulations in the updating models, their relative effectiveness, and the impacts of the quality of the prior information on the final results. The study shows that in general, updating small local samples of travel attribute data with prior information from national data sources provides an improved estimate of local travel attributes when compared to using the local sample only. However, it was found in this study that the inclusion of all the available historical data in the prior distributions does not necessarily improve the quality of the updating results. Therefore, a careful analysis of the applicability of the prior information to the desired context is necessary when using a Bayesian updating formulation. The National Household Travel Survey 2001 (NHTS) and the Nationwide Personal Transportation Survey 1995 (NPTS) are utilized for the demonstration exercises in this study.

Subject Areas: Bayesian updating, conjugate distributions, non-conjugate distributions, informative prior distribution, National Household Travel Survey

Availability: 2012 TRB presentation and paper submittal

Are Cell Phones Samples Needed for Studies of Walking Activity? *Ugo Lachapelle, Marc D. Weiner, and Robert B. Noland*

Publication Date: N/A

Abstract: The growth in cell-phone-only households represents a challenge for the collection of survey data. Cell phone-only households have distinct socio-demographic characteristics, which may result in different travel behavior. To explore those differences, as well to investigate the impact of including a cell phone component in active transportation research, a representative sample of New Jersey households was surveyed with a random-digit dialing survey that included 1,200 completed interviews (800 based on a statewide landline sample, 400 from a landline oversample of Jersey City) and 311 statewide cell-phone interviews, of which 80 were cell-phone-only respondents. The survey explored walking behavior and perceived characteristics of the pedestrian environment. Socio-demographic characteristics, the frequency of walking and home location characteristics are compared using Chi-square tests of significance between sample pairs as well as multivariate analysis (ordered probit). Cell-phone-only respondents were typically younger and poorer, with a greater proportion of renters, carless households and minorities. It was found that cell-only households walked more frequently, but this was due to their distinct socio-demographic characteristics, not their cell phone use *per se*. The implication for any analysis of rates or trends in walking (and probably other travel behavior) is that cell-only households must be included via cell-phone sample supplementing a landline sample. However, multivariate analysis of the correlates of walking may not be overly biased if socio-demographics relevant to cell-phone only respondents are collected and included in analysis.

Subject Areas: survey; cell phones; mobile phones; wireless; random digit dial; landlines; physical activity; travel; active transportation; demographics.

Availability: 2012 TRB paper submittal

An Efficient Automatic Approach for Variable Selection to Visualize 2009 National Household Travel Survey Data *Qifeng Lu, Bingsong Fang, and Xiaoli Han*

Publication Date: November 15, 2011

Abstract: To maximize the utility and relevance of the 2009 National Household Travel Survey data program to the user community, a geospatial data visualization tool is being developed at Federal Highway Administration to provide support in data dissemination reporting for easy access to indicators of travel behavior, or measure variables. 20 key measure variables are manually selected with domain knowledge. The performance of such a measure variable is affected by a set of relevant variables representing the characteristics of traveling persons, their households, and their vehicles in the survey. Due to the large number of variables and significant amount of data, it is extremely difficult to allow users to conveniently understand and capture the key relevant variables to these measure variables. Therefore, it is necessary to adopt an automatic and efficient approach to effectively select key variables based on their importance or impacts to the corresponding measure variable, and present these key relevant variables in the visualization tool for users to explore the impacts of these variables to the corresponding measure variable. This paper introduces the Information Gain method from machine learning field into transportation field to automatically and efficiently select key relevant variables for a given measure variable. Major findings through the application of Information Gain are intuitive and consistent with domain knowledge and were validated by domain experts, and other findings that are not intuitive to domain experts but have strong relations to the corresponding measure variables are also identified, and they are invaluable findings to travel behavior analysts and modelers. All findings are beneficial to policy makers, planners, and travel behavior modelers to explore the relationship between these key variables and the corresponding measure variable of interest for decision making.

Subject Areas: information gain, geospatial data, visualization tool, travel behavior

Availability: 2012 TRB paper submittal

U.S. National Household Travel Survey Used to Validate Exposure Estimates by the Quasi-Induced Exposure Technique

Author(s): Xinguo Jiang, Yanjun Qiu, and Richard W. Lyles

Publication Date: January 27, 2012

Abstract: Unlike exogenous estimates of exposure to risk such as vehicle miles of travel, number of registered vehicles, and number of licensed drivers, quasi-induced (Q-I) exposure has not received adequate vetting. A criticism of Q-I is that its underlying assumptions are not convincingly validated or verified, partially because the risk estimates of Q-I have not been sufficiently compared with the more conventional techniques. The 2009 National Household Travel Survey data were used to derive annual vehicle miles traveled, disaggregated by characteristics of interest (age and gender). Comparisons were developed at different disaggregation levels between the vehicle miles traveled and the relative exposure calculated with Q-I. The main findings of the exercises follow: (*a*) statistical results suggest that the exposure estimates for 15 age groups and driver gender are in good agreement with the corresponding annual vehicle miles traveled and thus the induced exposure estimates are deemed to be reasonably representative of the driving population and (*b*) the validation study revealed that data disaggregation improves the homogeneity of age and gender distributions (reduced data irregularities caused by the aggregated distributions). The comparisons confirm that Q-I is a promising and powerful tool for estimating exposure in safety analysis.

Subject Areas: vehicle miles travelled, VMT, registered vehicles, licensed drivers, quasi-induced exposure, National Household Travel Survey

Availability: http://trb.metapress.com/content/11437643527t612r/fulltext.pdf

Transforming the Telephone-Based National Household Travel Survey to the Internet: Application to University Students

Author(s): Sanghoon Son, Khattak Asad, Xin Wang, Ju-Yin Chen

Publication Date: 2012

Abstract: The transformation of National Household Travel Survey (NHTS) and regional surveys to the internet is inevitable, partly because online surveys offer an efficient means of collecting data. Behavioral surveys are increasingly being offered as mixed mode, giving respondents the choice of filling out the survey using the internet, telephone, or other means. This study reports experience and lessons learned by transforming the computer-assisted telephone interview methodology used for NHTS to an Internet-based method for university students, who have ubiquitous access to the internet. The study reflects innovations in survey research methodology, in the context of surveying students at large universities in Virginia. This paper provides comparisons of two rounds of behavioral surveys conducted in 2009 and 2010, and develops statistical models that quantify trip underreporting. In an attempt to closely mimic the NHTS instrument, the internet instrument had a relatively high survey response burden. Trip underreporting was suspected in the first round of surveys, based on analysis of trip frequencies. This paper documents improvements in survey design that were intended to lower the survey response burden and reduced trip underreporting. Statistical models are estimated to quantify how changes in the instrument captured more trips. Results showed that survey design improvements can encourage students to recall and report 15%-20% more trips. Discretionary trips and shorter trips were more likely to be underreported, consistent with earlier studies. The results from this study are valuable for future regional and national survey implementations.

Subject Areas: college students, design, Internet, Internet surveys, mathematical models; methodology, National Household Travel Survey, research, travel surveys, trip underreporting

Availability: Transportation Research Board Annual Meeting 2012 Paper #12-1488

A Strategy on How to Utilize Smartphones for Automatically Reconstructing Trips in Travel Surveys *Philippe Nitsche, Peter Widhalm, Simon Breuss, Peter Maurer*

Publication Date: 2012

Abstract: The acquisition of travel data is currently based on cost- and time-intensive questionnaires and yields mostly an incomplete picture due to limited coverage and inadequate updates. There is an urgent need for technologically supported data acquisition tools. This paper introduces a novel approach to developing a large-scale travel survey by intelligently employing data from smartphones. Based on signals of the embedded accelerometers and GPS receivers, an ensemble of probabilistic classifiers is trained for automatically reconstructing the individual trips composing a tour, including the mode choice. In the region of Vienna, Austria, 266 hours of travel data were collected to train and evaluate the models. Using a set of 72 features, the best classification results are achieved for detecting walks (92%) and bike rides (98%). Railway modes were correctly identified in 80% of all cases, which is subject to further research. In case of GPS losses only accelerometer data are used, which still shows promising results. This allows the method to incorporate places where there is normally only a weak or no GPS signal. Future smartphone applications are intended to spread the tool among traffic users, while the effort for them should be kept to a minimum i.e. no manual entries or questionnaires are necessary. Due to the increasing popularity of smartphones, the tool has the potential to be used on a wide-spread basis.

Subject Areas: Smartphones; mobility data; travel survey; accelerometer; GPS; transport modes; mode detection

Availability: Science Direct – Social and Behavioral Sciences Volume 48, 2012, Pages 1033–1046

http://www.sciencedirect.com/science/article/pii/S1877042812028169#

TRAFFIC SAFETY

Blocking-out auditory distracters while driving: A cognitive strategy to reduce task-demands on the road *Ayça Berfu Ünal, Samantha Platteel, Linda Steg, Kai Epstude*

Publication Date: August 2012

Abstract: The current research examined how drivers handle task-demands induced by listening to the radio while driving. In particular, we explored the traces of a possible cognitive strategy that might be used by drivers to cope with task-demands, namely blocking-out auditory distracters. In Study 1 (N = 15), participants listened to a radio-broadcast while watching traffic videos on a screen. Based on a recall task asking about what they had listened to, we created baseline scores reflecting the general levels of blocking-out of radio-content when there was no concurrent driving task accompanying the radio-listening. In Study 2 (N = 46), participants were asked to complete two drives in the simulator: one drive in high-complexity traffic and another in low-complexity traffic. About half of the participants listened to a radio-broadcast while driving, and the other half drove in silence. The radio-listeners were given the same recall task that we had used in Study 1. The results revealed that the participants who drove while listening to the radio (Study 2) recalled less material from the radio-broadcast as compared to the participants who did not drive (Study 1). In addition, the participants who drove while listening to the radio recalled less talk-radio excerpts when driving in high-complexity traffic than when driving in low-complexity traffic. Importantly, listening to the radio did not impair driving performance. Together, these findings indicate that blocking-out radio-content might indeed be a strategy used by drivers to maintain their driving performance.

Subject Areas: Blocking-out; Auditory distracters; Radio-listening; Compensatory strategies; Driving performance

Availability: Ünal, Ayça Berfu, et al. "Blocking-out auditory distracters while driving: A cognitive strategy to reduce task-demands on the road." Accident Analysis & Prevention (2012). http://www.sciencedirect.com/science/article/pii/S0001457512002746

Emergency Medical Service Providers' Experiences with Traffic Congestion

Author(s): Russell Griffin, PhD, Gerald McGwin Jr., MS, PhD

Publication Date: August 2012

Abstract: The population's migration from urban to suburban areas has resulted in a more dispersed population and has increased traffic flow, possibly resulting in longer emergency response times. Although studies have examined the effect of response times on time to definitive care and survival, no study has addressed the possible causes of slowed response time from the point of view of emergency medical services (EMS) first responders. To assess the variables most commonly associated with increased emergency response time as described by the opinions and views of EMS first responders. A total of 500 surveys were sent to randomly selected individuals registered as first responders with the Alabama Department of Public Health, and 112 surveys were returned completed. The survey included questions regarding roadway design, response to emergency calls, in-vehicle technology aimed at decreasing travel time, and public education regarding emergency response. Respondents reported traveling on city streets most often during emergency calls, and encountering traffic more often on interstates and national highways. Traffic congestion, on average, resulted in nearly 10 min extra response time. Most agreed that the most effective in-vehicle technology for reducing response time was a pre-emptive green light device; however, very few reported availability of this device in their emergency vehicles. Public education regarding how to react to approaching emergency vehicles was stated as having the greatest potential impact on reducing emergency response time. The results of the survey suggest that the best methods for reducing emergency response times are those that are easy to implement (e.g., public education).

Subject Areas: first responder emergency response time;

Availability: Griffin, Russell, and Gerald McGwin. "Emergency Medical Service Providers' Experiences with Traffic Congestion." The Journal of Emergency Medicine (2012). http://www.sciencedirect.com/science/article/pii/S0736467912006968

Distractions and motor vehicle accidents: Data mining application on fatality analysis reporting system (FARS) data files *Wen-Shuan Tseng, Hang Nguyen, Jay Liebowitz, William Agresti*

Publication Date: July 2012

Abstract: This research applies data mining techniques to discover the relationship between driver inattention and motor vehicle accidents. The data used in this research is obtained from the Fatality Analysis Reporting System of the National Highway Traffic Safety Administration, focused on the Maryland and Washington, DC area from years 2000 to 2003. The data are first clustered using the Kohonen networks. Then, the patterns and rules of the data are explored by decision tree and neural network models. Results suggest that when inattention and physical/mental conditions take place at the same time, the driver has a higher tendency of being involved in a crash that collides into static objects. Furthermore, with regards to the manner of collision, the relative importance of colliding into a moving vehicle as the first harmful event is two times higher relative to that of colliding into a fixed object as the first harmful event in a crash. The data used in this research are limited to fatal crashes that happened in Maryland and Washington, DC from years 2000 to 2003. This is one of the first research papers utilizing data mining techniques to explore the possible relationships between driver inattention and motor vehicle crashes.

Subject Areas: inattention; FARS; NHTSA;

Availability: Tseng, Wen-Shuan, et al. "Distractions and motor vehicle accidents: data mining application on fatality analysis reporting system (FARS) data files." Industrial Management & Data Systems 105.9 (2005): 1188-1205.
http://www.emeraldinsight.com/journals.htm/journals.htm?issn=0263-5577&volume=105&issue=9&articleid=1529639&show=pdf

The Effects of Land Use Patterns and Street Network Connectivity on the frequency of Child Pedestrian-Vehicle Collisions: An aggregate analysis in Portland, Oregon *Mark Braseth*

Publication Date: June 2012

Abstract: The rise in childhood obesity rates have led to an increased focus on encouraging children to use active commuting, walking or bicycling, to increase physical activity levels. However, parents often cite traffic safety concerns for not allowing their child to walk to and from school. Unfortunately, risk of being struck by a vehicle is a prominent threat to child pedestrians. Pedestrian-vehicle collisions are the second leading cause of accidental death among children. Moreover, children represent a disproportionate number of pedestrian-vehicle collisions. Nationwide, children, ages 15 and younger, represented 25 percent of all pedestrian-vehicle collisions in 2009. Understanding the impacts of the built environment on child pedestrian-vehicle collisions can lead to policy aimed at reducing total number of child pedestrian-vehicle collisions as well as increasing active commuting among children.

