

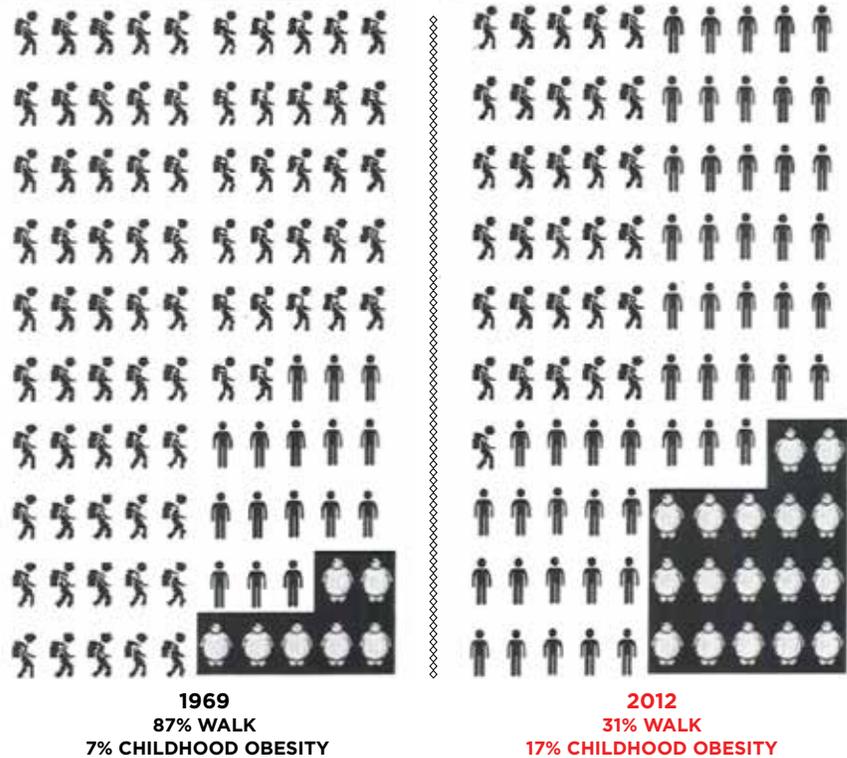
**RESEARCH YOU CAN USE****Correlation does not imply causation  
(when it comes to childhood obesity)**

The June 2014 issue of the *Journal of Planning Education and Research* contains four articles on “healthy schools,” meaning, in part, schools whose location and design promote physical activity. The cover of the issue, accordingly, has a graphic that compares childhood obesity and walking-to-school rates at two points in time, 1969 and 2012.

In 1969, 87 percent of U.S. students living close to school walked to school, and childhood obesity stood at seven percent. By 2012, the percentage of students walking to school had dropped to 31 percent, while the childhood obesity rate had risen to 17 percent. One might conclude (perhaps incorrectly) that one variable, a decline in walking to school, has caused another, a rise in childhood obesity.

For those not steeped in methodology, this is a teachable moment. The cover leads us to ponder the perils of causal inference. Correlation may not imply (or equal) causation. I suspect that practitioners are more likely to fall into this trap than academics are. The source of the figure, Nisha Botchwey, an associate professor of city and regional planning at Georgia Tech, writes in that issue: “The built environment CAN affect children’s behavior, such as walking to school, which has dramatically declined in recent decades, and [CAN] contribute to childhood obesity.” Botchwey’s *JPER* cover image is not intended to equate causation with proximate events; however, its combination of two findings reminds us of a general human tendency. The wonderfully insightful book *Thinking, Fast and Slow*, by the winner of a Nobel Prize in Economics, Daniel Kahneman, puts it this way: “Our mind is strongly biased toward causal explanations and does not deal well with ‘mere statistics.’”

To assert causation, three conditions must be met. First, variable A and variable B must be related to one another. This condition is met in the *JPER* example. From time series data, walking to school and childhood obesity have been inversely re-

**WALKING TO SCHOOL AND OBESITY RATES  
OF CHILDREN AGES 2-19 LIVING WITHIN ONE MILE OF SCHOOL**

SOURCE: Nisha Botchwey, Georgia Tech; courtesy *JPER*

lated to one another. Second, a proper time order must be established, with the causal variable A preceding the effect variable B. We cannot tell if this condition is met in the above example, as the two trends have occurred simultaneously.

Third, and most importantly, the relationship between variable A and variable B must not be due to some confounding, extraneous, or “third” variable. Again, we cannot tell if this condition is met as we have no information about other variables that may confound the relationship between school-related travel and childhood obesity. A confounding variable is one that is correlated with variable A and causally related to variable B. Potential confounders abound, as trends in mode of travel to school have been accompanied by many other lifestyle changes.

Students’ environment has changed dramatically in many ways over 43 years, and we cannot be sure which contribute more to childhood obesity. Students take

less physical education at school than they used to. They spend more time watching TV and playing video games after school. They eat more fast food and less home cooking than before. I could go on, but you get the idea.

