

Travelers Behaving Badly

Behavioral Economics Offers Insights and Strategies for Improving Transportation

By Mark Solof

Driving in traffic, one is often hard-pressed to think of fellow travelers as rational. They swerve across multiple lanes to make a turn, race to get to the next red light, slow to ogle fender-benders and engage in other roadway antics. Yet for the most part transportation planners and policymakers treat drivers—as well as transit riders and other travelers—as basically rational. Given the right rules, signs and signals, it is assumed we will tend to make reasoned and thoughtful choices about where and how we travel.



Top photo: Dan Sheridan

Bad toll booth behavior: (top) Interstate 95 in Westchester County, N.Y. and Interstate 190 in Buffalo, N.Y.

A growing body of research is concluding otherwise. Researchers are finding that people's bad decisions and behavior involving transportation, health, finances and many other areas of life are often not aberrations. Time and time again, in similar circumstances, people will make the same mistakes and bad choices.

"We all have irrational tendencies," Duke University Professor of Behavioral Economics Dan Ariely said. "But these are not random. It is not as if one person behaves irrationally one way and another person behaves irrationally another way." Rather, as Ariely sums it up in the title of his best-selling book, we are *Predictably Irrational*. The tendencies have their roots in brain circuitry created by evolution.

"Everything we do similarly, we do for a biological reason," he said.

Some transportation planners and engineers are beginning to draw upon psychological experiments cataloguing these patterns of behavior—as well as their own experience about real world travel—to find creative ways to discourage roadway antics and other bad travel

Our Behavioral Biases

Behavioral economists have found that people make the same cognitive mistakes over and over. Knowledge of these can be used to influence or "nudge" travel and other behavior. They include:

Availability—Recent events or vivid memories tend to sway our judgment.

Optimism—We're consistently unrealistically optimistic about our luck and abilities.

Loss Aversion—Losing something makes you about twice as unhappy as gaining the same thing makes you happy.

Status Quo Bias—We often stick with our current situation, even when change is clearly better.

Framing—How we choose is often determined by how problems are stated. Context matters.

Expectations—Received wisdom from others (e.g. about prices or quality) can strongly color our perceptions.

Social Influence—We are very sensitive to the thoughts and actions of others and seek their approval.

Salience—Lacking readily available information to make a decision, we often rely on habit or rules of thumb.

choices and improve infrastructure design.

Their efforts are part of a wider movement by the new academic discipline of behavioral economics, established in the early 1990s, which is exploring how to factor “the human factor” into the computer models and decision processes used in financial markets, the transportation sector and other fields. There are tantalizing indications these efforts to understand and harness the quirks of human nature can help speed progress towards improved safety, energy efficiency, reduced carbon emissions and achievement of other goals.

Experimental Insights

The experiments into human behavior use games and simplified decision situations—many conducted with college students—to identify patterns of behavior that are likely to mirror real life decision-making.



Which inner square is darker? Neither. They are exactly the same. Context matters. This is one of the many perceptual biases that can affect our judgement driving and in other aspects of life.

One set of experiments finds that we are irrationally optimistic about our abilities in many situations. Asked to predict their grades in a class at the beginning of the semester, students invariably overrate their performance, with the class skewed towards high achievers. Similarly most drivers in repeated studies rate their skills as better than average (sometimes referred to as the “Lake Woebegone Effect,” after radio personality Garrison Keillor’s fictional hometown “where all the children are above average”). This can plausibly account for much of the risky and boneheaded behavior on roadways—for instance driving while talking on a cell phone. Drivers think they can beat the odds. They feel, “It’s the other person’s behavior that needs to be controlled, not mine,” Tom Vanderbilt noted in his bestselling book *Traffic*.

Much of drivers’ overconfidence stems from an “illusion of control” Ariely said. “When we control something, we feel the risk is lower, even when it is not, and this is especially strong in driving.”

Other experiments identify an irrational “loss aversion” we all exhibit in many situations. Students given free mugs demanded substantially more money to give them up than other students, who did not get mugs, were willing to pay for them. That is, we tend to place greater weight on avoiding losses than in realizing gains. There is also the related “endowment effect”—we can be tenacious in holding on to our possessions.