Previous research shows the built environment influences both pedestrian activity and rate of pedestrian-vehicle collisions. However, little is understood of land use patterns and street network connectivity and their impacts on child pedestrian-vehicle collisions. This study seeks to understand how land use patterns and street network connectivity affect child pedestrian-vehicle collisions using an aggregate analysis at the census tract level. Results of the study provide recommendations for land use and transportation planning.

Subject Areas: active commuting; traffic safety; pedestrian-vehicle collisions; land use

Availability: Braseth, Mark. "The Effects of Land Use Patterns and Street Network Connectivity on the frequency of Child Pedestrian-Vehicle Collisions: An aggregate analysis in Portland, Oregon." (2012). https://scholarsbank.uoregon.edu/xmlui/bitstream/handle/1794/12266/Braseth%20Terminal%20Project.pdf?sequence=1

A new braking and warning scoring system for vehicle forward collision imminent braking systems *Chien, S.; Lingxi Li & Yaobin Chen*

Publication Date: October 2012

Abstract: Vehicle forward collision imminent braking (CIB) systems have been equipped in high-end passenger vehicles by many auto manufactures. Due to the complex nature of the CIB technology, the features and performance of various CIB systems differ significantly. As to date, there are no standards to evaluate and compare different CIB systems. This paper describes a systematic methodology for the evaluation of CIB systems which include both braking and warning. The percentage kinetic energy reduction is used as a common unit to allow the evaluation of the performance of both CIB braking and CIB warning. The information collected from some ongoing vehicle active safety testing projects will be used to validate the proposed methodology.

Subject Areas: Legged locomotion

Availability: Chien, Stanley, Lingxi Li, and Yaobin Chen. "A new braking and warning scoring system for vehicle forward collision imminent braking systems." Intelligent Transportation Systems (ITSC), 2012 15th International IEEE Conference on. IEEE, 2012. http://ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=6338775&url=http%3A%2F%2Fieeexplore.ieee.org%2Fxpls%2Fabs_all.jsp%3Farnumber%3D6338775

Safety Challenges and Oversight in the Motorcoach Industry: Attitudes and Perceptions of Drivers, Roadside Inspectors, and Federal Investigators *Elisa R. Braver, Robert S. Dodd, Ivan Cheung, and Lindsay O. Long*

Publication Date: October 2012

Abstract: Interstate motorcoach travel has been the fastest-growing transportation mode in recent years. To identify challenges to monitoring compliance with motorcoach safety regulations and to examine factors affecting safety, four focus groups with a total of 32 participants were conducted during 2011, one with federal safety investigators, one with state motor carrier inspectors, and two with motorcoach drivers. Investigators and inspectors expressed concern about falsified logbooks, inadequate sleep among motorcoach drivers, hazards from speeding motorcoaches, practices by motorcoach carriers to mask ownership and avoid oversight, and difficulties keeping up with rapid motorcoach industry growth. Drivers described problems with getting sufficient sleep, pressure to drive longer than permitted, and fears of motor carriers giving them less work if they turned down driving jobs. Drivers said that driving 72–74 mph was acceptable in light traffic. To help assess workload among personnel performing safety oversight, data on numbers of motor carriers, commercial motor vehicles, federal investigators, and state inspectors were obtained from the Federal Motor Carrier Safety Administration (FMCSA). The data suggested a heavy workload (2.13 inspectors per 1,000 commercial motor vehicles). The focus groups of inspectors, investigators, and drivers indicated the existence of serious motorcoach safety problems, provided insight about the multiple factors contributing to them, and described major obstacles to effective safety oversight. The qualitative nature of focus group research means that these notable findings will need to be measured using other methods such as surveys and observational studies.

Subject Areas: Motorcoach carriers; crashes

Availability: Braver, Elisa R., et al. "Safety challenges and oversight in the motorcoach industry: attitudes and perceptions of drivers, roadside inspectors, and federal investigators." Annals of Advances in Automotive Medicine/Annual Scientific Conference. Vol. 56. Association for the Advancement of Automotive Medicine, 2012.
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3503431/

Characteristics of Interstate Motorcoach Carriers With Elevated Rates of Crashes and Inspection Violations *Ivan Cheung and Elisa R. Braver*

Publication Date: October 2012

Abstract: Widely-publicized fatal motorcoach crashes have caused public concern about their safety. This study estimated crash and violation rates among interstate motorcoach carriers based on 2005–2011 data obtained from the Federal Motor Carrier Safety Administration (FMCSA). Motorcoach carriers with relatively high crash and violation rates were compared with those with better safety records. The principal component analysis produced three orthogonal factors that captured the majority (63 percent) of the total variance in the data set. Motorcoach carriers operating 10 or fewer motorcoaches were more likely to be classified in both the high crash rate and the high inspection and violation rates group. Those carriers with 10 or fewer years in business were more likely to be classified in the high inspection and violation rates group. The vast majority of motorcoach carriers with problematic safety records were non-scheduled route providers (charters). Scheduled-service motorcoach carriers identified as providing at least occasional curbside service, defined as picking up or dropping off passengers at a place other than a traditional terminal at the origin or destination, had an increased risk of involvement in fatal crashes compared with other scheduled-service carriers (1.4 per 100 vehicles, 95% C.I.: 0.1–2.7 versus 0.2, 95% C.I.: 0.0–0.5). The data did not indicate whether crashes or violations occurred during the trips where curbside service was provided. These findings suggest that FMCSA and the states need to have the resources necessary for close monitoring of motorcoach carriers, particularly high-risk ones such as small and less experienced motorcoach carriers

Subject Areas: Motorcoach carriers; crashes

Availability: Cheung, Ivan, and Elisa R. Braver. "Characteristics of interstate motorcoach carriers with elevated rates of crashes and inspection violations." Annals of Advances in Automotive Medicine/Annual Scientific Conference. Vol. 56. Association for the Advancement of Automotive Medicine, 2012. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3503421/

An Analysis of Distance from Collision Site to Pedestrian Residence in Pedestrian versus Automobile Collisions Presenting to a Level 1 Trauma Center *Craig L. Anderson, Kathlynn M. Dominguez, Teresa V. Hoang,Armaan Ahmed Rowther, M. Christy Carroll, Shahram Lotfipour, Wirachin Hoonpongsimanont, and Bharath Chakravarthy*

Publication Date: October 2012

Abstract: This study tests the hypothesis that most pedestrian collisions occur near victims' homes. Patients involved in automobile versus pedestrian collisions who presented to the emergency department at a Level I trauma center between January 2000 and December 2009 were included in the study. Patient demographics were obtained from the trauma registry. Home address was determined from hospital records, collision site was determined from the paramedic run sheet, and the shortest walking distance between the collision site and pedestrian residence was determined using Google Maps. We summarized distances for groups with the median and compared groups using the Kruskal-Wallis rank test. We identified 1917 pedestrian injury cases and identified both residence address and collision location for 1213 cases (63%). Forty-eight percent of the collisions were near home (within 1.1 km, 95% CI 45–51%). Median distance from residence to collision site was 1.4 km (interquartile range 0.3–7.4 km). For ages 0–17, the median distance 0.7 km, and 59% (95% CI 54–63%) of collisions occurred near home. For ages 65 and older, the median distance was 0.6 km and 65% (95% CI 55–73%) were injured near home. Distance did not differ by sex, race, ethnicity, or blood alcohol level. More severe injuries (Injury Severity Score ≥ 16) occurred further from home than less severe injuries (median 1.9 km vs. 1.3 km, p=.01). Patients with a hospital stay of 3 days or less were injured closer to home (median 1.3 km) than patients with a hospital stay of 4 days or more (median 1.8 km, p=.001). Twenty-two percent were injured within the same census tract as their home, 22% on the boundary of their home census tract, and 55% in a different census tract.

Subject Areas: pedestrian collision;

Availability: Anderson, Craig L., et al. "An analysis of distance from collision site to pedestrian residence in pedestrian versus automobile collisions presenting to a level 1 trauma center." Annals of Advances in Automotive Medicine/Annual Scientific Conference. Vol. 56. Association for the Advancement of Automotive Medicine, 2012.
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3503430/

Why more male pedestrians die in vehicle-pedestrian collisions than female pedestrians: a decompositional analysis *Motao Zhu, Songzhu Zhao, Jeffrey H Coben, Gordon S Smith*

Publication Date: November 2012

Abstract: Pedestrians account for a third of the 1.2 million traffic fatalities annually worldwide, and men are overrepresented. We examined the factors that contribute to this male-female discrepancy: walking exposure (kilometres walked per person-year), vehicle-pedestrian collision risk (number of collisions per kilometres walked) and vehicle-pedestrian collision case fatality rate (number of deaths per collision). The decomposition method quantifies the relative contributions (RCs) of individual factors to death rate ratios among groups. The male-female ratio of pedestrian death rates can be expressed as the product of three component ratios: walking exposure, collision risk and case fatality rate. Data sources included the 2008–2009 US Fatality Analysis Reporting System, General Estimates System, National Household Travel Survey and population estimates. Death rate per person-year, kilometres walked per person-year, collisions per kilometres walked and deaths per collision by sex. The pedestrian death rate per person-year for men was 2.3 times that for women. This ratio of male to female rates can be expressed as the product of three component ratios: 0.995 for walking exposure, 1.191 for collision risk and 1.976 for case fatality rate. The RCs of these components were 1%, 20% and 79%, respectively. The majority of the male-female discrepancy in 2008–2009 pedestrian deaths in the US is attributed to a higher fatality per collision rate among male pedestrians.

Subject Areas: traffic pedestrian fatality;

Availability: Zhu, Motao, et al. "Why more male pedestrians die in vehicle-pedestrian collisions than female pedestrians: a decompositional analysis." Injury prevention (2012). http://injuryprevention.bmj.com/content/early/2012/11/28/injuryprev-2012-040594.full?g=widget_default

Impact of social and technological distraction on pedestrian crossing behaviour: an observational study *Leah L Thompson, Frederick P Rivara, Rajiv C. Ayyagari1, Beth E. Ebel*

Publication Date: December 2012

Abstract: The objective of the present work was to study the impact of technological and social distraction on cautionary behaviours and crossing times in pedestrians. Pedestrians were observed at 20 high-risk intersections during 1 of 3 randomly assigned time windows in 2012. Observers recorded demographic and behavioural information, including use of a mobile device (talking on the phone, text messaging, or listening to music). We examined the association between distraction and crossing behaviours, adjusting for age and gender. All multivariate analyses were conducted with random effect logistic regression (binary outcomes) and random effect linear regression (continuous outcomes), accounting for clustering by site. Observers recorded crossing behaviours for 1102 pedestrians. Nearly one-third (29.8%) of all pedestrians performed a distracting activity while crossing. Distractions included listening to music (11.2%), text messaging (7.3%) and using a handheld phone (6.2%). Text messaging, mobile phone use and talking with a companion increased crossing time. Texting pedestrians took 1.87 additional seconds (18.0%) to cross the average intersection (3.4 lanes), compared to undistracted pedestrians. Texting pedestrians were 3.9 times more likely than undistracted pedestrians to display at least 1 unsafe crossing behaviour (disobeying the lights, crossing mid-intersection, or failing to look both ways). Pedestrians listening to music walked more than half a second (0.54) faster across the average intersection than undistracted pedestrians. Distracting activity is common among pedestrians, even while crossing intersections. Technological and social distractions increase crossing times, with text messaging associated with the highest risk. Our findings suggest the need for intervention studies to reduce risk of pedestrian injury.

Subject Areas: distracted pedestrian; crossing time

Availability: Thompson, Leah L., et al. "Impact of social and technological distraction on pedestrian crossing behaviour: an observational study." Injury prevention (2012).
http://injuryprevention.bmj.com/content/early/2012/12/06/injuryprev-2012-040601.short

Temporal Modeling of Highway of Highway Crash Severity *James Mooradian, John N. Ivan, Nalini Ravishanker, and Shan Hu*

Publication Date: N/A

Abstract: This paper describes analysis using ordinal logistic regression to uncover temporal patterns in the severity level (fatal, serious injury, minor injury, slight injury or no injury) for persons involved in highway crashes in Connecticut. Existing state sources provide data describing the time and weather conditions for each crash and the vehicles and persons involved over the time period from 1995 to 2008 as well as the traffic volumes and the characteristics of the roads on which these crashes occurred. Controlling for characteristics known to be related to severity, e.g., age, crash type, and road characteristics, statistical modeling enables us to predict the probability of an individual to have a specific severity outcome if he/she is involved in a crash. Specifically, this paper investigates overall, long-term, time dependent and seasonal trends in senior drivers and travelers (65 years and over). This study also accounts for special conditions in data distribution and modeling in order to point to significant impacts on public health and safety as seniors become a larger portion of the population. Findings indicate an overall increase in increased crash severity probability for seniors, as well as a distinct seasonal trend. Other time-dependent trends in the data were visible, but not significant.

Subject Areas: senior safety, highway safety, injury severity, ordinal responses, partial proportional odds, National Household Travel Survey

Availability: 2012 TRB paper submittal

Vulnerability of Female Drivers Involved in Motor Vehicle Crashes An Analysis of US Population at Risk *Dipan Bose, PhD; Maria Segui-Gomez, ScD, MD, MPH; Jeff R. Crandall, PhD*

Publication Date: January 30, 2012

Abstract: Objectives: Motor vehicle trauma has been effectively reduced over the past decades; however, it is unclear whether the benefits are equally realized by the vehicle users of either sex. With increases in the number of female drivers involved in fatal crashes and similarity in driving patterns and risk behavior, we sought to evaluate if advances in occupant safety technology provide equal injury protection for drivers of either sex involved in a serious or fatal crash.

Methods: We performed a retrospective cohort study with national crash data between 1998 and 2008 to determine the role of driver sex as a predictor of injury outcome when involved in a crash.