So what would it take to draw causal inferences about the built environment, travel to school, and childhood obesity? First and foremost, it would require disaggregate data for a decent-sized sample of individual children in order to avoid a common statistical problem called aggregation bias. Then it would require socio-demographically similar students living in very different built environments vis-a-vis school access. Then it would require objectively measured physical activity levels for different students at different times of day, including just before and after school, so the researcher could distinguish between students walking to school and those being driven. Finally, it would require objectively measured weight and height for students in

order to link sociodemographics, the built environment, and physical activity to body mass index.

In fact, a quasi-experimental study that meets most of these criteria has already been done by a colleague at the University of Utah, Barbara Brown, in the Department of Family and Consumer Studies. Brown's sample consisted of 187 fifth graders from two schools representing three communities: (1) a walkable new urbanist community, Daybreak; (2) a mixed community (where students live in a less walkable community but attend the walkable school so that part of the route to school is walkable), and (3) a less walkable community.

She and her graduate student coauthor, Robert Stevens, tested whether students living in the new urbanist community had greater accelerometer-measured moderate-to-vigorous physical activity (known as MVPA) compared to students from other communities. Community walkability was, in fact, related to more MVPA during the half-hour before and after school and, among boys only, more MVPA after school generally. In a related study, physical activity proved to be inversely correlated with student body mass index.

So the simple cover graphic of the most recent *JPER* issue, with its evidence of correlation, may eventually find support in carefully controlled studies like Brown's. Let's conduct more of those studies to see if there is causation.

—Reid Ewing

*Ewing is a professor of city and metropolitan planning at the University of Utah and an associate editor of JAPA. Past columns are available at [www.plan.utah.edu/?page\\_id=509](http://www.plan.utah.edu/?page_id=509), including "The Perils of Causal Inference" from May 2007. The Stevens and Brown article, "Walkable New Urban LEED Neighborhood Development (LEED-ND) Community Design and Children's Physical Activity: Selection, Environmental, or Catalyst Effects?" appears in International Journal of Behavioral Nutrition and Physical Activity, 2011.*

## LETTERS

### On the alert

I very much enjoyed Mary Jane Nirdlinger's Viewpoint (August/September). I've long thought that one of the underappreciated "perks" of being a city planner is the pleasure we derive when we travel to different

places. Particularly when our work involves planning in a particular community, vacations and travel can provide the stimulus for documenting examples of things we think might be appropriate in our community—or things we definitely want to avoid.

*Making Places Special*, the book I wrote that APA Planners Press published in 2002, contains a case study of Westminster, Colorado, that makes much the same point. Planners in Westminster were actively attempting to improve the design of development in that fast-growing city between Denver and Boulder. In describing what shaped the design of a significant commercial development in Westminster, I wrote the following:

"Another architectural reference point was provided by John Carpenter [director of Planning and Community Development] who showed [developer] Jim Sullivan slides he had taken of Country Club Plaza in Kansas City—an elegantly planned shopping center built in the 1930s. ... 'Westminster's planners are great collectors of photographs,' said Dauer [a landscape architect and consultant hired by the city to redesign the project], and showing photographs is a great way to tell a developer, 'What you're bringing in is not what we're looking for. This is more what we're looking for.'"

One developer I spoke to in Westminster observed that whenever John Carpenter came back from vacation he had hundreds of pictures of things he wanted developers to emulate—which led him to muse that perhaps what he and other developers needed to do was put a bounty on Carpenter's camera.

Thanks for your perceptive and thought-provoking article.

—Gene Bunnell  
Albany, New York

### Have camera, will travel

Loved Mary Jane Nirdlinger's op-ed on travel and planning (Viewpoint, August/September). I can attest to the value of witnessing other cities' approaches to our urban condition. I can also show you the many photos of trash cans, news racks,

landscape strips, and drainage swales that pepper my iPhoto file (many of which get forwarded to colleagues for their edification).

A big plus: My wife still loves to tell of our visit to the sewers in Paris and the myriad dams and reclaimed landfills I have dragged her to over the years. Good times!

—Paul Kelman, FAICP  
Atlanta

## PLANNERS LIBRARY

### The American Dream in a tent

Planner Andrew Heben of Opportunity Village Eugene (in Oregon) has spent time in places many planners don't know and wouldn't sanction if they knew—self-managed tent cities and other ad hoc, informal housing arrangements. His book, *Tent City Urbanism: From Self-Organized Camps to Tiny House Villages* (2014; Village Collaborative; 238 pp.; \$18), is part travelogue, part autobiography, part analysis, and part vision. His goal is for the informal tent cities of the homeless and the tiny houses of downsizing families to meet in the middle in the causes of affordability, sustainability, and self-governed community.

The book comes in four parts: an introductory framework, a review of five camps (Ann Arbor, Nashville, Seattle, St. Petersburg, and Portland), a review of three villages (Portland, Olympia, and Eugene), and finally a guide proposing "tent city urbanism" and how to advocate, plan, design, and build a low-cost, low-impact village. The American tent city, he argues, is not just a symbol of hard times and homelessness: "Just maybe it is alluding to a more sustainable and fulfilling housing option—socially, economically, and environmentally."

The author has not just visited various camps and villages; he has participated in some (and been denied entrance to one). These stories bring the book alive and also animate the final section, where Heben lays out a bottom-up approach with a number of options: sanctuary camp (in the spirit of "Shelter First"), rest area (for more transient people), transitional village, and affordable village. Moving on up the