These biases likely influence how people drive in many circumstances. In stop-and-go traffic, researchers find drivers inordinately focus on the progress of adjacent lanes to see if they are losing out. They can be tempted to change lanes even when the advantage gained is fleeting. Such behavior, Vanderbilt suggests, can be risky, especially in heavy traffic.

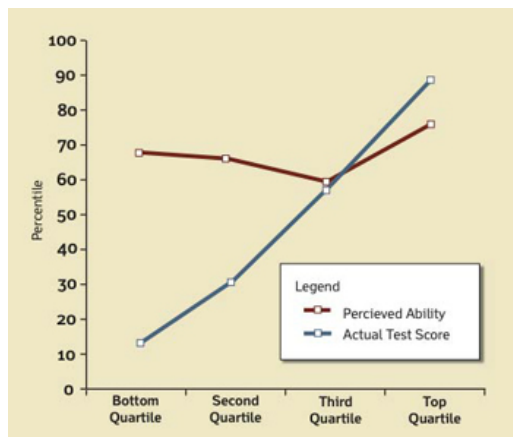
While this may not be the same phenomenon as the loss aversion we experience with objects or money, according to Ariely, “it is related and maybe we use similar brain mechanisms to think about it.”

Research also suggests that loss aversion can bias our choice of routes, modes and other travel options. We are much more motivated to avoid choices that we perceive might cause losses (in time or money) than we are to adopt choices that promise us savings. Some advocates of congestion pricing have suggested that loss aversion may also account for people’s initial, knee-jerk opposition to charging tolls on free roadways. In his research, Ariely said, loss aversion “is very basic. We don’t find people this doesn’t happen to.”

The catalogue of “irrational” behaviors that afflict humans is long and varied (see sidebar above right).

Systematic Bias

The most far-reaching implications are in the field of finance and economics. The “irrational exuberance” leading up to the recent economic crisis—including herd mentality among investors and overconfidence in past trends and financial instruments—provide behavioral economists with dramatic evidence about how



Overconfidence is pervasive in driving and other areas of life. This graph shows how people perceived their abilities on a logical reasoning test compared to their actual score. Those with the least ability showed the greatest overconfidence.

From: Justin Krueger, David Dunning. "Unskilled and Unaware of it." *Psychology*, 2009, 1, 30-46.

The crisis, they say, has underscored the need for public and private officials to recognize the “bounded rationality” of individuals—that is, the real world limits on the ability of individuals to rein in emotions and avoid cognitive pitfalls that affect decision-making.

Ariely said rational economics is still useful. “The problem is not so much with economics,” he said. “The problem is that for some reason we have assumed that [standard] economics is 100 percent accurate . . . and we went a step further and we created systems—the legal system and the banking system—that assume it is 100 percent accurate.”

While behavioral economics can offer many insights for correcting this assumption, he said, it is not about to supplant standard economics. “We will probably never have a single theory of human decision-making or of behavioral economics because the brain uses different mechanisms to deal with different problems,” he said. Ariely envisions the field becoming “an applied discipline” that offers practical insights to policymakers and directions for creating experiments to improve the effectiveness of existing policies. The approach, he said, is to “acknowledge our limitations... [and] don’t assume we understand everything.”

Nudges

How can behavioral insights be applied to change the choices we make in transportation and other areas? Clearly regulation and enforcement, such as banning cell phone use while driving, must play a primary role. But behavioral economists Richard Thaler and Cass Sunstein suggest that subtle interventions (“nudges”) that operate at the level of our automatic thinking can often work. Following the publication of their 2008 bestselling book *Nudge*, the authors launched a blog world.

The book and blog “sparked a lot of interest among people who make public policy,” according to John



AP Photo: Matt Rourke

*Pavement decals
create a speed
bump
illusion to nudge
drivers in Philadelphia*

Nudge Blog editor and research assistant to the authors at the University of Chicago. “There also has been interest on the private sector side, particularly with large organizations trying to figure out how to help their employees get things done.” One category of nudges relates to people’s “status quo” bias, that is, our reluctance to change our current circumstances or even take the time to ponder better alternatives. We’re all lazy deciders. Balz said people often use a “yeah, whatever” decision-making approach: “[They think] ‘I was doing this before. Sure. Yeah, whatever. I’ll keep doing it.’”