Results: The odds for a belt-restrained female driver to sustain severe injuries were 47% (95% confidence interval=28%, 70%) higher than those for a beltrestrained male driver involved in a comparable crash.

Conclusions: To address the sex-specific disparity demonstrated in this study, health policies and vehicle regulations must focus on effective safety designs specifically tailored toward the female population for equity in injury reduction.

Subject Areas: female drivers, fatalities, car crash, driving patterns, risk behavior

Availability: American Journal of Public Health. 2011;101(12):2368-2373

http://www.medscape.com/viewarticle/757187

I-70 Dedicated Truck Lanes Feasibility Study, Phase 2 Final Report, 2011 *CDM Smith, HNTB, Bernardin Lochmueller & Assoc., American Transportation Research Institute and John Gentle & Assoc. for the Illinois Department of Transportation, Indiana Department of Transportation, Missouri Department of Transportation, Ohio Department of Transportation and the Federal Highway Administration*

Publication Date: June 2011

Abstract: The I-70 Dedicated Truck Lanes (DTLs) Feasibility Study was conducted as part of the United States Department of Transportation's Corridors of the Future program. Through that program, the Federal Highway Administration provided matching funding for a coalition of four states (Indiana, Missouri, Ohio and Illinois) to conduct a two-phase feasibility study to determine the need, cost, risk, financing options and practicality to develop DTLs on the I-70 Corridor as a unified facility.

The NHTS was used to understand long distance passenger travel patterns using the I-70 corridor. The study found that DTLs are expected to reduce truck/car conflict crashes by more than 95 percent; reduce crashes in the general purpose lanes by 50 percent; reduce total annual crashes by one third; and reduce fatal crashes by two-thirds. Dedicated Truck Lanes provide increases in corridor travel reliability. When compared to the No-Build Scenario, DTLs provide six times more benefit in travel time, operations and crash rates than adding the general purpose lanes that are currently included in each of the Coalition member state's Long Range Transportation Plans. In the No-Build Scenario, 70 percent of the corridor is anticipated to be congested in 2045. With DTLs, half of this expected congestion in general purpose lanes will be eliminated, while 97 percent of DTLs will be uncongested in 2045. The I-70 DTL Study concluded that DTLs on I-70 would generate approximately $36 billion in economic output and 258,000 job years from tolling, construction, operation and maintenance and travel efficiencies.

Subject Areas: dedicated truck lanes, I-70

Availability: http://www.i70dtl.org

An Analysis of Distance from Collision Site to Pedestrian Residence in Pedestrian versus Automobile Collisions Presenting to a Level 1 Trauma Center *Craig L. Anderson, MPH, PhD, Kathlynn M. Dominguez, MD, MPH, Teresa V. Hoang, Armaan Ahmed Rowther, M. Christy Carroll, RN, BSN, Shahram Lotfipour, MD, MPH, Wirachin Hoonpongsimanont, MD, and Bharath Chakravarthy, MD, MPH*

Publication Date: October 2012

Abstract: This study tests the hypothesis that most pedestrian collisions occur near victims' homes. Patients involved in automobile versus pedestrian collisions who presented to the emergency department at a Level I trauma center between January 2000 and December 2009 were included in the study. Patient demographics were obtained from the trauma registry. Home address was determined from hospital records, collision site was determined from the paramedic run sheet, and the shortest walking distance between the collision site and pedestrian residence was determined using Google Maps. We summarized distances for groups with the median and compared groups using the Kruskal-Wallis rank test. We identified 1917 pedestrian injury cases and identified both residence address and collision location for 1213 cases (63%). Forty-eight percent of the collisions were near home (within 1.1 km, 95% CI 45–51%). Median distance from residence to collision site was 1.4 km (interquartile range 0.3–7.4 km). For ages 0–17, the median distance 0.7 km, and 59% (95% CI 54–63%) of collisions occurred near home. For ages 65 and older, the median distance was 0.6 km and 65% (95% CI 55–73%) were injured near home. Distance did not differ by sex, race, ethnicity, or blood alcohol level. More severe injuries (Injury Severity Score ≥ 16) occurred further from home than less severe injuries (median 1.9 km vs. 1.3 km, p=.01). Patients with a hospital stay of 3 days or less were injured closer to home (median 1.3 km) than patients with a hospital stay of 4 days or more (median 1.8 km, p=.001). Twenty-two percent were injured within the same census tract as their home, 22% on the boundary of their home census tract, and 55% in a different census tract.

Subject Areas: pedestrian collisions, automobile collisions

Availability: Association for the Advancement of Automotive Medicine, 2012 October; 56: 31–36. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3503430/

Characteristics of Interstate Motorcoach Carriers With Elevated Rates of Crashes and Inspection Violations *Ivan Cheung and Elisa R. Braver*

Publication Date: October 2012

Abstract: Widely-publicized fatal motorcoach crashes have caused public concern about their safety. This study estimated crash and violation rates among interstate motorcoach carriers based on 2005–2011 data obtained from the Federal Motor Carrier Safety Administration (FMCSA). Motorcoach carriers with relatively high crash and violation rates were compared with those with better safety records. The principal component analysis produced three orthogonal factors that captured the majority (63 percent) of the total variance in the data set. Motorcoach carriers operating 10 or fewer motorcoaches were more likely to be classified in both the high crash rate and the high inspection and violation rates group. Those carriers with 10 or fewer years in business were more likely to be classified in the high inspection and violation rates group. The vast majority of motorcoach carriers with problematic safety records were non-scheduled route providers (charters). Scheduled-service motorcoach carriers identified as providing at least occasional curbside service, defined as picking up or dropping off passengers at a place other than a traditional terminal at the origin or destination, had an increased risk of involvement in fatal crashes compared with other scheduled-service carriers (1.4 per 100 vehicles, 95% C.I.: 0.1–2.7 versus 0.2, 95% C.I.: 0.0–0.5). The data did not indicate whether crashes or violations occurred during the trips where curbside service was provided. These findings suggest that FMCSA and the states need to have the resources necessary for close monitoring of motorcoach carriers, particularly high-risk ones such as small and less experienced motorcoach carriers.

Subject Areas: motorcoach, crash rates

Availability: Association for the Advancement of Automotive Medicine, 2012 October; 56: 47–56.
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3503421/

Safety Challenges and Oversight in the Motorcoach Industry: Attitudes and Perceptions of Drivers, Roadside Inspectors, and Federal Investigators *Elisa R. Braver, Robert S. Dodd, Ivan Cheung, and Lindsay O. Long*

Publication Date: October 2012

Abstract: Interstate motorcoach travel has been the fastest-growing transportation mode in recent years. To identify challenges to monitoring compliance with motorcoach safety regulations and to examine factors affecting safety, four focus groups with a total of 32 participants were conducted during 2011, one with federal safety investigators, one with state motor carrier inspectors, and two with motorcoach drivers. Investigators and inspectors expressed concern about falsified logbooks, inadequate sleep among motorcoach drivers, hazards from speeding motorcoaches, practices by motorcoach carriers to mask ownership and avoid oversight, and difficulties keeping up with rapid motorcoach industry growth. Drivers described problems with getting sufficient sleep, pressure to drive longer than permitted, and fears of motor carriers giving them less work if they turned down driving jobs. Drivers said that driving 72–74 mph was acceptable in light traffic. To help assess workload among personnel performing safety oversight, data on numbers of motor carriers, commercial motor vehicles, federal investigators, and state inspectors were obtained from the Federal Motor Carrier Safety Administration (FMCSA). The data suggested a heavy workload (2.13 inspectors per 1,000 commercial motor vehicles). The focus groups of inspectors, investigators, and drivers indicated the existence of serious motorcoach safety problems, provided insight about the multiple factors contributing to them, and described major obstacles to effective safety oversight. The qualitative nature of focus group research means that these notable findings will need to be measured using other methods such as surveys and observational studies.

Subject Areas: safety, motorcoach, drivers

Availability: Association for the Advancement of Automotive Medicine, 2012 October; 56: 57–67.
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3503431/

Why More Male Pedestrians Die in Vehicle-Pedestrian Collisions than Female Pedestrians: A Decompositional Analysis *Motao Zhu, Songzhu Zhao, Jeffrey H Coben, Gordon S Smith*

Publication Date: November 29, 2012

Abstract: Objective: Pedestrians account for a third of the 1.2 million traffic fatalities annually worldwide, and men are overrepresented. We examined the factors that contribute to this male-female discrepancy: walking exposure (kilometres walked per person-year), vehicle-pedestrian collision risk (number of collisions per kilometres walked) and vehicle-pedestrian collision case fatality rate (number of deaths per collision).

Design: The decomposition method quantifies the relative contributions (RCs) of individual factors to death rate ratios among groups. The male-female ratio of pedestrian death rates can be expressed as the product of three component ratios: walking exposure, collision risk and case fatality rate. Data sources included the 2008–2009 US Fatality Analysis Reporting System, General Estimates System, National Household Travel Survey and population estimates.

Setting: USA.

Participants: Pedestrians aged 5 years and older.

Main outcome measures: Death rate per person-year, kilometres walked per person-year, collisions per kilometres walked and deaths per collision by sex.

Results: The pedestrian death rate per person-year for men was 2.3 times that for women. This ratio of male to female rates can be expressed as the product of three component ratios: 0.995 for walking exposure, 1.191 for collision risk and 1.976 for case fatality rate. The RCs of these components were 1%, 20% and 79%, respectively.

Conclusions: The majority of the male-female discrepancy in 2008–2009 pedestrian deaths in the US is attributed to a higher fatality per collision rate among male pedestrians.

Subject Areas: pedestrian activity, traffic fatalities

Availability: Injury Prevention *Inj Prev* doi:10.1136/injuryprev-2012-040594

TRAVEL BEHAVIOR

Association of neighbourhood residence and preferences with the built environment, work-related travel behaviours, and health implications for employed adults: Findings from the URBAN study *Hannah M. Badland, Melody Oliver, Robin A. Kearns, Suzanne Mavoa, Karen Witten, Mitch J. Duncan, G. David Batty*

Publication Date: October 2012

Abstract: Although the neighbourhoods and health field is well established, the relationships between neighbourhood selection, neighbourhood preference, work-related travel behaviours, and transport infrastructure have not been fully explored. It is likely that understanding these complex relationships more fully will inform urban policy development, and planning for neighbourhoods that support health behaviours. Accordingly, the objective of this study was to identify associations between these variables in a sample of employed adults. Self-reported demographic, work-related transport behaviours, and neighbourhood preference data were collected from 1616 employed adults recruited from 48 neighbourhoods located across four New Zealand cities. Data were collected between April 2008 and September 2010. Neighbourhood built environment measures were generated using geographical information systems. Findings demonstrated that more people preferred to live in urban (more walkable), rather than suburban (less walkable) settings. Those living in more suburban neighbourhoods had significantly longer work commute distances and lower density of public transport stops available within the neighbourhood when compared with those who lived in more urban neighbourhoods. Those preferring a suburban style neighbourhood commuted approximately 1.5 km further to work when compared with participants preferring urban settings. Respondents who preferred a suburban style neighbourhood were less likely to take public or active transport to/from work when compared with those who preferred an urban style setting, regardless of the neighbourhood type in which they resided. Although it is unlikely that constructing more walkable environments will result in work-related travel behaviour change for all, providing additional highly walkable environments will help satisfy the demand for these settings, reinforce positive health behaviours, and support those amenable to change to engage in higher levels of work-related public and active transport.

Subject Areas: Transport; Neighbourhood; Physical activity; Adults; New Zealand; Employed; Travel behavior

Availability: Badland, Hannah M., et al. "Association of neighbourhood residence and preferences with the built environment, work-related travel behaviours, and health implications for employed adults: Findings from the URBAN study." Social Science & Medicine (2012). http://www.sciencedirect.com/science/article/pii/S0277953612004674

Harry Potter's Life in the Fast Lane: Using ORFE Magic to Predict Muggle Speeds on State Route 167 (Hermoine Granger's Thesis for a Muggle Studies Degree) *Anna Zhao*

Publication Date: June 2012

Abstract: Research has shown that travel times, and by extension, speeds, have conditional distributions dependent on a combination of weather, congestion, time of day, and the presence of incidents. Because travel time is dependent on the distance traveled, this thesis uses the distribution of speeds on Washington State Route 167, and focuses on the high occupancy toll lane and ramp metered lane, with the ultimate goal of forecasting speeds with a probability. In the first part, we examine the relationship between speeds, weather, congestion, and collisions and find that volume is the most deciding factor for speed. We then use a time series model to forecast traffic volume, so that when we use a copula method to find the joint density between speed and volume, we can obtain the conditional distribution of speed given our forecasted volume. Instead of predicting a speed at a particular time of the time of day, we will be able to forecast it in a weather like fashion, such as \because there is no precipitation today, expect 420 vehicles on the road at 9 a.m. and a 22% chance of traveling at speeds less than 60 mph."

Subject Areas: travel time; distribution speeds; traffic volume

Availability: Zhao, Anna. Harry Potter's Life in the Fast Lane: Using ORFE Magic to Predict Muggle Speeds on State Route 167. Diss. Princeton University, 2012. http://www.orfe.princeton.edu/~alaink/SeniorTheses12/ZhaoAnna12_SeniorThesis.pdf

A National Dataset for Characterizing Location Sustainability and Urban Form *Kevin Ramsey and John Thomas*

Publication Date: January 2012

Abstract: There is a growing demand for data products and tools that enable users to consistently compare multiple places based on their location sustainability and urban form. EPA's Smart Location Database (SLD) is intended to help address this crucial need. It characterizes every Census 2000 block group in the U.S. using several variables which are demonstrated in the transportation research literature to have an effect on residential travel behavior. These variables are all related to factors known as the ―five Ds‖ (Cervero and Kockelman 1997; Ewing et al. 2007): density (of population, housing, or jobs), land use diversity, urban design, destination accessibility, and distance to transit. While this database is still undergoing refinement and quality assurance testing, it is freely available for public use. This report documents each of the variables included in the SLD, discusses limitations that must be considered before use, and describes ongoing efforts to improve or expand the SLD.

