

RESEARCH YOU CAN USE

Experiments and Quasi-Experiments: Two Great New Studies

There are three basic research designs that make use of quantitative data: controlled experiments, quasi-experiments, and studies with statistical controls. Controlled experiments are seldom conducted in planning because they require random assignment of subjects to experimental and control groups. If we could, for instance, randomly assign households to different neighborhoods, we would be able to draw strong conclusions about the effect of neighborhood design on household behavior. The problem is that

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the households in different neighborhoods differ significantly, confounding the relationship between neighborhood design and household behavior. (For more on this subject, see my July 2009 column on "Compact Development and Good Outcomes.")

That's not to say that there are no true controlled experiments in the planning field. In the summer 2011 issue of the *Journal of the American Planning Association*, Zhan Guo, Asha Weinstein Agrawal, and Jennifer Dill reported on a study that randomly assigned a small number of households to two groups. One group was made up of drivers who paid a graduated per-mile fee to use roads, with the rate based on the level of congestion (congestion pricing). The second group was charged a flat fee. Using regression models, the researchers tested the effects of both types of pricing on vehicle miles traveled. Very clever—and very unusual in planning.

Of the two remaining classes of quantitative studies, statistically controlled

studies are more common than quasi-experiments. I know this because two of our doctoral students at the University of Utah recently reviewed back issues of *JAPA* and its sister journal, the *Journal of Planning Education and Research* (JPER), and counted studies. Statistical studies outnumbered quasi-experiments by a wide margin. However, quasi-experiments have a certain intuitive appeal and public accessibility that statistical studies cannot match. Hence I have promoted them in two earlier columns.

Most planning studies use what is referred to as a *post-test only design*. They compare different people or places at a certain time, attributing different outcomes to different conditions. Using the symbolism of quasi-experimental design, these studies can be diagrammed as follows, where the Os are observations and the X is a treatment:

$$\begin{array}{c} \text{NR X O1} \\ \text{-----} \\ \text{NR O2} \end{array}$$

The dashed line between the groups and the letter NR that precedes the treatment, indicate that the groups were not randomly assigned. (For an example, see my November 2006 column comparing growth rates in cities with and without growth management controls. Though the cities were carefully matched, we cannot be sure they were comparable before growth management was instituted).

In another column (April 2010), I looked at the closing of a street in Midtown Manhattan. This simple *one-group pretest, posttest design* can be diagrammed as follows, with O1 representing observations before the treatment X and O2 representing observations after the treatment. This design is also weak, since it lacks a control or comparison group.

$$\text{O1 X O2}$$

Gold standard

Relatively few planning studies use a research design called a *pre-test/post-test design with a comparison group*. Yet, this

is the gold standard in quasi-experimental research. The study design is diagrammed as follows:

$$\begin{array}{c} \text{NR O1 X O2} \\ \text{-----} \\ \text{NR O1 O2} \end{array}$$

By comparing outcomes before and after a treatment, and referencing matched comparison cases, this third design provides the strongest evidence of cause-effect relationships. In recent study of traffic calming in New York City, for instance, I found that the frequency of crashes dropped after traffic calming measures were taken. Had I limited myself to a simple one-group pre-test/post-test design, I would have incorrectly concluded that traffic calming improved traffic safety. In fact, however, crash frequencies on treated and matched untreated streets declined to about the same degree over the 10-year period studied.

For a well-done study using the a pre-test/post-test design with a comparison group, I refer readers to the winter 2011 issue of *JAPA*, in which Rebecca Lewis and Gerrit Knaap evaluate Maryland's Rural Legacy Program. These two researchers have previously shown that the state's Priority Funding Program, which directs urban infrastructure investments to existing communities, has been marginally effective. For the current study, the two conducted a statistical analysis of development in and near the legacy areas both before and after they were designated. While mixed, their findings nevertheless add to the growing evidence of the limitations of targeted spending as a smart growth strategy.

For a fuller discussion of this topic, find a copy of the groundbreaking 2002 book, *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*, by W. R. Shadish, T.D. Cook, and D.T. Campbell, D.T.

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