The default options we’re presented therefore become a powerful force. For instance, to address the current low rate of savings for retirement, companies can make a minimal contribution to retirement plans the default option for new employees. Most employees will not go to the trouble of changing it.

The approach is called “libertarian paternalism”—using nudges to guide people to make better choices, while still leaving them free to decide on their own, even to make bad choices. Balz said “one of the key pieces is retaining the libertarian side”—that is, providing “an easy option for someone to go another route” if they want.

The default retirement nudge has been adopted by many companies and may find its way into national policy. At the prompting of Sunstein, who now heads the Obama Administration’s Office of Information and Regulatory Affairs, the federal budget now before congress includes provisions to expand adoption of the retirement nudge by employers.

One nudge blog reader reported that at the company Novo Nordisk, fuel-efficient vehicles were made the default option for sales people. Those who wanted an SUV or minivan could still get one, but they needed approval from a supervisor. Minivan orders dropped from 300-350 per year to 25.

In the field of transportation, the “choice architecture” affecting decisions includes the environment through which people travel—providing a potential focus for nudges to change behavior. For example, to calm traffic entering business or residential districts, many towns use physical changes like narrowed lanes or speed bumps. But nudges involving “psychological traffic-calming” can also work, according to Erel Avineri, reader in travel behavior at the Centre for Transport & Society, University of the West of England.

“Rather than humps and bumps and penalties . . . all kinds of changes to the environment—changes to the pavement, to the road surface texture, to street furniture—make it clear to drivers that they are entering a different zone where different rules apply,” he said. In Avineri’s town of Bristol, a gatehouse acts as calming nudge for those entering the town center.

Some cities have tried transforming the humps and bumps into less intrusive nudges. In Philadelphia, high-tech 3-D decals that create the illusion of speed bumps were installed on the road surface at 100 intersections. On one residential street, average speeds dropped 13 mph after a month. A smaller reduction of 4 mph was found in a previous test in Phoenix. Of course, locals may learn to ignore the illusion over time, but the decals can still serve as a symbolic reminder to slow down.

A perceptual nudge was also used to slow traffic approaching a dangerous curve along Chicago’s Lake Shore Drive in 2006. According to nudge.com, “the city painted a series of white lines perpendicular to



Chicago Dept. of
Transportation

*Perceptual nudge:
Narrowing lines on
Chicago's
Lake Shore Drive
approaching a
dangerous curve
have reduced
crashes by 36 percent.*

traveling cars. The lines get progressively narrower as drivers approach the sharpest point of the curve, giving them the illusion of speeding up, and nudging them to tap their brakes.” Crashes went down 36 percent in the six months following the intervention, compared to the previous six months.

This Lake Shore Drive intervention, like many nudges, emerged through efforts of local officials to find creative solutions after other approaches came up short. “It was not a systematic application of behavioral economics,”

Avineri said. “It was a good intuition about us human beings not being perfectly rational creatures. We have our limitations, our biases.”

Marketing techniques, such as branding, can also act as nudges to change behavior, as advertisers have long known. The transportation sector is just catching on. New light rail systems and bus rapid transit services are employing sleek new vehicles and being branded with bright color schemes

and logos with catchy slogans. The marketing approach helps potential riders, many of whom may have never considered riding a standard bus or train, to see the services in a new light.

Starbucks did much the same when it built its business by changing customers’ frame of reference (or “anchor”) for coffee, according to Ariely. A lounge atmosphere, hip music and a variety of new menu options with exotic names persuaded customers to consider \$3.50 a reasonable price to pay for a coffee beverage. The context of decisions is often a crucial influence on behavior.

Salience and people

The visibility of our choices is another important factor. Often we go about our lives on automatic pilot, relying on habit or rules of thumb to guide our behavior. Nudges that increase the “salience” of choices confronting us or give us feedback on what we are doing can wake us up to actively consider options and make better choices.

Signs that show motorists how fast they’re going have been found to modestly reduce speeds. Countdown timers on walk/don’t walk signs for pedestrians have improved safety at some (but not all) street crossings. In Asia, similar timers for cars waiting at red lights have helped drivers be more deliberate entering the intersection, reducing accidents. (Countdown timers on green lights, in contrast, have prompted drivers to speed up to get through the intersection before the light turns, increasing accidents). “Idiot lights” and alerts in our cars—which are getting increasingly sophisticated—serve a similar “wakeup” function.