Subject Areas: Smart Location Database (SLD)

Availability: Ramsey, Kevin, and John Thomas. "EPA's Smart Location Database: A National Dataset for Characterizing Location Sustainability and Urban Form." (2012). https://metrocouncil.onlinegroups.net/groups/research/files/f/26322-2012-02-28T213936Z/SLD_v02_report.pdf

Electric vehicles rising from the dead: Data needs for forecasting consumer response toward sustainable energy sources in personal transportation *Ricardo A. Daziano, & Esther Chiew*

Publication Date: October 2012

Abstract: Since standard vehicles are powered by internal combustion mechanisms that rely on fossil fuels, electric vehicles that are propelled by one or more electric engines have been proposed as an alternative to promote sustainable personal transportation. In this paper we propose a general demand model for vehicle purchases at the individual level assuming that the necessary microdata is available. We then list the ideal microdata that would be needed for estimating this general demand model. For elaborating this list, we take into account the particularities of low emission vehicles, with emphasis in their cost-reliability-environmental benefits tradeoff, as well as the potentiality for evaluation of welfare improving policies related to adoption of energy-efficient technologies. We discuss data sources and collection strategies for the different attributes of the model, especially for those characteristics that are nonstandard such as symbolic values. For instance, we discuss the role of range anxiety as a barrier of adoption of electric vehicles, and the implied relevance of including driving range to get consumers' willingness to pay for better performing electric batteries.

Subject Areas: Discrete choice models; Ultra-low-emission vehicles; Endogenous latent attributes

Availability: Daziano, Ricardo A., and Esther Chiew. "Electric vehicles rising from the dead: Data needs for forecasting consumer response toward sustainable energy sources in personal transportation." Energy Policy (2012).
http://www.sciencedirect.com/science/article/pii/S0301421512008154

Community design and how much we drive *Wesley E. Marshall & Norman W. Garrick*

Publication Date: October 2012

Abstract: The preponderance of evidence suggests that communities with denser and more connected street networks and a higher degree of mixed land uses results in fewer vehicle kilometers traveled (VKT). However, there is less agreement on the size of the effect. Also, there is no clear understanding of the specific aspects of community design—such as street networks and land use mix—that are most important in contributing to lower VKT. One reason why there is some confusion on this point is that past studies have not always made a clear distinction between different street network design characteristics such as density, connectivity, and configuration. In this research, care was taken to control for land use mix while fully characterizing the different features of the street network, including a street pattern classification system that works at the neighborhood level but also focuses on the citywide street network as a separate entity.

We employ a spatial kriging analysis of National Household Travel Survey (NHTS) data in combination with a generalized linear regression model in order to examine the extent to which community design, particularly in terms of street network design while controlling land use mix, influences VKT in 24 California cities of populations from 30,000 to just over 100,000. Our results suggest that residents of more compact street network designs tend to drive less. Street connectivity, however, played an adverse role in performance.

Subject Areas: mixed use; vmt; generalized linear regressison model

Availability: Marshall, Wesley E., and Norman W. Garrick. "Community design and how much we drive." Journal of Transport and Land Use 5.2 (2012).
https://jtlu.org/index.php/jtlu/article/viewArticle/301

Mobility Fulfillment Among Low-car Households: Implications for Reducing Auto Dependence in the United States *Kristin Lovejoy*

Publication Date: October 2012

Abstract: There is widespread interest in reducing vehicle-miles of travel as a policy goal. Any progress toward that goal requires a better understanding of the potential for incremental reduction in vehicle use in the context of ubiquitous ownership and auto-oriented communities, as we have in the United States today. A key to incremental reductions in vehicle use may be new paradigms for using cars only sometimes, by sharing cars and rides. To explore this potential, this dissertation examines the use of cars outside of conventional ownership, among members of no-car and low-car households in the United States. I use the National Household Travel Survey to characterize the volume and nature of car use by levels of car ownership nationwide. Next I develop a method for estimating benchmark mobility levels based on demographic attributes, in order to evaluate overall mobility fulfillment among non-car-owners. Comparing fulfillment levels among different subgroups helps to identify circumstances in which nonownership does and does not indicate hardship. I supplement this quantitative nationwide assessment with a qualitative examination of the experiences of a particular subpopulation with limited vehicle access, recent immigrants to California from Mexico participating in focus group interviews. Collectively the results characterize most likely circumstances, social contexts, practical logistics, and overall mobility outcomes for those using cars outside of the context of conventional ownership. The findings point to circumstances in which innovative sharing enabling services might be adopted more readily. They also point to the circumstances in which services or policies might provide the most added value, filling important gaps, improving nonowner quality of life, and complementing overall vehicle-reduction goals.

Subject Areas: VMT; vehicle ownership

Availability: Lovejoy, Kristin. "Mobility Fulfillment Among Low-car Households: Implications for Reducing Auto Dependence in the United States." University of California Davis http://pubs.its.ucdavis.edu/download_pdf.php?id=1725

Temporal Stability and Transferability of Non-Motorized and Total Trip Generation Models *Judith L. Mwakalonge, Juhann C. Waller, Judy A. Perkins*

Publication Date: August 2012

Abstract: Transportation systems provide a means for moving people and the goods from which they are spatially separated. Of the two means of surface transportation, the motorized mode is used extensively for utilitarian travel in developed countries. The increasing reliance on motorized travel has contributed to increased traffic congestion, air pollution, and greenhouse emissions. Non-motorized travel has recently received significant attention as a means to reduce congestion and environmental problems and improve human health. However, non-motorized modeling is generally underde- veloped. This study investigated some changes in non-motorized and total travel and the characteristics of the traveling public in 1990, 1995, 2001, and 2009 using a national travel survey. The study also investigated the temporal transfer- ability of linear-regression trip generation models for non-motorized and total travel under such changes. High-income households made fewer non-motorized trips in 1990 and 1995 compared to 2001 and 2009. Persons aged 50 and over showed an increased demand for non-motorized travel, whereas children aged 0 - 15 showed a decreasing preference for non-motorized travel over time. Regarding temporal stability, only the coefficient for single-adult households with no children was stable across all of the analysis years. For both non-motorized and total travel, most model parameter estimates were stable short term but not long term. In general, the total travel models transferred better than non-mo- torized models, both short term and long term. Despite not finding universal stability in model parameter estimates, the models were marginally able to replicate travel in 2009 relative to the locally estimated 2009 model.

Subject Areas: Non-motorized; transferability; temporal; total travel

Availability: Mwakalonge, Judith L., Juhann C. Waller, and Judy A. Perkins. "Temporal Stability and Transferability of Non-Motorized and Total Trip Generation Models." Journal of Transportation Technologies 2.4 (2012): 285-296.
http://www.scirp.org/fileOperation/downLoad.aspx?path=JTTs20120400001_98264156.pdf&type=journal

Consumer Perceptions and Use of Driving Distance of Electric Vehicles *Woodjack, Justin, Dahlia Garas, Andy Lentz, Thomas Turrentine, Gil Tal, and Michael Nicholas*

Publication Date: November 2012

Abstract: Popular media and even researchers commonly assume that ownership of a battery electric vehicle (BEV) provides consumers less performance and mobility than consumers expect. A common claim is that consumers have constant worry about the range of their BEVs, often termed "range anxiety." BMW converted 450 Mini Coopers to all-electric drive (named the Mini E) and leased them to fleets and 235 private households in the Los Angeles, California, and New York-New Jersey regions from spring 2009 to spring 2010. Through the course of the 1-year lease, University of California, Davis (UCD), researchers conducted multiple online surveys and in-person interviews and administered weeklong driving diaries. This paper explores the reactions of Mini E drivers to the driving distance of the Mini E through the framework of a lifestyle learning process. Over time, Mini E drivers learned how the 104-mi range of the Mini E fit into their lifestyles. Drivers adapted and explored with their Mini E through activities such as altering driving behavior (such as speed and trip routes), optimizing charging opportunities, planning trips, and educating themselves on distances to destinations with the help of online and mobile mapping tools. In the course of the UCD Mini E consumer study, researchers found evidence suggesting that the driving range was not a major concern for these early adopters. Even with no public charging available to their vehicle, 100% of survey respondents stated that BEVs were suitable for daily use. The results of this study will be of interest to policy makers and practitioners interested in expanding the BEV market.

Subject Areas: Battery electric vehicle; diary; driving range;

Availability: Woodjack, Justin, et al. "Consumer Perceptions and Use of Driving Distance of Electric Vehicles." Transportation Research Record: Journal of the Transportation Research Board 2287.1 (2012): 1-8. http://trb.metapress.com/content/hj2326m5441q4635/

Dynamic Ridesharing: Understanding the role of gender and technology *Zarar Siddiqi*

Publication Date: November 2012

Abstract: Using a case study approach, the thesis examines how dynamic ridesharing (DRS) has evolved through time, parallel with changes in information and communication technologies (ICTs). DRS is conceptually framed using a socio-ecological modeling approach, the goal being to develop hypotheses regarding factors likely influencing DRS use. This conceptual work forms the foundation for an empirical study of DRS use. Survey data were used in descriptive analysis and logistic regression modeling organized to identify who uses DRS and how. The study reveals that gender may be a central concept to understanding why and how DRS is used by certain segments of population more than others. With regard to technology, it is found that although technical competencies were enabling, in terms of facilitating rideshares, gender and perhaps related mobility constraints, emerged as a larger issues. The findings also caution against relying solely on technological advancement for the success of ridesharing programs.

Subject Areas: Dynamic ridesharing; gender; mobility

Availability: Siddiqi, Zarar. Dynamic Ridesharing: Understanding the role of gender and technology. Diss. University of Toronto, 2012. https://tspace.library.utoronto.ca/handle/1807/33529

The Impacts of Children on the Activity-Travel Patterns of Adults *Lin Lin and Dr. Anne Vernez Moudon*

Publication Date: November 14, 2011

Abstract: This study provided insights on how individual activity-travel patterns of adults were impacted by whether they lived with children or not. A better understanding of travel behavior of families and households will improve travel demand forecasting and the assessment of emerging transport policies. This cross-sectional study used the 2006 Puget Sound Regional Council Household Activity and Travel Survey data to investigate activity-travel patterns of 7,709 adults living in the Puget Sound Region, Washington. Multilevel regression models with the individual as the first level and the household as a second level were developed. With one-third of the participants living with children, the results showed that individuals who lived with children made 20% more non work trips than those who did not. There was no significant difference between the two groups in terms of size of activity realm. Also, whether individuals lived with children or not was found to be an insignificant variable to predict individuals' automobile dependence. The impact of residential density on parents was no different from that of non parents. Interactions among gender, work status, and whether adults lived with children or not, revealed complex travel patterns according to different population subgroups. Women who worked part time and lived with children made the second highest number of non work trips after women who were unemployed and lived with children. Men who worked part time and lived with children had the largest individual activity realm. Interestingly, men who did not work but lived with children traveled the least.

Subject Areas: activity travel patterns, children, travel behavior, National Household Travel Survey

Availability: 2012 TRB paper submittal

Consumers' Perceptions and Use of Electric Vehicle Range: Changes Over Time Through a Lifestyle Learning Process *Justin Woodjack, Dahlia Garas, Andy Lentz, Thomas Turrentine, Gil Tal, and Michael Nicholas*

Publication Date: N/A

Abstract: Popular media and even researchers commonly assume that battery electric vehicle (BEV) ownership will provide consumers less performance and mobility. A common claim is that consumers will have constant worry about the range of their BEV, often termed "range anxiety". BMW converted 450 MINI Coopers to all-electric drive (named the *MINI E*) and leased them to fleets and 235 private households in the Los Angeles and New York/New Jersey regions from Spring 2009 to Spring 2010. Through the course of the one-year lease, UC Davis researchers conducted multiple online surveys, in-person interviews, and administered weeklong driving diaries. This paper explores the reactions of MINI E drivers to the range of the MINI E through the framework of a Lifestyle Learning Process. Over time, MINI E drivers learned how the 104-mile range of the MINI E fit into their lifestyles. Drivers adapted and explored with their MINI E through activities like altering driving behavior (such as speed and trip routes), optimizing charging opportunities, trip planning, and educating themselves on distances to destinations with the help of online and mobile mapping tools. In the course of the UC Davis MINI E Consumer Study, we found evidence suggesting that range was not a major concern among these early adopters. Even with no public charging available to their vehicle, 100 percent of survey respondents stated that BEVs are suitable for daily use. The results of this study will be of interest to policymakers and practitioners interested in expanding the BEV market.

Subject Areas: battery electric vehicle, MINI E, MINI Coopers, driving behavior. National Household Travel Survey

Availability: 2012 TRB paper submittal

Value of Life Cycle in Explaining Trip Making Behavior and Improving Temporal Stability of Trip Generation Models *Leta F. Huntsinger, and Dr. Nagui M Rouphail*

Publication Date: N/A

Abstract: Travel demand models are valuable tools in the transportation planning process; based on sound theory they bring a quantitative element to what is predominantly a political process. The forecasts output from these models guide decision makers in the evaluation and selection of transportation programs and projects. Developing a better understanding of the factors that influence travel behavior, the changes in travel behavior over time, and the variables that best capture these changes may lead to the development of models that are more stable over time, increasing the analyst's confidence in model results and leading to more cost effective investment decisions.

This paper investigates life cycle as one such class of variables. In this context life cycle is defined as the stage at which a family is in at a given point in time as it relates to factors such as the number and age of adults in the household, the presence, number, and age of children, and worker status. Using various statistical tests to evaluate its usefulness, the paper presents evidence to indicate that life cycle has a strong influence on trip making behavior while also improving stability in trip rates over time. These findings suggest that advanced trip generation models that accommodate more independent variables may lead to improved models are more temporally stable and better capture the dynamics that influence trip making.

