

This month: University of California, Davis | February 2011

Road Closed: How do Commuters Cope? UC Davis Researcher is Finding Out

If you commute by car to work and a major highway closes, what do you do? You may take a detour or find alternate routes. Or you may try something new, like carpooling, taking transit, shifting your commute time, or telecommuting if your employer approves. After the highway reopens, you may resume driving alone on your old route, or you may find that your new option is more appealing.

California Department of Transportation



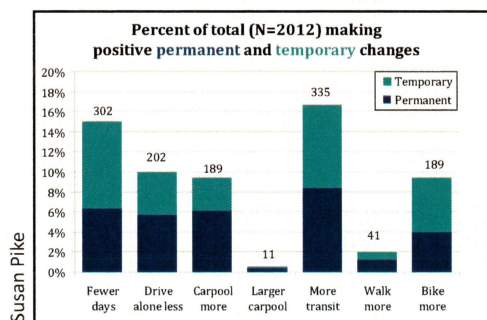
The closure of the southbound stretch of I-5 from US-50 to Garden Highway as shown from the air.

One such highway closure—the summer 2008 reconstruction of Interstate 5 (I-5) in Sacramento, CA (aka. “The Fix”)—became the basis of a real-life experiment to determine how commuters react when forced to change their commute patterns. For 9 weeks, a 1-mile stretch of I-5 was intermittently closed. By studying commuter responses to “The Fix,” University of California, Davis Civil and Environmental Engineering professor Patricia Mokhtarian hopes to discover why some commuters opt for more environmentally sustainable ways to get to work while others do not. Her work is funded in part by the University of California, Davis Sustainable Transportation Center (STC) (<http://stc.ucdavis.edu/>).

Mokhtarian surveyed commuters about their travel choices in three waves:

- during the first week of The Fix, when all northbound lanes were closed;
- during the third week of The Fix, when all southbound lanes were closed; and
- in February 2009, 6 months after project completion.

Preliminary findings showed that auto trips dropped, and some commuters adopted permanent changes—but not attributable solely to The Fix.



The study found both permanent and temporary changes to commuter behaviors. Shown here are the categories of the positive changes.

when commuters were making changes during construction. Her newer research focuses on the third survey, to which more than 2,000 people responded. These responses have not been exhaustively explored, and Mokhtarian has proposed further analysis.

“Our follow-on research will attempt to answer two questions,” Mokhtarian says:

Mokhtarian’s early research examined the factors associated with commuters’ choices to increase transit use and telecommuting, and focused entirely on the first and second surveys,

1. "To what extent does a change in behavior long outlast the closure event, resulting in a (relatively) permanent change?" and
2. "What makes some people adopt their new behavior indefinitely, while others return to their previous pattern as soon as possible?"



Closure and rehabilitation of Interstate 5 as it goes through downtown Sacramento.

One distinctive attribute of this study is its longevity. "Many studies of behavior change just ask for intentions; they don't do a true before-and-after study. If they do, it's often just 1 month later. Few have measured actual behavior as long as 6 months after the impetus for change," she explains.

Initial findings from the third survey indicate that 41.6 percent have made a permanent change from the commute pattern they had before The Fix. Of those, however, two-thirds said The Fix had nothing to do with their change. Roughly one-quarter said The Fix was one factor. Only 9 percent (of the 41.6 percent) said The Fix was the most important factor contributing to their permanent change.

Focusing only on that small fraction of changes influenced by The Fix, Mokhtarian subdivided them into environmen-

tally positive changes versus negative changes. Positive changes include behaviors such as telecommuting, adopting compressed work schedules, or shifting from driving alone to carpooling, transit or nonmotorized modes. She then analyzed what share of changes in each of those categories was permanent, versus only temporary. She found that The Fix was more likely to prompt positive changes (19%) than negative changes (6%), although the negative changes were more likely (55%) than positive changes (31%) to be permanent. The net permanent effect, however, is in the positive direction: 6% of all cases made permanent positive changes, while only 3% made permanent negative changes.

Mokhtarian counsels colleagues to temper their expectations for permanent positive changes. The data show that some of the same factors prompting positive change can also prompt negative change, resulting in the proverbial double-edged sword. Still, she adds, freeway reconstruction can have a positive side-benefit of reducing vehicle-miles traveled. "It could be a virtue born of necessity, inducing a small but beneficial change in commute behavior."

The next steps will be to develop models that distinguish permanent from temporary and positive from negative changes to help researchers understand what types of people make each of those types of changes.

Mokhtarian hopes that her research can be used to help highway planners around the country prepare for how commuters might respond to similar road closures, which might become more commonplace as the Nation's highway system ages. Furthermore, understanding what motivates people to change their commute behavior may transfer to other travel behavior response research, such as on price signals, transit, and travel incentives. ♻️

About This Project

Patricia L. Mokhtarian, a professor of Civil and Environmental Engineering at UC Davis, has specialized in the study of travel behavior for more than 30 years. Colleague H. Michael Zhang, also a professor of Civil and Environmental Engineering at UC Davis, was principal investigator on the Fix I-5 impacts analysis project. Zhang led a team of graduate and undergraduate students in field surveys of traffic and transit impacts. In addition to Mokhtarian and Zhang, two visiting researchers, Liang Ye and Meiping Yun of Tongji University in Shanghai, China, chose to examine differences in impact by gender.

This newsletter highlights some recent accomplishments and products from one University Transportation Center (UTC). The views presented are those of the authors and not necessarily the views of the Research and Innovative Technology Administration or the U.S. Department of Transportation, which administers the UTC program.