Nudges to increase salience are being looked to help us travel in ways that use less energy, reduce our carbon footprint and save money. The rules of thumb for meeting these goals are well known—drive a smaller car, slow down, take transit or walk when possible. But Toyota Prius owners get a car with a built-in nudge to do better—a meter that provides a running read-out of miles per gallon. Many owners change their driving behavior moment-to-moment to maximize their fuel economy, even to the point of obsession by so-called “hypermilers.”

A host of carbon footprint calculator apps blossoming on the web and mobile devices promise to increase the salience of the environmental impacts of our decisions. One calculator being tested called Carbon Diem uses GPS to log users’ movements and to determine whether they are traveling by car, train, walking or

other modes.

To encourage use of more eco-friendly modes, some have proposed using travelers' loss aversion in "framing" travel information. Highlighting the time or money lost by driving to a destination may get more people to consider riding the bus than just highlighting the saving to be gained using mass transit. "Being a loser is something people really don't like," Avineri said.

Adding a social dimension to these and other nudges, researchers suggest, will greatly increase their effectiveness ([see sidebar](#)).

Nudges limits

While nudges are often low-cost and have the virtue of not limiting people's choices, they have their shortcomings. "The limitations of the nudge approach is that it influences intuitive, impulsive forces of the [brain's] automatic system," Avineri said. "It doesn't really address the fundamental problem of behavioral changes because people don't change their attitudes or values."

Coupling nudges with bigger interventions, like building new facilities or pricing changes, can have more lasting and beneficial effects. Avineri offered the example of a new bus service or bike lane. Because of habit and status quo bias, people may not notice or may be reluctant to take advantage of these new travel alternatives. Nudges could help change their ingrained behavior, speeding up use of the travel alternatives, according to Avineri. "It might start with a nudge but they would then realize the alternative provides them real utility."

Ariely said this is a form of "reward substitution," giving people incentives or motivations to change their behavior in the short term in ways that allow them to realize long-term benefits.

The nudge approach, Avineri said, is "not a substitute for a good policy but another means to promote what is already a good policy and get quick wins." How we decide on these policies and "bigger interventions" is also being explored by behavioral economists ([see sidebar](#)). But in general, the transportation sector has a long way to go to catch up to private companies that have long been adept at nudging our buying habits.

"There is much research about the cognitive limitations of consumers and how to make consumers buy things," Avineri said. "The ways we've been nudged and sometimes even manipulated to make consumer choices might be relevant and applied to the context of transport choices. There is no reason to believe that in transport we should be more economically rational as human beings than in other contexts."

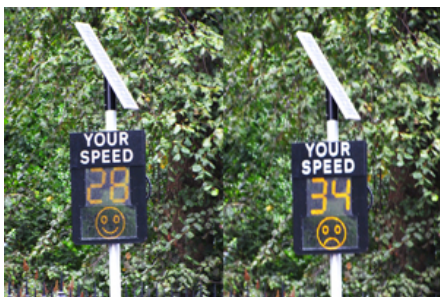
Perhaps inspired by "the customer is always right," the transportation sector could start by doing more to view drivers, transit riders and other travelers as they are—with all their quirks and penchant for bad behavior—rather than the rational actors we'd like them to be.

—*Mark Solof is director of public affairs at the NJTPA.*

SIDEBAR:

Social Nudges

All of us seek the approval of others in large and small ways, often without being conscious of it. Studies have found that people are quick to abandon their best judgment in answering a question if they feel they are out of step with other test takers. It is not surprising therefore that if we are informed about how we compare with others, we can be nudged to change our behavior.



Jani Helle

Social psychologist Robert Cialdini used this insight to start a company, Positive Energy, to help utilities reduce energy use by customers. In one test, Sacramento residents who received mailings about how their energy use compared to their neighbors reduced their annual energy consumption by more than 2 percent—a significant amount, equivalent to the energy use of 700 homes. The simple use of a “smiley face” graphic on the mailings, indicating social approval for those using less energy, boosted cooperation further. (In the U.K., many speed radar

signs have been programmed to display a smiley face or frown in the hopes of providing a social nudge to drivers to comply with speed limits.)