Subject Areas: trip making behavior, trip generation, National Household Travel Survey

Availability: 2012 TRB paper submittal

Travel Demand and Charging Capacity for Electric Vehicles in Rural States: A Vermont Case Study *Lisa Aultman-Hall, Justine Sears, Jonathan Dowds, and Paul Hines*

Publication Date: August 1, 2011

Abstract: As the number of electric vehicles (EVs) increase we must consider not only how this fuel switch may affect electrical power infrastructure but also mobility. Specifically, the suitability and charging requirements of these vehicles may differ in rural areas, where the electrical grid may be less robust and miles driven higher. Although other studies have examined issues of regional power requirements of EVs, none have done so in conjunction with the spatial considerations of travel demand. We use three datasets to forecast the future spatial distribution of EVs, as well as these vehicles' ability to meet current daily travel demand: the National Household Travel Survey (NHTS), geocoded Vermont vehicle fleet data, and an E911 geocoded dataset of every building statewide. We consider spatial patterns in daily travel and home-based tours to identify optimal EV charging locations, as well as any area-types that are unsuited for widespread electric vehicle adoption. We found that hybrid vehicles were more likely to be near other hybrids than conventional vehicles were. This suggestion of clustering of current hybrid vehicles, in both urban and rural areas, suggests that the distribution of future EVs may also cluster in rural areas. Our analysis suggests that between 69 and 84% of the state's vehicles could be replaced by a 40-mile range EV, depending on the availability of workplace charging. Problematic areas for EV adoption may be suburban areas, where both residential density is high (and potential clustering of hybrids), as well as miles driven. Our results suggest EVs are viable for rural mobility demand but require special consideration for power supply and vehicle charging infrastructure.

Subject Areas: electric vehicles, travel behavior, rural, Vermont, National Household Travel Survey

Availability: 2012 TRB paper submittal

A Quantile Regression Analysis of the Rebound Effect: Evidence from the 2009 National Household Transportation Survey in the United States *Qing Su*

Publication Date: March 2012

Abstract: This paper applies quantile regression method to measure the rebound effect and differentiate it with respect to demand for mobility using the 2009 National Household Transportation Survey (NHTS). The quantile regression results indicate that the rebound effect varies with the distribution of vehicle miles traveled (VMT), ranging between 0.11 and 0.19. Road network density and population density also play an important role in determining travel demand. Regression results indicate that travelers living in areas with higher road network density travel more miles although this positive impact consistently declines along the VMT distribution. Travelers living in areas with population density of at most 3000 persons per square miles travel more miles than those living in higher density areas. The quantile regression results also indicate that the impact of income is positive but declines consistently along the VMT distribution.

Subject Areas: rebound effect, quantile regression, vehicle miles traveled

Availability: Science Direct website
http://www.sciencedirect.com/science/article/pii/S0301421512001620

How People Use Their Vehicles: Statistics from the 2009 National Household Travel Survey *John Krumm*

Publication Date: April 16, 2012

Abstract: The 2009 U.S. National Household Travel Survey (NHTS) contains detailed data on individual vehicle trips. This paper demonstrates several useful statistics from the NHTS concerning how people use their vehicles, such as how far they drive, where they go, how long they stay, and their sequence of destinations. These statistics, in turn, are potentially useful for vehicle design, vehicle use simulation, navigation algorithms, interpreting GPS data, and the placement of electric vehicle charging stations.

Subject Areas: vehicle trips, National Household Travel Survey

Availability: Microsoft website **http://research.microsoft.com/en-us/um/people/jckrumm/Publications%202012/2012-01-0489%20SAE%20published.pdf**

A Joint Household Level Analysis of Work Arrangement Choices of Individuals

Mubassira Khan, Rajesh Paleti, Chandra R. Bhat, and Ram M. Pendyala

Publication Date: N/A

Abstract: This paper presents a comprehensive multi-dimensional multivariate binary probit model system capable of simultaneously representing multiple aspects of individual work arrangement decisions, while also accounting for interactions among household members in individual employment related choices. The model system is estimated on a survey sample drawn from the San Francisco Bay Area where a rich set of accessibility measures is available to account for built environment influences on work related decisions. Model results show that a host of demographic, socio-economic, built environment, and attitudinal variables influence individual choices regarding work arrangements; more importantly, the model shows that there is considerable interaction among household members in matters related to employment. The model system can be used to predict employment choices of individuals within larger microsimulation model systems of activity-travel demand.

Subject Areas: work arrangements, labor force participation, household interactions, individual choices, multivariate modeling, activity-travel behavior, National Household Travel Survey

Availability: 2012 TRB paper submittal

Workplace Choice Model: Comparison of Spatial Patterns of Commuting in Four Metropolitan Regions *Peter Vovsha, Surabhi Gupta, Joel Freedman, Wu Sun, and Vladimir Livshits*

Publication Date: July 2011

Abstract: The paper analyzes the spatial patterns of commuting in four different metropolitan regions through the estimation of consistent disaggregate workplace location choice models based on household travel survey data. The regions include San Diego, CA; Phoenix, AZ; Tucson, AZ; and Chicago, IL. Each estimated model is included as a component in an activity-based travel model (ABM) developed for each region. The models were validated against aggregate journey-to-work flows based on Census data. The model structure and segmentation are discussed in detail with cross-comparison of the most critical model variables across the regions. In general, it was found that the suggested structure performs well in different regional conditions. The main behavioral findings in terms of differences of commuting patterns relate to income, full-time vs. part-time workers status, gender, and occupation. When segmented by these attributes the workplace choice model replicated the observed flows with a good level of accuracy without any additional calibration or k-factors. However, actual model coefficients proved to be significantly different from region to region, leading one to conclude that models of this type must be re-estimated for each region. Another important behavioral finding with corresponding modeling implications is that the impedance function for commuting is essentially non-linear with respect to trip length with many specific effects that relate to a variable marginal disutility of time and cost in each distance range. This required a non-linear distance-decay function to be introduced to complement the mode choice logsum which has more traditional linear mode utilities in time and cost variables.

Subject Areas: workplace location choice, commuting pattern, work from home, model transferability, National Household Travel Survey

Availability: 2012 TRB paper submittal

Study of Long Distance Interregional Commuting using NHTS Data *Binbin Chen*

Publication Date: June 2011

Abstract: Interregional commuting refers to commuting trips from one metropolitan area to other metropolitan areas and to non-metro areas. Such commuting trips typically have a distance of at least 50 miles one-way. The recent Census data revealed a growing trend of Interregional commuting in the U.S. during the two-decade period from 1980 to 2000; inter-metropolitan commuting increased at a rate of more than 28%, which was almost three times that of internal metropolitan growth. The phenomenon of interregional long distance commuting is often out of the typical picture depicted by the traditional travel demand models, and challenges the conventional commuting concept. Especially, sometimes interregional commuting is chosen by people in the form of weekly commuting with dual residence. In this case, commuting could represent a new lifestyle, by which people take advantage of new telecommunication techniques, allocate time weekly instead of daily, and will have different needs for transportation.

This project is a preliminary study of a dissertation research which is to study long distance interregional commuting behavior in one of the megaregions in the US, the Texas Triangle Area. A combined cross sectional and longitudinal approach were used. Cross sectionally, the 2009 and the 2001 NHTS data were examined individually. For each time section, long distance commuters were identified and grouped based on their commuting distance. Binary logit models were used to examine factors, such as personal characteristics, household composition, and telecommuting options, which would affect long distance commuting decisions. Longitudinally, the changes of long distance commuting pattern and characteristics during the ten-year period were analyzed.

The study results show that nationwide, the percentage of long distance commuters remains relatively stable from 2001 to 2009 at about 3%. The South Census Region had the highest percentage of long distance commuters in 2009 and on average, long distance commuters in the south region traveled longer than their counterpart did in other regions. The main travel means for long distance commuters was private car; more than 90% of long distance commuters drove private cars to work and more than 80% of them drove alone. Long distance commuters spent more time away from home, leaving home earlier and return home later than normal commuters. Gender, income level and residence locations all affect long distance commuting decisions. Flexible work schedule also encourages people to commute longer distance. The NTHS data show that if a person has options to work at home occasionally, he or she tends to commute long distance. In addition, in Texas, 70% of commutes with distance of 50 miles or longer was interregional, and more than 70% of the long distance commutes in Texas was within the Texas Triangle Area.

Subject Areas: long distance commuting, weekly commuting, megaregions

Availability: Nation/Texas- University of Texas at Austin

A Joint Model of Residential Relocation Choice and Underlying Casual Factors

Katherine Kortum, Rajesh Paleti, Chandra R. Bhat, and Ram M. Pendyala

Publication Date: November 14, 2011

Abstract: Residential location choice is a key determinant of activity-travel behavior and yet, little is known about the underlying reasons why people choose to move, or not move, residences. Such understanding is critical to being able to model residential location choices over time, and design built environments that people find appealing. This paper attempts to fill this gap by developing a joint model of the choice to move residence and the primary reason for moving (or not moving). The model is estimated on the Florida subsample of the 2009 National Household Travel Survey. Model results shed considerable light on the socio-economic and demographic variables that impact household decision whether to move residence and the primary reason underlying that decision.

Subject Areas: residential location choice, residential move, causal factors, joint model, choice modeling.

Availability: TRB 2012 Paper # 12-3769

What Can We Learn from Analyzing University Student Travel Demand? *Xin Wang, Asad J. Khattak, Sanghoon Son*

Publication Date: Nov. 15, 2011

Abstract: To improve regional travel demand models, transportation engineers and planners desire appropriate representation of sub-populations. University students are a relatively neglected group of the population that are often missed in regional behavioral surveys and are not well represented in travel demand models. Many students attending a university reside, take classes, work, and perform other activities in the university environment, which is often mixed use, alternative mode friendly, higher density, and livable. The purpose of this paper is to understand travel behavior of university students and model associations with their attributes that include personal characteristics, residential location (residing on-campus or off-campus), and academic status. The data used in this study are from a unique internet-based survey (N=1,468) of Old Dominion University, Virginia students. This effort was conducted in 2010 and it was part of the University Travel Survey supplement. Using behavioral data combined with spatial data, rigorous models of automobile and walk/bicycle trip rates are estimated to explore associated factors. Results show that students living on-campus or near-campus are significantly more likely to walk/bicycle and less likely to drive automobiles, indicating the value of living in a campus environment with greater accessibility to activities and a walk/bicycle friendly network. The behavioral models provide helpful information that can be used to better represent the behavior of university students in regional travel demand models and to improve strategic planning.

Subject Areas: travel behavior, travel demand forecasting, university students, survey research, spatial analysis, Poisson and negative binomial models

Availability: TRB 2012 paper submittal

A Nationwide Look at Immigrant Neighborhoods and Travel Mode Choice *Michael J. Smart*

Publication Date: N/A

Abstract: Despite a process of adjustment toward automobile use, previous research has found that immigrants in the United States are more likely to use carpools, take transit, walk, and bicycle than the U.S.-born, even after controlling for relevant variables, and even after long periods in the United States. Others have found a positive effect of living in an immigrant neighborhood on the use of non-auto modes and carpools. These studies have been limited by two important factors: their narrow geographic scope, and their inability to test whether *all* individuals in immigrant neighborhoods experience this "neighborhood effect," or if the effect is limited to immigrants only. This paper improves upon prior research by expanding the geographic scope of the analysis to a U.S.-wide sample using the confidential, geocoded version of the 2001 National Household Travel Survey (NHTS) and the 2000 Census. The combination of these two datasets also allows for a comparison of the strength of the immigrant neighborhood effect on the U.S.- born and the foreign-born. The analysis suggests that *immigrants* within immigrant neighborhoods are far more likely to walk, bicycle, use transit, and carpool than are *non- immigrants* living in immigrant neighborhoods, though both groups are more likely to use these modes than are individuals living in non-immigrant neighborhoods. These findings imply that the "green travel" lessons that many may hope to learn from immigrant neighborhoods cannot be considered from a geographic or spatial perspective only, but that the social ties among immigrants within immigrant neighborhoods may play an important role.

Subject Areas: immigrants, immigrant neighborhoods, travel behavior

Availability: 2012 TRB paper submittal

Another Look At VMT: Determinants of Vehicle Use in Two-Vehicle Households *Gulsah Akar and Jean-Michel Guldmann*

Publication Date: November 12, 2011

Abstract: This study analyses the determinants of vehicle miles traveled (VMT) using data from the 2009 National Household Travel Survey (NHTS). First, total VMT models are estimated across all households. Next, the survey sample is segmented by the number of vehicles owned, and separate models are estimated for each sample segment. Finally, focusing on two vehicle households, a seemingly unrelated regression (SUR) model is formulated to analyze total household VMT and the VMT share of each vehicle. Household increases in income, number of vehicles, workers, adults and children, all lead to higher VMT. Population density and gasoline cost negatively affect VMT. Some of the more interesting findings of the total VMT models are related to telecommuting and vehicle characteristics. The results indicate that having the option to telecommute and owning SUVs, pickup trucks, vans or hybrid vehicles increase VMT. If the driver of a vehicle is female, older, unemployed or does not hold a bachelor's degree, that vehicle's share of the total household VMT decreases. If this vehicle is a SUV, pickup truck, van, or hybrid, it is likely to be used more. These significant effects have important implications for understanding the substitution patterns in multi vehicle households.

Subject Areas: VMT, travel behavior

Availability: TRB 2012

Understanding the Changes of Vehicle Miles Travelled in Response to Fuel Price and Fuel Efficiency for Different Income Groups *Tingting Wang and Cynthia Chen*

Publication Date: July 31, 2011

Abstract: Fuel price is one of the most effective policy tools in regulating travel demand. The effects of fuel price on travel demand for different income groups reveal the choices and constraints they are faced with. The first purpose of this study is to understand these underlying choices and constraints by examining the variation of fuel price elasticity of Vehicle Miles Traveled (VMT) across income groups. In the long run, improvement in fuel efficiency can result in increases in VMT, which is known as the rebound effect; the rebound effect may offset the negative effect of fuel price on VMT. The second purpose of this study is, therefore, to compare the relative magnitudes of the fuel price effect and the rebound effect. A sample of 105,372 households from the 2009 National Household Travel Survey is divided into five income quintiles and a Structural Equations System with VMT and fuel efficiency as endogenous variables is estimated for each quintile. Higher income group shows greater fuel price elasticity than lower income group and the rebound effect is found to be only significant for the lowest income quintile. We discuss that the relative inelasticity of the lower income group is due to that they may be already traveling at a minimum to maintain a functional life and the large rebound effect of the lowest income quintile confirms that their travel demand is far from satiation. These findings emphasize policies aimed at reducing the basic travel needs of lower income groups and meanwhile, increasing their accessibility to other travel options.

