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## Pushing Pedalers: What Drives Bicycling?

Jennifer Dill

*Portland State University, jdill@pdx.edu*

John Gliebe

*Portland State University*

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**OTREC**  
OREGON TRANSPORTATION RESEARCH  
AND EDUCATION CONSORTIUM

P.O. Box 751  
Portland, OR 97207  
Phone: (503) 725-2842  
Website: [www.otrec.us](http://www.otrec.us)  
Email: [askotrec@otrec.us](mailto:askotrec@otrec.us)



## PUSHING PEDALERS: WHAT DRIVES BICYCLING?

An on-going project from Portland State University uses GPS technology to examine cyclists' travel behavior—and finds that infrastructure does make a difference.

### Issue

Using a bicycle instead of a motor vehicle for a portion of regular travel could increase people's physical activity and help improve the nation's health. Over 60% of personal trips are five miles or less – a reasonable distance to ride a bike – and nearly 40% are two miles or less. Yet current rates of bicycling for transportation are very low, despite the popularity of recreational cycling. Given the potential of bicycling as a means of everyday travel, why aren't more people cycling?

Very little information has been available on the relationship between different types of infrastructure, such as bicycle lanes or paths, and people's decision to cycle. Dr. Jennifer Dill's study attempted to fill that gap by using GPS technology to gather comprehensive and reliable data from cyclists in Portland, Oregon. By determining which features are likely to increase bicycle travel, Dr. Dill's project could help cities make neighborhoods more bicycle friendly.

### Research

Dr. Dill's study used GPS technology to record where a sample of 164 adults, most of them regular cyclists, rode their bicycles in the Portland region. The data gathered from March through November 2007 was used to examine how often, when and where cyclists ride, as well as what factors influence these decisions. The study's findings highlight the influence of bicycle infrastructure on cyclists' behavior.

Study participants made an average of 1.6 one-way bicycle trips each day, with a median trip of 2.8 miles. The vast majority of these trips were "utilitarian" (e.g. for work, shopping or errands, not purely for recreation), and riding to work was the most frequent trip purpose (25%). When making these utilitarian trips, cyclists rode mainly on facilities with bicycle infrastructure such as striped bike lanes, separate paths or bicycle boulevards. In fact, more than half (52%) of the miles bicycled on utilitarian trips were made on facilities with bicycle infrastructure. Only 19% of the travel took place on high-traffic streets with no bicycle infrastructure.

### THE ISSUE:

What kind of infrastructure will best encourage more bicycling?

### THE RESEARCH:

Dr. Jennifer Dill (Portland State University) used GPS technology to monitor 164 adult bicyclists' riding behavior for seven months. A few statistics:

- **2.8** - median trip distance
- **25%** - trips getting to work
- **28%** - mileage pedalled on busy streets with bike lanes
- **28%** - mileage pedalled on quiet streets without bike lanes

### THE IMPLICATIONS:

Policies that favor well-connected low-traffic streets and communities with a greater mix of land uses will help encourage bicycling, especially for short trips.

Further research is needed, especially to look at the needs and preferences of infrequent cyclists and to compare more than one region.

### MORE PROJECT INFORMATION:

[www.otrec.us/project/33](http://www.otrec.us/project/33)

The study wanted to determine how much people value bicycle infrastructure by going out of their way to use it. To do so, researchers compared the routes the bicyclists actually rode to the shortest-distance route between their starting and ending points. They found that bicyclists go out of their way to ride on facilities with bicycle infrastructure and on low-traffic streets. In particular, the participants rode 14% of their miles on bicycle paths, while only 6% of the miles for the shortest possible routes were on paths. In addition, 10% of the miles were ridden on bicycle boulevards (traffic-calmed streets that give priority to bicyclists), while only 4% of the predicted shortest-path miles were on those facilities. Many bicyclists also adjusted their routes to avoid arterials and highways that do not have bike lanes.

Participants were asked about their route choices and preferences for each trip. Most utilitarian bicyclists want to minimize travel time; however, depending upon the transportation network available, the quickest route for bicyclists may not satisfy their second objective: avoiding motor vehicle traffic. This second objective is especially important to women and less-experienced bicyclists.

Finally, when comparing the actual bicycle travel times to estimated driving times, researchers found that for half of the short trips (3 miles or less), the difference was less than five minutes. This means that bicycles can be time-competitive with automobiles in some neighborhoods.

Facility Type	% of Miles		% Point Difference (Observed - Shortest)
	Where Bicyclists Rode (Observed Bike Trips)	Hypothetical Shortest-Path Trips	
Arterials or Highways without Bike Lanes	19%	36%	-17%
Low-Traffic Streets without Bike Lanes	28%	29%	+1%
Streets with Bike Lanes	28%	36%	+4%
Bicycle Boulevards (low-traffic streets with calming)	10%	4%	+6%
Multi-Use Paths	14%	6%	+8%

**Figure: Difference between Bicycle Travel by Facility Type, Observed vs. Shortest-Path Routes**

Bicyclists in the study rode a total of 6,131 miles for utilitarian purposes. If they had taken the shortest-distance route instead, they would have ridden 4,629 miles. Why the difference? They often went out of their way to use bicycle lanes, bicycle boulevards and separated paths, while avoiding high traffic arterials or highways (where bicycles are allowed).

### Implications

For encouraging women and novice adult cyclists, well-connected low-traffic streets, bicycle boulevards and separate paths may be more effective than bicycle lanes on busy streets. Adding bike lanes, however, could reduce travel times and distances, particularly for experienced bicyclists, and this also would increase bicycle travel overall. Cycletracks on major streets, which function like bike lanes but have more physical barriers between the lane and motor vehicles, may be a new solution that addresses cyclists' top two concerns.

Shorter trips – for which bicycling is more time-competitive – are most likely to occur in areas with a greater mix of land uses and higher network connectivity. Therefore, policies that promote these features are likely to support more bicycling for transportation.

Although this study collected more detailed information on bicycling behavior than other studies found in the literature, more research is still needed. By studying the needs and preferences of infrequent as well as frequent cyclists, and by studying more than one region, researchers could continue to develop a clearer and more comprehensive picture of how bicyclists behave and what can be done to increase bicycle travel.

### PROJECT INFORMATION

TITLE: Understanding and Measuring Bicycling Behavior: A Focus on Travel Time and Route Choice

LEAD INVESTIGATOR: Jennifer Dill, Ph.D. (Portland State Univ.)

CO-INVESTIGATOR: John Gliebe, Ph.D. (Portland State)

PROJECT #: 2007-33

PARTNERS: Robert Wood Johnson Foundation, Active Living Research Program & Portland State University

COMPLETED: December 2008

WEBSITE: [otrec.us/project/33](http://otrec.us/project/33)