The Behavior Analyst 2010, 33, 185–187 No. 2 (Fall)

Virtual Rewards for Driving Green

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Americans drive about three *trillion* miles each year (U.S. Federal Highway Administration, 2009), so any improvement in driving efficiency is bound to produce an important reduction in carbon dioxide (CO_2) emissions. Driving green means reducing the amount of fuel needed to get from Point A to Point B. More specifically, it means starting and stopping gradually and maintaining sensible speeds (Energy and Environmental Analysis, Inc, 2001; The Road Information Program, 2010). But how can we get people to drive greener?

We know that the price of gasoline affects how people drive (Rapp, Rapp, Carroll, & Bartlett, 2010). When gas prices are high, people drive more slowly and less aggressively. Raising gas prices by levying a tax or cutting the subsidies that oil companies receive[1] would probably be the most effective way of changing driving habits, but in today's political climate that idea is about as likely to take off as a water-filled balloon.

Another approach is to provide immediate feedback to drivers about their performance. Many cars now include devices that do this. For example, the Subaru Impreza has a digital display of the miles per gallon the driver is getting, updated in real time. On the Honda Insight, the speed display changes color: Drive fast, make jackrabbit starts, or brake hard and the display is blue; drive more sensibly and the color goes from blue to green. The Ford Fusion display sprouts green leaves as your efficiency improves; the better you drive, the more leaves appear. The Toyota hybrids allow drivers to judge their progress by comparing their current driving to that of the previous trip.

Behavioral research has shown that well-designed feedback can produce significant improvements in performance (Balcazar, Hopkins, & Suarez, 1985; Balcazar, Shupert, Daniels, Mawhinney, & Hopkins, 1989). In fact, several studies found feedback to be more effective than traditional methods of reducing speed, such as police surveillance and citations (Van Houten & Nau, 1981, 1983; Van Houten et al., 1985). However, over the long term, feedback is usually most effective when it is backed up with rewards (Alvero, Bucklin, & Austin, 2001; Balcazar et al., 1985). Unfortunately, the rewards for driving green are weak. For example, feedback indicating that you are getting optimal mileage means money saved at the pump, but at today's gas prices, the pocketbook benefits are meager. Positive feedback about driving also means that the driver is helping the environment, but that consequence is negligible and delayed. After all, the sky does not get bluer when we ease off of the gas pedal.

The weak rewards for driving efficiently compete poorly with the immediate rewards for driving fast and loose: reaching our destination sooner, making it through an intersection before the light turns red, getting ahead of rush-hour traffic. What we need are stronger rewards for driving green.

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[1] Many people are unaware that the actual cost of gasoline is far higher than what they pay at the pump. In 2010, gasoline in the U.S. sells for about $2.72 a gallon, but when hidden costs such as oil company subsidies are considered, the true cost may be $4.37 and could be considerably higher (Klein, 2010; see also International Center for Technology Assessment, 1998).

Virtual merchandise (digital items that can be earned, purchased, and traded on Web sites) may do the trick. In a virtual world such as Second Life, people enjoy an alternate existence online where they acquire items ranging from clothes to real estate. Even though these items do not exist beyond cyberspace, people have become millionaires by buying and selling them (Hof, 2006). In fact, Americans spent an estimated $1 billion on virtual items in 2009, and the Chinese spent five times that amount (Boykoff, 2010). This suggests that for some people, at least, virtual merchandise could provide strong motivation for green driving.

Facebook is another site on which people spend many hours and dollars obtaining virtual aquatic life, farm animals, and assorted trophies. (Some of the most popular applications on Facebook exist solely as a means to collect and trade virtual items; e.g., Give Hearts has more than eight million active users.) With more than 400 million active users (over 25% of the global Internet population), Facebook is the top social networking Web site and ranks ninth in overall Internet traffic. More than half of Facebook members log in daily. An online presence that generates such massive return traffic clearly influences the behavior of huge numbers of people. Moreover, Facebook is not just for kids; more than 47 million members are over the age of 35 (Facebook, 2010). It provides a great platform for an application to use virtual items to reward green driving.

I am currently developing an application to do just that. Facebook is already equipped to receive driver data via wi-fi from car computers. The application under development, "Green Wheels," will convert that information to "green" dollars with which the driver can purchase virtual items. The more fuel efficient a person's driving is, the more green dollars are deposited in his or her account.

After the driver has gone through the set-up procedure, he or she can begin to earn green dollars. The dollars earned will be based on an algorithm that combines the elements of efficient driving. This approach, as opposed to using an outcome measure such as fuel consumption, will allow the driver of any car, regardless of its fuel efficiency, to earn points. There might also be occasional bonus dollars for people who consistently get good mileage or who perform better overall than they did the previous month.

One concern about this proposal may be that drivers will be so intent on improving their driving efficiency that they will be distracted from the business of driving. This is a possibility, but the feedback devices on most cars are simple and can be interpreted at a glance. In addition, to the extent that drivers attempt to improve their efficiency, they will be driving more slowly and less aggressively, which may also lower the rate of accidents.

Drivers might also earn certificates or awards for driving green, and these items might be displayed on their Facebook walls. Much like other successful virtual competitions (e.g. fantasy sports leagues, on-line games), there might be weekly contests for most points earned and highest rankings. Finally, a counter showing the total reduction of CO_2 emissions of all the participating drivers would provide a sense of community and shared accomplishment. Public posting of a group's collective achievements can be a powerful method for motivating behavior change (Van Houten, 1984; Van Houten, Nau, & Marini, 1980).

One limitation of this proposal is that many cars are not equipped with the requisite tools to transmit a driver's data to Facebook. This application would have a limited impact on global warming if those drivers were excluded. Happily, there are aftermarket gadgets that can solve this problem for just under $100, extending the reach exponentially.

There are approximately 120 million Facebook users of driving age (Facebook, 2010). If only 1% of these drivers used Green Wheels, 1.2 million people could be driving more efficiently. Energy and Environmental Analysis, Inc. (2001) indicates that driving green can reduce fuel consumption by up to 33%. For a conservative estimate of the effect on CO_2 emissions, let's assume a 20% savings in fuel consumption. The average driver puts 5.5 metric tons of CO_2 into the atmosphere per year (U.S. Environmental Protection Agency, 2005), so a 20% improvement in driving efficiency would mean an annual reduction of about 1.3 million tons of CO_2 per year.

When gas prices go up sharply, as they are expected to do around the world (Steiner, 2009), savings from driving green will likely be sufficient to reduce consumption drastically. However, environmental damage is happening now; we can't wait for the timely arrival of high gas prices. We must seek solutions. One solution is the use of virtual rewards for green driving.

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