Subject Areas: vehicle miles traveled, VMT, fuel price, travel demand

Availability: 2012 TRB paper submittal

Is Usual Share of Commuting Mode Always Greater Than Its Actual Share? *Sujan Sikder and Xuehao Chu*

Publication Date: Feb 21, 2012

Abstract: With data from the 2001 National Household Travel Survey (NHTS), recent research showed that transit's usual share was greater than its actual share for workers in the United States in a variety of commuter markets. A mode's usual share is the percentage of workers who state that they usually use that mode for commuting in a week, whereas the actual share of a mode is the percentage of work trips by that mode by the same workers on a typical work day. This study explores whether this relative relationship between a mode's usual and actual shares holds true for common modes other than transit for the United States. Mathematically, it is determined that this relative relationship cannot hold true for all modes; in other words, the usual share has to be smaller than the actual share for one or more modes other than transit. Empirically, the same 2001 NHTS is used to test this relative relationship for three common modes—the privately owned vehicle (POV), walking, and biking—and for a variety of commuter markets. The empirical results confirm the mathematical conclusion that the relative relationship holds true for biking but not for POV and walking. In addition, the relationship between usual and actual shares is determined not solely by the mode but also by individual commuter markets. Finally, the deviation between usual and actual shares in percentage terms is large for transit and walking, but small for privately operated vehicles and bikes. One direction of future research would be to determine the reasons for these differences in the usual–actual relationship across modes and commuter markets.

Subject Areas: travel behavior, 2001 National Household Travel Survey, bicycle travel, commuting, empirical methods, modal split, private passenger vehicles, public transit, travel surveys, walking, work trips, data and information technology, highways, operations and traffic management, pedestrians and bicyclists, public transportation, I70: traffic and transport

Availability: http://trb.metapress.com/content/m41716707wpl5336/

Propensity to Telecommute Exploring the National Household Travel Survey *Xia Jin, Jingcheng Wu*

Publication Date: November 16, 2011

Abstract: Telecommuting is the substitution for work at the workplace with work at home or other locations close to home. The interest in telecommuting stems from its potential benefits in trip reduction, congestion mitigation, cost saving for office spaces, increased productivity, and better home-work balance. The factors that influence people's telecommuting behavior were explored by using data from the 1995 Nationwide Personal Transportation Survey and 2001 and 2009 National Household Travel Survey. A comprehensive analysis was undertaken, and the trends over several years were examined. The analysis advances the understanding of the characteristics of workers who telecommute according to detailed categories of telecommuting frequency. The findings are essential as a first step toward estimating and incorporating telecommuting in the travel demand forecasting process.

Subject Areas: telecommute, travel demand forecasting, congestion mitigation

Availability: http://trb.metapress.com/content/d812267744753h57/

Telecommuting, Travel Behavior and Residential Location Choice: Can Telecommuting Be An Effective Policy to Reduce Travel Demand? *Pengyu Zhu*

Publication Date: November 2011

Abstract: Whether telecommuting and personal travel are complements or substitutes is a key question in urban policy analysis. Urban planners and policy makers have proposed telecommuting as part of travel demand management (TDM) programs to reduce street and highway congestion. Based on small samples, several empirical studies have found that telecommuting has a substitution effect (although small) on conventional commuting, and have thus argued that policies promoting telecommuting might be promising in reducing travel.

Using data from the 2001 and 2009 National Household Travel Surveys (NHTS), this study involves two large national samples to try to more accurately identify the impact of telecommuting on personal and household travel patterns. Through a series of empirical tests, this research investigates how telecommuting influences workers' one-way commute trips, daily total work trips and daily non-work trips, how these influences differ across different MSA sizes, and how telecommuting affects household commute trips. The results of these tests suggest that telecommuting has been an important factor in shaping personal and household travel patterns over the 2001–2009 period, and that telecommuting consistently has a complementary effect on not just workers' one-way commute trips, daily total work trips and total non-work trips, but also household total commute trips.

Subject Areas: telecommuting, travel congestion, work trips

Availability: http://gradworks.umi.com/34/78/3478051.html

Evansville Travel Model Update 2011, Model Development and Validation Report

Bernardin Lochmueller & Assoc. for the Evansville (IN) Metropolitan Planning Organization

Publication Date: May 2012

Abstract: The Evansville (IN) Metropolitan Planning Organization recently completed the development of a hybrid tour-based model. The hybrid framework combines elements of both traditional four-step and more recent activity-based models. Like their activity-based cousins, hybrid models can provide consistency with tours and sensitivity to important planning variables such as gas prices, seniors in the population, mixtures of land uses, walkability measures, etc. However, like their four-step cousins, hybrid models are simpler than full activity-based models and with lower resulting development costs and faster run times.

NHTS Add-On data was merged with a local household survey and used to estimate component behavioral models including models of households vehicle ownership, daily tour and activity generation, tour mode choice, destination choice, trip mode choice and departure time choice. The resulting models offered a far more realistic picture of local travel behavior such as responses to gas prices and the differential behavior of senior travelers.

Subject Areas: hybrid tour-based, travel demand model development

Availability: Contact the Evansville (IN) Metropolitan Planning Organization

Transportation and the New Generation: Why Young People Are Driving Less and What It Means for Transportation Policy *Benjamin Davis and Tony Dutzik, Frontier Group and Phineas Baxandall, U.S. PIRG Education Fund*

Publication Date: April 2012

Abstract: N/A

Subject Areas: policy, young drivers, travel behavior

Availability:
http://www.uspirg.org/sites/pirg/files/reports/Transportation%20%26%20the%20New%20Generation%20vUS_0.pdf

Vermont Travel Model 2010-2011 (Year 3) *Jim Sullivan*

Publication Date: October 2011

Abstract: N/A

Subject Areas: Vermont, travel demand model

Availability: University of Vermont Transportation Research Center, UVM TRC Report # 11-009
http://www.uvm.edu/~transctr/research/trc_reports/UVM-TRC-11-009.pdf

NCHRP 08-84: Long-Distance and Rural Travel Transferable Parameters for Statewide Travel Forecasting Models *Cambridge Systematics, Inc. with Geostats, Nancy McGuckin, Texas Transportation Institute, University of Maryland, and Whitehouse Group*

Publication Date: October 7, 2011

Abstract: NCHRP 08-84: Long-distance and rural travel transferable parameters for statewide travel forecasting models NHTS 2009, NHTS 2001 and the American Travel Survey (ATS) were used to examine long-distance and rural travel transferable parameters for statewide travel forecasting models under the NCHRP 08-84 Study. Trip rates, travel party size and average trip length were obtained from both NHTS 2001 and NHTS 2009. The long distance file was used from NHTS 2001 and analysis for NHTS 2009 focused on rural areas.

Subject Areas: statewide travel demand models, rural areas, trip rates, travel party size, trip length

Availability: N/A

NCHRP 08-61 Travel Demand Forecasting: Parameters and Techniques *Cambridge Systematics, Inc.*

Publication Date: N/A

Abstract: NCHRP 08-61: Travel Demand Forecasting: Parameters and Techniques: NHTS 2009 was used to obtain parameters for urban and regional travel demand models for NCHRP 08-61: Travel Demand Forecasting: Parameters and Techniques. These parameters can be used by analysts for urban areas with insufficient local data with which to estimate model parameters, and in areas that have already developed model parameters to check these parameters for reasonableness. Trip rates, average trip lengths, vehicle occupancy and time of day distribution were derived from NHTS 2009 by urban size categories.

Subject Areas: travel demand models, urban areas, trip rates, vehicle occupancy, trip length

Availability: N/A

The Fundamental Law of Road Congestion: Evidence from US Cities *Gilles Duranton, University of Toronto and Matthew A. Turner, University of Toronto*

Publication Date: September 4, 2009

Abstract: We investigate the relationship between interstate highways and highway vehicle kilometers traveled (vkt) in us cities. We find that vkt increases proportionately to highways and identify three important sources for this extra vkt: an increase in driving by current residents; an increase in transportation intensive production activity; and an inflow of new residents. The provision of public transportation has no impact on vkt. We also estimate the aggregate city level demand for vkt and find it to be very elastic. We conclude that an increased provision of roads or public transit is unlikely to relieve congestion and that the current provision of roads exceeds the optimum given the absence of congestion pricing.

Subject Areas: highways, vehicle kilometers traveled, public transport, congestion

Availability: University of Toronto, Department of Economics

Health Effects Of Walking To Transit *Alan Hoback, Scott Anderson, and Utpal Dutta*

Publication Date: N/A

Abstract: Post-industrial society is centered on sedentary lifestyles. This has caused obesity rates to rise and related health problems to amplify. Obesity is only one result of sedentary life, but it is a sufficient indicator of physical activity. However, regions of the US with more effective transit systems are less susceptible to obesity because their residents walk more by going to transit. The health benefits of walking to transit are quantified. While walking to transit, riders burn calories, which controls body weight, and the physical activity makes them more healthy. This healthiness is reflected in an improved quality of life. When people are physically active, they have less absenteeism at work, are more productive, and their employers pay less for health insurance.

Subject Areas: transit, health, transit oriented development

Availability:
http://www.trforum.org/forum/downloads/2012_34_Health_Effects_Walking_Transit.pdf

The Next Generation of Travel Behavior: Potential Impacts Related to Household Use of Information and Communications Technology *Janine Mans, Erica Interrante, Lewison Lem, Judy Mueller, Michael Lawrence*

Publication Date: 2012

Abstract: Transportation behavior appears to be shifting in recent years. Between the 2001 and 2009 National Household Travel Surveys (NHTS), the average annual total vehicle miles traveled (VMT) for all age brackets fell. This reduction is likely to be related to a number of different factors, one of which may be the rapid introduction and adoption of information and communication technologies (ICTs) over this period. Based on recent studies and reports, this paper builds a framework to analyze the extent to which there is a link between use of new technologies and changes in transportation behavior. It also attempts to establish whether there is a difference in the intensity and manner of technology use between age cohorts, and in the manner in which technology use affects transportation behavior. Finally, the paper assesses major gaps in our understanding of how ICTs may be affecting travel behavior for future research.

Subject Areas: age groups, communication systems, culture (social sciences), information technology, social change, social media, telecommuting, travel behavior

Availability: Transportation Research Board Annual Meeting 2012 Paper #12-4057

Some Help On the Way: Opportunistic Routing Under Uncertainty *Eric Horvitz and John Krumm*

Publication Date: N/A

Abstract: We investigate *opportunistic routing*, centering on the recommendation of ideal diversions on trips to a primary destination when an unplanned waypoint, such as a rest stop or a refueling station, is desired. In the general case, an automated routing assistant may not know the driver's final destination and may need to consider probabilities over destinations in identifying the ideal waypoint along with the revised route that includes the waypoint. We consider general principles of opportunistic routing and present the results of several studies with a corpus of real-world trips. Then, we describe how we can compute the expected value of asking a user about the primary destination so as to remove uncertainty about the goal and show how this measure can guide an automated system's engagements with users when making recommendations for navigation and analogous settings in ubiquitous computing.

Subject Areas: Opportunistic routing, mixed-initiative, information value

Availability: Microsoft Research http://research.microsoft.com/en-us/um/people/jckrumm/Publications%202012/diversion%20analysis_camera_ready01.pdf

NCHRP Report 716: Travel Demand Forecasting: Parameters and Techniques *Cambridge Systematics, Inc., Vanasse Hangen Brustlin, Inc., Gallop Corporation, Chandra R. Bhat, Shapiro Transportation Consulting, LLC, and Martin/Alexiou/Bryson, PLLC*

Publication Date: 2012

Abstract: This report is an update to *NCHRP Report 365: Travel Estimation Techniques for Urban Planning* and provides guidelines on travel demand forecasting procedures and their application for solving common transportation problems. The report presents a range of approaches that allow users to determine the level of detail and sophistication in selecting modeling and analysis techniques most appropriate to their situations and addresses straight-forward techniques, optional use of default parameters, and appropriate references to other more sophisticated techniques.

Subject Areas: Highways, Operations and Traffic Management, Planning and Forecasting, Safety and Human Factors

Availability: Transportation Research Board

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_716.pdf

Spatial Analysis of Built Environments and Vehicle Transit Behavior *Daniel Currie Eisman*

Publication Date: August 2012

Abstract: In an effort to explore smart growth principles, this study offers an empirical test of the influence of the built environment at the neighborhood scale on vehicle transit behavior. Using U.S. Census data combined with spatial analysis techniques, the study conducts a cross-sectional analysis of the effect of the built environment on household automobile ownership and vehicles miles traveled (VMTs) in 75 block groups across five metropolitan statistical areas. Variables are measured for density, job and retail access, transit accessibility, and street connectivity. The study also considers confounding variables including household income, regional density, extent of regional transit network, age of neighborhood population, and individual transit expenditure. From these data, best-fit regression models are developed for VMTs and automobile ownership. Although there is significant unexplained variation, the regression models confirm a statistically significant association of VMTs and automobile ownership with the built environment. Among the implications of these findings are that (1) neighborhood density should be encouraged in areas well-served by transit, (2) transit and smart-growth projects will have a greater impact on VMTs in regions that have robust, existing transit systems, and (3) new transit projects will likely be most effective in reducing vehicle ownership if planners focus on better serving moderate and low-income neighborhoods. Future research should examine statistical associations longitudinally, based on updated data from the 2010 U.S. Census, and should attempt to gather primary data on VMTs at the household and neighborhood scales.