Direct peer pressure is the strongest of social nudges. Realizing this, many companies have formed “green teams” to motivate cooperation among employees to cut carbon emissions through recycling, carpooling, use of mass transit and walking/biking. Yahoo and other companies in Silicon Valley have been early adopters.

Poland Spring used a social nudge to reduce truck idling. Compiling data from onboard computers, it posted a ranking of drivers’ idling times in the break room. A gift card was provided to the 10 lowest idlers. Idle-time dropped by over half in two years, saving thousands of dollars. “Human nature, no one wants to be at the bottom of the list,” a manager explained on nudges.org.

SIDEBAR:

Modeling Unruly Travel

Computer models are relied upon to predict future travel demands on roads, rail lines and other facilities. In many cases, their findings are the deciding factor in justifying investments of many millions of dollars.

But despite the increasing computing horsepower and data analysis capabilities being built into them, travel models confront an inherent and bedeviling complication – people are generally sloppy, and often bad, travel planners. The transportation models assume they will rationally and successfully pursue their self interest—that is, examining all their options and making travel decisions to minimize time, cost and distance.



Archives of
Michigan

*A Bendix computer
G-15 at the
Michigan State
Highway
Department,
late 1950s.*

Behavioral economists are not so sure. “We don’t have a supercomputer between our ears that can calculate sophisticated statistical functions and generate the level of uncertainty attached to different travel alternatives,” said Erel Avineri, reader in travel behavior at the Centre for Transport & Society, University of the West of England.

As a result, the behavioral economists say, people rely on habit, make snap decisions and consistently misjudge probabilities – in short, they can be unpredictable travelers. In addition, people can be swayed by innumerable “affective” factors—the weather, a recent traffic jam experience, a desire to see the sights, the lure of what’s trendy and cool—none of which can be reduced to formulas in modeling software.

A more fundamental problem is that, simply put, the future is unknowable. Over the lifespan of infrastructure built today travel demand may be drastically changed by energy prices, climate change, new technologies, cultural trends and other factors that can’t be foreseen or modeled.

Despite their weaknesses, models provide useful demand estimates for well-defined problems—like the near-term traffic impacts of new development in a town. For broader applications and longer time frames, behavioral economists say, models necessarily build in assumptions that people’s travel is more regular and predictable than it really is and take leaps of faith about future conditions. If these shortcomings are forthrightly acknowledged, model estimates can still serve as a consideration in decision-making. Yet often the caveats get conveniently lost.

“What forecasts models really do,” said Jonathan Gifford, associate dean and director of the Transportation Policy, Operations and Logistics program at George Mason University, “is give decision-makers, engineers and planners some comfort that they’re spending the public’s resources wisely. [They say] ‘We’ve used the best available models. This is a worthwhile investment.’”

Rarely do model users investigate whether demand estimates actually came to pass, since “Nobody wants to be backward-looking,” Gifford said. Attempts to do this, he said, find that models tend to “massively overshoot or undershoot” actual demand.

Efforts are underway to make models more accurately mirror real life travel by taking a “microscopic” approach to travel. But these efforts “at the very beginning,” Gifford said. Given the limits of modeling, Gifford said, “we need to think about acting strategically, and incrementally recognizing that we are in an unpredictable domain.” An incremental approach, he said, might include building new facilities or services in stages “with an orientation towards testing, towards validation and towards results, recognizing that we don’t really know how people respond to changes.” We can also spend money upfront to leave future options open, such as acquiring rights-of-way or creating wider structures to allow lanes or rail tracks to be added if warranted.

The lack of certainty also means that the public sector may have to do much more to encourage use of the transportation systems it creates, rather than waiting for predicted demand to appear. Systems can be designed and marketed, Gifford said, in ways that resonate with people’s emotions, aesthetics, sensitivity to social groups and other “affective” factors. Gifford suggests that these “soft” factors have often been neglected in favor of “cold, hard facts of transportation—the ride quality, waiting time, cost and other objective things that we can easily plug into our models.”

“We can use marketing and other approaches to help shape behavior but we want to leave ourselves some options in case things develop in ways we don’t anticipate,” Gifford said.

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