



UNIVERSITY OF CALIFORNIA *Berkeley*
Transportation Sustainability
RESEARCH CENTER

Ecodriving Behavioral Research at UC Berkeley's TSRC

Susan A. Shaheen, PhD

Co-Director, TSRC

University of California, Berkeley

May 18, 2011

TSRC: Brief Introduction

- Founded in 2006, ITS Berkeley's TSRC conducts applied research and education/outreach in energy, environment, and transportation
- A team of researchers, students, and staff design, produce, and evaluate projects that advance sustainable transportation
- Focuses on cross-cutting academic research that yields empirical understanding from real-world pilots of transportation innovation



Ongoing Ecodriving Research

Understanding How Public Education Can Result in Reduced Greenhouse Gas Emissions and Fuel Consumption

- Evaluates changes in fuel economy through reporting of mileage and gasoline receipts
- Two-part study: 1) focus groups/longitudinal w/ UCB staff and students and 2) clipboard w/ general public
- Two focus groups conducted in Berkeley (Summer 2010)
- Assesses before-and-after response to an ecodriving informational website over a 3-month period (Fall 2010)
- Longitudinal survey (N = 110) explores behavioral changes in driving and maintenance practices (Winter 2011)
- Clipboard survey in Bay Area (N = 306) explored general attitudes towards ecodriving



Created by Congress in 1991

Ongoing Ecodriving Research (cont'd)

Evaluation of Real-time Ecodriving Feedback on Fuel Economy

- Participants have an Eco-way™ device installed in their car; monitors MPG and CO2 emissions/mile
- Using data from the OBDII port, the Eco-way provides real-time feedback to drivers and records all data at 2-second intervals
- Participants drive one month with the device recording data without feedback and a second month with the device recording feedback
- Study population of 20+ participants
- Before-and-after survey (8 weeks total) is given to each participant
- Asks about perception of fuel efficiency and driver distraction



Ongoing Ecodriving Research (cont'd)

Ecodriving and Goods Movement

- Research part of the Air Resources Board California Freight Toolkit
- Develops an information module to advise truck drivers on ecodriving
- Two sets of stakeholder interviews: 1) drivers and fleet managers and 2) regulators, educators, advocacy
 - Interviews to occur in May/June 2011
 - Module development in June/July 2011
 - Module verification interviews in July/Aug 2011
 - Final report in Nov/Dec. 2011
- Incorporates stakeholder feedback to produce information and a presentation format that is useful to the trucking industry



California Environmental Protection Agency
 Air Resources Board

Ecodriving Research: Open Problems

- Which forms of information delivery are most effective in modifying driving behavior?
 - By what magnitude do different mechanisms improve fuel economy and how does this vary across the driving population?
 - How much fuel economy is gained from dynamic vs. static feedback?
- How long do any measured impacts persist after introduction? How can behaviors best be reinforced?
- Which real-time feedback designs (e.g., in-vehicle technologies) are most effective? Are there distracted driver concerns?
- How responsive is the freight industry to ecodriving practices and how much are operators already doing?
- How can vehicles provide better feedback to drivers on optimal maintenance practices based on real-time performance? How best to provide info. to avoid driver distraction?
- Which public policies reinforce and incentivize ecodriving behavior? How can improvements be quantified (performance measures) and tracked?



Research Challenges in Ecodriving

- Recruitment and data
 - Identifying participants for long-term studies (e.g., car purchases)
 - Unbiased population recruitment (i.e., self-selection bias)
 - Vehicle instrumentation to evaluate performance over time (e.g., successful collection and data retention)
- Ecodriving definitions and public education
- Establishing benchmarks for monitoring reduction (different for private and commercial vehicles)





Summary

- Ecodriving research an area of emerging activity
- New devices and designs for feedback are being developed
- Effectiveness of most of these devices remains unexplored
- Ecodriving research challenged due to overall uncertainty and awareness, along with longitudinal study participant retention considerations and self-selection bias





tsrc

www.tsrc.berkeley.edu



Transportation Sustainability RESEARCH CENTER
UNIVERSITY OF CALIFORNIA BERKELEY