Subject Areas: VMT, built environment

Availability:

http://spatial.usc.edu/wp-content/uploads/2012/07/Eisman-Thesis.pdf

Does the Substitutability of Public Transit Affect Commuters' Response to Gasoline Price Changes? *Elisheba Spiller, Heather M. Stephens, Christopher Timmins, and Allison Smith*

Publication Date: July 2012

Abstract: This paper determines the extent to which gasoline price elasticity is affected by the availability of a substitute for driving—public transportation. Measuring the substitutability of public transportation presents an important practical difficulty. To address this, we predict individuals' commute times by private and public transit conditional upon their observable characteristics and create a measure of substitutability between the two modes based on transit times. This allows us to measure the effect of public transportation on commuters' sensitivity to gasoline prices. The interaction of gasoline price with our constructed substitutability measure is found to have a significant effect on annual vehicle miles traveled (VMT), indicating that investments in public transit could play an important role in altering motorists' sensitivity to gasoline prices and increasing the effectiveness of a gasoline tax. However, we find evidence to support a policy of increasing public transit accessibility only in the presence of increased gasoline taxes.

Subject Areas: public transportation, elasticity, commuting, gasoline prices

Availability: Resources For The Future

http://www.rff.org/RFF/Documents/RFF-DP-12-29.pdf

Generating Disaggregate Population Characteristics for Input to Travel-Demand Models *Lu Ma*

Publication Date: June 2012

Abstract: The past several years have seen tremendous developments in disaggregate travel-demand models. The application of such models for predictions and policy evaluations requires as inputs detailed information on the socio-economic-mobility characteristics of the population. Synthesis methods are used to first generate the population for a base year (current year/census year) and this, in turn, is used as an input to generate the target year (forecast year) population.

The state-of-the-practice approach to population synthesis involves the use of the Iterative Proportional Fitting (IPF) method. While there have been several applications of this approach, several issues still remain. First, the number of controls used in the synthesis of the base-year population has been limited. In particular, most practical applications control only for household-level attributes (e.g., household size and dwelling-unit type) and not for person-level attributes such as age and gender. Thus, the synthesized base-year population may not truly match the observed person-level distributions. This would affect the accuracy of the target-year population as the synthesized base-year population is used as an input to generate the target-year population. Second, documentation of the validation of the synthesis procedure, especially in the context of a "target" year population, is limited. The broad focus of this dissertation is to contribute towards synthetic population generation by addressing these issues.

To generate a synthetic population as inputs on disaggregate travel-demand models, this dissertation proposes a new framework for synthetic population generation through a fitness based synthesis (FBS) method in which multi-level (household level and personal level etc.) attributes can be controlled simultaneously. During simulation, several socioeconomic variables (such that household size, income, gender, age and etc) under census tract level are chosen as control information and the 5% sample from corresponding PUMA (Public Used Microdata Area) forms the seed data. Empirical results indicate that controlled attributes of synthetic population can match the true population almost perfectly. Furthermore, this dissertation also proposes a validation idea in which a set of household is transferred into the distribution of household type and several criteria are also introduced for measuring the difference between true population and synthetic populations. As expected, the synthetic population under household and person level controls will have much similarity with the true population comparing to the synthetic population using only household level controls. On the other hand, this dissertation also compares the FBS method with other population synthesizers through proposed validation criteria. Then these synthetic populations are compared based on the difference with the true population.

Subject Areas: travel demand

Availability: http://gradworks.umi.com/35/14/3514962.html

Trends in Metropolitan Network Circuity *David J. Giacomin, Luke S. James, and David M. Levinson*

Publication Date: N/A

Abstract: Because people seek to minimize their time and travel distance (or cost) when commuting, the circuity{the ratio of network distance traveled to the Euclidean distance between two points{plays an intricate role in the metropolitan economy. This paper seeks to measure the circuity of the United States' 51 most populated Metropolitan Statistical Areas and identify trends in those circuities over the time period from 1990-2010. With many factors playing a role such as suburban development and varying economic trends in metropolitan areas over this timeframe, much is to consider when calculating results. In general, circuity is increasing over time.

Subject Areas: travel distance, travel time, metropolitan areas

Availability: http://nexus.umn.edu/Papers/CircuityTrends.pdf

Demand for Public Transport in Germany and the USA: An Analysis of Rider Characteristics *Ralph Buehler & John Pucher*

Publication Date: August 9, 2012

Abstract: This paper first provides a brief review of trends in public transport demand from 1980 to 2010 in 16 countries in Europe, North America, and Australia. The focus, however, is on a detailed analysis of public transport demand in Germany and the USA, using uniquely comparable national travel surveys from 2001/2002 and 2008/2009 for both countries. Public transport has been far more successful in Germany than in the USA, with much greater growth in overall passenger volumes and trips per capita. Even controlling for differences between the countries in demographics, socio-economics, and land use, logistic regressions show that Germans are five times as likely as Americans to use public transport. Moreover, public transport in Germany attracts a much broader cross-section of society and for a greater diversity of trip purposes. The success of German public transport is due to a coordinated package of mutually supportive policies that include the following: (1)more and better service, (2) attractive fares and convenient ticketing, (3) full multimodal and regional integration, (4) high taxes and restrictions on car use, and (5) land-use policies that promote compact, mixed-use developments. It is the integrated package of complementary policies that explains why public transport in Germany can compete so well with the private car, even among affluent households. Conversely, it is the lack of complementary policies that explains the continuing struggle of public transport in the USA.

Subject Areas: public transport

Availability: Transport Reviews, 2012, 1–27, iFirst Article http://www.tandfonline.com/loi/ttrv20

Assessment of Electric Cars' Range Requirements and Usage Patterns Based on Driving Behavior Recorded in the National Household Travel Survey of 2009 *Rob van Haaren*

Publication Date: July, 2012

Abstract: The main barrier to electrification of the car industry is the electric car's limited range. The fear of getting stranded on the side of the road with an empty battery, first observed in General Motor's EV1 project is named: 'Range Anxiety'. The purpose of this study is to characterize driving behavior of the United States population (on a National and State level) and to give an overview of what percentage of trips can be covered with a fully charged electric car. Also, this study has successfully identified factors that influence driven distances, such as the effect of urbanity and household ethnicity. The second research goal is to provide future research on grid integration of electric cars with a temporal outline of when electric cars will be connected to the electricity grid. Data for this can be downloaded for free from the website.

Subject Areas: Electric cars, travel behavior, trip distance, trip purpose

Availability: Solar Journey USA www.solarjourneyusa.com

Household Travel Analysis Using Bayesian Binomial Negative Models *Dapeng Zhang and Xiaokun (Cara) Wang*

Publication Date: 2012

Abstract: One critical component in transportation planning is the relationship between household travel patterns and socioeconomic factors. The 2009 National Household Travel Survey in the U.S. provides data to characterize such a relationship. Although NHTS is considered the most informative dataset for house travel patterns on national level, the depth and frequency of the survey are constrained by available budget. The goal of this study is to develop a better model to produce more reasonable parameter estimations and better prediction performance. This paper examines the conventional negative binomial regression model for household trips production analysis. This approach incorporates prior information, has optimal small-sample properties and allows for tractable inference. Using Markov Chain Monte Carlo simulation, parameters are estimated a randomly sampled dataset. It is found that Bayesian negative binomial model is effective in enhancing model estimation performance when sample size is limited but reliable prior information is available.

Subject Areas: transportation planning, travel patterns, household travel, binomial model

Availability: http://ascelibrary.org/doi/pdf/10.1061/9780784412442.367

Valuing the Consumption Benefits of Urban Density *Victor Couture*

Publication Date: November 2012

Abstract: Density is a defining feature of cities, yet there is little evidence as to how consumers benefit from urban density. This paper measures the consumption value of urban density by combining travel data with recently available online micro-geographic data on local businesses.
I first show that increased density enables consumers to both realize welfare gains from variety and save time by making shorter trips. I then estimate the gains from density in the restaurant industry using data from Google Map's pages, identifying an individual's willingness to pay for access to a slightly preferred location from the extra travel costs that she incurs to reach it. The results reveal wide disparities across areas in a variety-adjusted restaurant price index, leading to significant geographic welfare differentials. Within large metropolitan areas, the index generally decreases by more than 20% from a city's outskirts to the denser downtown core. This decrease represents yearly gains of about $400 for an average household, considering restaurants only. The model predicts a key feature of the data, that increasing the density of destinations generates little reduction in trip times. Most of the gains from density are therefore gains from variety, not savings on travel time. Americans' aggregate welfare gains from access to a variety of eating options beyond the one restaurant closest to them amount to approximately 2% of consumer expenditures, the first estimate of the gains from variety in the service sector.

Subject Areas: consumer cities, gains from variety, urban density, accessibility, travel demand

Availability: N/A

Leisure Travel of the 50+ *Nancy McGuckin and Jana Lynott*

Publication Date: October 2012

Abstract: Traditionally, people in the empty-nest stage of life (which most people reach in their 50s) travel more for leisure than either older or younger people. The 2009 National Household Travel Survey shows that people in their 50s and 60s are taking more weekend getaways in place of one big annual vacation. The shift to more frequent but shorter leisure trips means that more people will be driving to their destinations, which in turn may affect safety due to increased exposure to traffic. People aged 70 and older reported both more trips and more miles. Accessibility planning and implementation for air, rail, and bus terminals, stations, and vehicles will increasingly make a difference in the ability of older people to travel and their comfort while doing so.

Subject Areas: travel behavior, older drivers, leisure travel

Availability: AARP Public Policy Institute Fact Sheet 268 http://www.aarp.org/ppi

Impact of Baby Boomers on U.S. Travel, 1969 to 2009 *Nancy McGuckin and Jana Lynott*

Publication Date: October 2012

Abstract: The Baby Boom Generation has been the demographic engine fueling much of the growth in travel over the past 40 years—both in the number of travelers and in the amount of travel per person. The historic growth in vehicle travel generated economic, spatial, and cultural changes that are still being felt today. This Insight on the Issues offers one perspective on the role of the population bubble known as the baby boomers on U.S. travel, as described through four decades of travel data. It then offers recommendations on public and private investments needed to ensure the future mobility of boomers as they age.

Subject Areas: baby boomers, travel data

Availability: Impact on the Issues, #70 http://www.aarp.org/ppi/

Do Smart Growth Strategies Have a Role in Curbing Vehicle Miles Traveled? A Further Assessment Using Household Level Survey Data *Sudip Chattopadhyay and Emily Taylor*

Publication Date: September 2012

Abstract: This paper draws on McFadden's location choice theory and incorporates households' residential choice decisions as a hierarchical process in a structural travel demand model. The paper argues that such an approach can effectively tackle the problems of self-selection and multicollinearity. Contrary to previous findings, empirical results based on OLS and 3SLS reveal that travel demand is highly elastic to certain smart-growth features, if they are measured at different spatial scales. The results are robust against alternative sequencing of the hierarchical choice process. An analysis of the quantitative impact of a change in the smart-growth and fuel-tax policies reveals significant returns under both policies. Finally, a simulation based on California suggests that smart growth policies substantially reduce household travel demand.

Subject Areas: transportation demand; land use policies; self-selection; multicollinearity; hierarchical choice theory; structural equations model; three stage least squares

Availability: The B.E. Journal of Economic Analysis & Policy. Volume 12, Issue 1, Pages –, ISSN (Online) 1935-1682, DOI: 10.1515/1935-1682.3224, September 2012

The Dynamics of Urban Traffic Congestion and the Price of Parking *Mogens Fosgerau and Andr´e de Palma*

Publication Date: September 19, 2012

Abstract: We consider commuting in a congested urban area. While an efficient time-varying toll may eliminate queuing, a toll may not be politically feasible. We study the benefit of a substitute: a parking fee at the workplace. An optimal time-varying parking fee is charged at zero rate when there is queuing and eliminates queuing when the rate is non-zero. Within certain limits, inability to charge some drivers for parking does not reduce the potential welfare gain. Drivers who cannot be charged travel when there is queuing. In some cases, interaction between morning and evening commutes can be exploited to remove queueing completely.

Subject Areas: parking; dynamic; congestion; urban; traffic

Availability: http://hal.archives-ouvertes.fr/hal-00742104

Community Design and How Much We Drive *Wesley E. Marshall & Norman W. Garrick*

Publication Date: 2012

Abstract: The preponderance of evidence suggests that communities with denser and more connected street networks and a higher degree of mixed land uses results in fewer vehicle kilometers traveled (VKT). However, there is less agreement on the size of the effect. Also, there is no clear understanding of the specific aspects of community design—such as street networks and land use mix—that are most important in contributing to lower VKT. One reason why there is some confusion on this point is that past studies have not always made a clear distinction between different street network design characteristics such as density, connectivity, and configuration. In this research, care was taken to control for land use mix while fully characterizing the different features of the street network, including a street pattern classification system that works at the neighborhood level but also focuses on the citywide street network as a separate entity.

We employ a spatial kriging analysis of National Household Travel Survey (NHTS) data in combination with a generalized linear regression model in order to examine the extent to which community design, particularly in terms of street network design while controlling land use mix, influences VKT in 24 California cities of populations from 30,000 to just over 100,000. Our results suggest that residents of more compact street network designs tend to drive less. Street connectivity, however, played an adverse role in performance.

Subject Areas: VKT, vehicle miles travelled, street connectivity

Availability: Journal of Transport and Land Use http://jtlu.org Vol 5 No 2 [2012] pp. 5–21
doi: 10.5198/jtlu.v5i2.301

Statewide Rural-Urban Bus Travel Demand and Network Evaluation: An Application in Tennessee *Hongtai Yang and Christopher R. Cherry*

Publication Date: 2012

Abstract: This paper examines the characteristics of intercity bus riders within Tennessee and proposes methods to identify service gaps and prioritize network expansion, particularly focusing on rural-urban connections. Data were collected through an on-board survey and compared with intercity auto trips. Compared to personal auto users, intercity bus riders are more likely to be of minority races, unemployed, unable to drive, and from low-income households. Five demand levels were determined based on the population distribution with these characteristics. The service areas of existing bus stops were identified and compared with the high demand areas. The result shows that an insufficient number of stops are located in high demand area. Still, approximately 80 percent of stops connect to meaningful destinations such as hospitals. The results imply that bus stations are well-connected to destinations but poorly connected to potential riders. Changes to the current network could better cover high-demand areas.

Subject Areas: on-board survey, intercity bus, Tennessee, bus riders

Availability: Journal of Public Transportation, Vol. 15, No. 3, 2012

http://www.nctr.usf.edu/wp-content/uploads/2012/10/15.3_Yang.pdf

Temporal Stability and Transferability of Non-Motorized and Total Trip Generation Models

Judith L. Mwakalonge, Juhann C. Waller, Judy A. Perkins

Publication Date: August 2012

Abstract: Transportation systems provide a means for moving people and the goods from which they are spatially separated. Of the two means of surface transportation, the motorized mode is used extensively for utilitarian travel in developed countries. The increasing reliance on motorized travel has contributed to increased traffic congestion, air pollution, and greenhouse emissions. Non-motorized travel has recently received significant attention as a means to reduce congestion and environmental problems and improve human health. However, non-motorized modeling is generally underdeveloped. This study investigated some changes in non-motorized and total travel and the characteristics of the traveling public in 1990, 1995, 2001, and 2009 using a national travel survey. The study also investigated the temporal transfer- ability of linear-regression trip generation models for non-motorized and total travel under such changes. High-income households made fewer non-motorized trips in 1990 and 1995 compared to 2001 and 2009. Persons aged 50 and over showed an increased demand for non-motorized travel, whereas children aged 0 - 15 showed a decreasing preference for non-motorized travel over time. Regarding temporal stability, only the coefficient for single-adult households with no children was stable across all of the analysis years. For both non-motorized and total travel, most model parameter estimates were stable short term but not long term. In general, the total travel models transferred better than non-motorized models, both short term and long term. Despite not finding universal stability in model parameter estimates, the models were marginally able to replicate travel in 2009 relative to the locally estimated 2009 model.

Subject Areas: Non-Motorized; Transferability; Temporal; Total Travel

Availability: Journal of Transportation Technologies, 2012, 2, 285-296 doi:10.4236/jtts.2012.24031
Published Online October 2012 (http://www.SciRP.org/journal/jtts)

Men Shape a Downward Trend in Car Use among Young Adults—Evidence from Six Industrialized Countries *Tobias Kuhnimhof, Jimmy Armoogum, Ralph Buehler, Joyce Dargay, Jon Martin Denstadli, and Toshiyuki Yamamoto*

Publication Date: September 2012

Abstract: This paper investigates trends in the travel behaviour of young adults in Germany, France, Great Britain, Japan, Norway, and the USA over the past few decades with a focus on car availability and car travel. The trend analysis relies on micro-data from over 20 National Travel Surveys from the study countries dating back to the mid-1970s. The analysis of the survey data is supplemented by official statistics on license holding. On this basis, this paper compiles a body of evidence for changes in mobility patterns among young adults in industrialized countries over the past few decades. The findings indicate that since the turn of the millennium, access to cars, measured in terms of drivers' licenses and household car ownership, has decreased in most study countries—especially for men. Moreover, average daily car travel distance has decreased in most study countries, again especially for men. In France, Japan, and most significantly in the USA, the decrease in car travel has led to a reduction in total everyday travel by young travellers. In Great Britain, the decline in car travel was partly, and in Germany fully, compensated by an increased use of alternative modes of transport.

Subject Areas: travel behavior, young drivers, mobility

Availability: Transport Reviews: A Transnational Transdisciplinary Journal Volume 32, Issue 6, 2012

Managing Autonomous Transportation Demand *Bryant Walker Smith*

Publication Date: December 2012

Abstract: As autonomous and even semiautonomous technologies become more feasible, governments—and especially their planners, engineers, and lawyers—should not be idle. Autonomous driving has the potential for tremendous benefits. In the near or long term, however, some of these benefits, such as a lower time-cost of travel and a higher vehicle capacity on some highways, may actually increase certain costs associated with congestion, emissions, and sprawl. Maximizing the net benefit of autonomous driving will require researching, modeling, planning, and regulating—cooperatively, not autonomously

Subject Areas: autonomous vehicles;

Availability: Santa Clara Law Review Smith, Bryant Walker. "Managing Autonomous Transportation Demand." Santa Clara L. Rev. 52 (2012): 1401-1561.

Synthesis of Spatially & Temporally: Disaggregated Person Trip Demand: Application For Typical New Jersey Weekday *Talal R. Mufti*

Publication Date: November 2012

Abstract: With the advent of technologies such as autonomous taxis and large-scale personal rapid transit networks drawing nearer to the present reality, serious studies must be made with regard to what levels of demand and opportunity exist for the degree of accessibility that such technologies can provide in urban areas. With a lack of high resolution information available from conventional surveying methods, this thesis looks to generate synthetic data regarding person trips at a highly disaggregated level, in space and in time, across the entire state of New Jersey. The model used produces an output of 32.6 million trips where the average trip distance, after removing outliers, is 12.4 miles and the average travel time to work is 21 minutes—figures that are reasonably near to New Jersey benchmarks. The thesis documents the model's methodologies and results and proceeds to display limitations as well as suggest improvements for future iteration.

Subject Areas: person trips, trip distance

Availability: Princeton University
http://www.princeton.edu/~alaink/Orf467F12/MuftiTripSynthesizer_v.1.pdf

TREND ANALYSIS AND MARKET SEGMENTATION

Barriers to widespread adoption of electric vehicles: An analysis of consumer attitudes and perceptions *Ona Egbue, Suzanna Long*

Publication Date: September 2012

Abstract: Electric Vehicles (EVs) are promoted as a viable near-term vehicle technology to reduce dependence on fossil fuels and resulting greenhouse gas (GHG) emissions associated with conventional vehicles (CVs). In spite of the benefits of EVs, several obstacles need to be overcome before EVs will be widely adopted. A major barrier is that consumers tend to resist new technologies that are considered alien or unproved, thus, policy decisions that consider their critical concerns will have a higher level of success. This research identifies potential socio-technical barriers to consumer adoption of EVs and determines if sustainability issues influence consumer decision to purchase an EV. This study provides valuable insights into preferences and perceptions of technology enthusiasts; individuals highly connected to technology development and better equipped to sort out the many differences between EVs and CVs. This group of individuals will likely be early adopters of EVs only if they perceive them to be superior in performance compared to CVs. These results can guide policymakers in crafting energy and transportation policy. It can also provide guidance to EV engineers' decision in incorporating consumer preference into EV engineering design.

Subject Areas: Electric vehicles; Consumer attitudes; Socio-technical barriers

Availability: Egbue, Ona, and Suzanna Long. "Barriers to widespread adoption of electric vehicles: An analysis of consumer attitudes and perceptions." Energy Policy (2012). http://www.sciencedirect.com/science/article/pii/S0301421512005162

The Economic Cost of Airline Flight Delay *Peterson, Everett B.; Neels, Kevin; Barczi, Nathan; Graham, Thea*

Publication Date: October 2012

Abstract: Flight delay has become widespread in the United States with nearly one-quarter of all flights delayed by more than 15 minutes in 2007. This paper determines the economic costs of delayed flights, including the direct effects of increased airline cost and the indirect effects of lost labour productivity for business travellers, an opportunity cost of time for leisure travellers, and changes in consumer spending on travel and tourism goods and services. US net welfare would increase by $17.6 billion for a 10 percent reduction in flight delay and by $38.5 billion for a 30 per cent reduction

Subject Areas: autonomous vehicles; Politely Change Lane (PCL);

Availability: Peterson, Everett B., et al. "The Economic Cost of Airline Flight Delay." Journal of Transport Economics and Policy (JTEP) 47.1 (2013): 107-121.
http://www.ingentaconnect.com/content/lse/jtep/2013/00000047/00000001/art00007

Scheduling of Connected Autonomous Vehicles on Highway Lanes *Jiajun Hu, Linghe Kong, Wei Shu, and Min-You Wu*

Publication Date: N/A

Abstract: With recent progress in vehicle autonomous driving and vehicular communication technologies, vehicle systems are developing towards fully connected and fully autonomous systems. This paper studies lane assignment strategies for connected autonomous vehicles in a highway scenario and their impact on the overall traffic efficiency and safety. We formulate a model of connected autonomous vehicles, which includes three features: traffic data available online, ultra-short reaction time, and cooperative driving. Based on this model, we propose a novel lane change maneuver Politely Change Lane (PCL), which achieves the tradeoff between traffic safety and efficiency. Its effectiveness is validated and evaluated by extensive simulations. The performance shows that PCL improves both safety and efficiency of the overall traffic, especially with heavy traffic.

Subject Areas: autonomous vehicles; Politely Change Lane (PCL);

Availability: Litman, Todd. "Current mobility trends: Implications for Sustainability." Keep moving, towards sustainable mobility (2012).

Current Mobility Trends Implications for Sustainability *Todd Litman*

Publication Date: N/A

Abstract: This chapter investigates current mobility trends and their implications for sustainability. It discusses factors that affect transport demands (the amount and type of travel that people would choose in a particular situation) and how demographic and economic trends affect these demands. During most of the last century, motor vehicle travel grew steadily in most developed countries. During this period, it made sense to invest significant resources in expanding roads and parking facilities, so this became the focus of transport planning. However, per capita vehicle travel has peaked in most developed countries because of demographic and economic trends, including aging population, rising fuel prices, increasing urbanization and associated traffic and parking congestion, improving transport options, increasing health and environmental concerns and changing consumer preferences.

Subject Areas: sustainability; VMT;

Availability: Litman, Todd. "Current mobility trends: Implications for Sustainability." Keep moving, towards sustainable mobility (2012).

Predicting the Market Potential of Plug-in Electric Vehicles Sing Multiday GPS Data

Mobashwir Khan and Kara M. Kockelman

Publication Date: N/A

Abstract: Detailed GPS data for a year's worth of travel by 255 households from the Seattle area were used to investigate how plug-in electric vehicle types may affect adoption rates and use levels. The results suggest that a battery-electric vehicle (BEV) with 100 miles of range should meet the needs of 50% of one-vehicle households and 80% of multiple-vehicle households, if those households fully charge their BEVs just once a day and are willing to use a different vehicle or mode of transport just 4 days a year or less (to serve daily travel distances above 100 miles).Moreover, the average one-vehicle household in the Seattle region relies on its vehicle for 23 miles per day and should be able to electrify close to 80% of its miles using a plug-in hybrid electric vehicle (PHEV) with 40-mile all-electric-range. Households owning two or more vehicles can electrify 50 to 70% of their household miles using a PHEV40, depending on how they assign the vehicle across their drivers each day. Cost comparisons between the average single-vehicle household owning a Chevrolet Cruze (regular gasoline vehicle) versus a Chevrolet Volt PHEV suggest that when gas prices are $3.50 per gallon and electricity rates at the U.S. average of 11.2 ct per kWh, the Volt will save the household $535 per year in operating costs. Similarly, the Toyota Prius PHEV, when compared to the Toyota Corolla, will provide an annual savings of $538 per year.

Subject Areas: plug-in electric vehicles, all-electric range, battery-electric vehicles, vehicle use and cost

Availability: 2012 TRB paper submittal

Tracking National Household Vehicle Usage by Type, Age, and Area in Support of Market Assessments for Plug-in Hybrid Electric Vehicles *Yan Zhou, Anant Vyas and Danilo Santini*

Publication Date: N/A

Abstract: This paper examines usage for household vehicles to support assessment of the market potential of plug-in hybrid electric vehicles (PHEVs), which require high usage rates for the technology investment to pay off. According to the 2009 National Household Travel Survey (NHTS), about 40% of household vehicles were not used on the survey travel day [1]. This study analyzed household vehicle use and non-use by vehicle type, age, and area type (metropolitan statistical area [MSA] and non-MSA). Vehicles used on survey day with or without a reported travel time and distance in the survey are considered "vehicles used." All others are referred to as "vehicles not used." We divided the "vehicles not used" into three categories: (1) left at home while using other household vehicles, (2) not used because travelers used other modes, and (3) no household trips. The "vehicle used" category comprises two categories: (1) those with distance and time data and (2) those with no travel data. Within these five categories, vehicles were further subdivided according to four vehicle types: car, van, SUV, and pickup. Each vehicle type was further subdivided in two age groups: 10 years or less (<=10) and more than 10 years (>10). In addition, vehicle usage was compared in both MSAs and non-MSAs and during weekdays and weekends. Results indicate that most vehicles, especially pickups, are not used because the households own and use other vehicles. Moreover, SUVs — especially newer SUVs (<=10 years) — are the most utilized vehicle type and should be considered as the first available vehicle type for new-technology vehicles.

Subject Areas: hybrid electric vehicles, vehicle usage

Availability: 2012 paper submittal

Thinking About Economic Growth: Cities, Networks, Creativity, and Supply Chains for Ideas *Peter Gordon*

Publication Date: 2012

Abstract: Discussions of economic growth require an examination of the role of cities. It is widely claimed that cities exist because they facilitate economic growth and development. Spatial concentrations reduce transactions costs. There are additional benefits gained as positive spillover effects are realized. The latter is especially important for the exchange of ideas. Creativity comes from new arrangements of thoughts and ideas. The thoughts of others facilitate new combinations of ideas. It is argued here that propitious spatial arrangements make both sets of benefits possible. These arrangements involve choices from a very large combinatorial set. The choice problem is too complex to entrust to models or planning agencies. Rather, flexible land markets are required. This paper is based on the author's presidential address delivered at the February 2012 meetings of the Western Regional Science Association in Kauai, Hawaii.

Subject Areas: economic growth, creativity, urban form

Availability: Price School of Public Policy

FREIGHT MOVEMENT

Effects of Built Environment on Freight Consumption *Dan Miodonski, Kazuya Kawamura*

Publication Date: 2012

Abstract: The aim of this study is to examine the relationship between built environment and consumption of consumer products. The study uses the data obtained from a series of surveys conducted in Texas to empirically examine the relationship between tons of consumer products per capita delivered to each tract and built environmental variables such as road density, population density, and block size while controlling for socioeconomic characteristics. The finding of this study will contribute toward the interrogation of the broad effect of policies that are often called "smart growth" in terms of effect on the demand for freight.

Subject Areas: Freight transportation planning; built environment and freight consumption; consumer products

Availability: http://www.sciencedirect.com/science/article/pii/S1877042812005599#