Scholar Spotlight

Shahzeen Attari
Global Climate Change and Human Behavior: Decreasing Energy Consumption

Born in India, Shahzeen Attari grew up in the Middle East. When she came to the United States to study physics at the University of Illinois at Urbana Champaign, she volunteered for the Nature Conservancy for spring break. Her experience increased her love of the environment, and she began to search for scholarships to fund her education as a Ph.D. candidate at Carnegie Mellon University. In 2005 she was awarded EREF's Francois Fiessinger scholarship, and thus began her research investigating public perceptions of waste, which later evolved to studying public perceptions of energy consumption.

One thing soon became very apparent to Shahzeen: people don't know how much energy is being used in their homes and day-to-day lives. When asked for the most effective way to conserve energy, chances are that the Average Joe will tell you to turn off the lights when you leave a room, or cut down on how much you drive your car. It might surprise "Joe" to know that experts advise installing more efficient light bulbs and getting the recommended tune-ups for his car in addition to driving less. Perhaps Joe is focused on the fact that turning off the lights is something he can do easily to make him feel like he's helping the environment even though it may not save him as much energy as other behaviors, while taking more extreme actions like purchasing new energy-efficient appliances involve a great amount of cost and effort.

Shahzeen's Ph.D. thesis, entitled "Global climate change and human behavior: Decreasing energy consumption," looked at different ways to encourage members of the public to decrease their carbon emissions by saving energy. Her project consisted of two main studies:

1. Preferences to change behavior: Shahzeen surveyed 209 Pittsburgh residents to understand when and why an individual would accept voluntary actions, soft regulations or hard regulations to reduce his or her energy consumption.

Hard regulations, such as bans or laws, are governmental controls that impose an economic cost for non-compliance. Soft regulations are recommendations designed to guide behavior and voluntary actions involve minimal governmental involvement. In other words, Shahzeen explored when and why people would prefer hard regulations to no regulations to reduce their fossil fuel consumption. She found people prefer soft regulations and voluntary actions much more than hard regulations to facilitate behavior change.

2. Perceptions of energy consumption: In this experiment, Shahzeen surveyed 505 participants nationwide to investigate their perceptions of energy consumption and savings for household, transportation and recycling behaviors.

As noted above with our Average Joe, most participants mentioned curtailment (turning off lights, driving less) rather than efficiency improvements as the best way to conserve energy in their everyday lives. For a sample of 15 activities, participants severely underestimated energy use and savings. For example, participants correctly reported that making a can or bottle from virgin aluminum or glass requires more energy than making the same container from recycled materials. However, they incorrectly reported that making a glass bottle requires less energy than making an aluminum can. In fact, the reverse is true: A glass bottle requires 1.4 times as much energy as an aluminum can when virgin materials are used and 20 times as much energy when recycled materials are used.

These underestimations suggest that well-designed efforts to improve the public's understanding of energy use and savings could pay large dividends. Public communications about climate change that address misconceptions about energy consumption and savings would allow people to make better decisions for their pocketbooks and the planet.

In their article "The Short List: The Most Effective Actions U.S. Households Can Take to Curb Climate Change," researchers Gerald T. Gardner and Paul C. Stern came up with a list of 27 different actions that individuals and/or households could take to save energy. The list includes curtailment efforts such as carpooling to work, turning down the water heater thermostat and line-drying clothing, as well as increased efficiency efforts like maintaining correct automobile tire pressure, caulking/weather-stripping the home and replacing light bulbs. Shahzeen and her research team, which included both engineers and psychologists, looked at that list from the perspective of the public's perceptions of how easy or difficult it might be to implement each of these actions. Understanding the perceived barriers to these actions is crucial to creating effective campaigns that highlight energy-saving actions. Shahzeen's perspective is that education is not enough – motivation plays a huge factor in behavior change as well.

Shahzeen and her team continued their research by looking at that list from the perspective of the best way to design information campaigns, incentives and other efforts by knowing more about people's perceptions of the ease or difficulty of implementing these actions. Campaigns targeting energy-saving actions that are both effective and easy to implement may help people identify and implement the easiest and most efficient means of saving energy; and understanding the perceived barriers to these actions can only enhance the campaigns. Shahzeen also submitted a paper on "Energy conservation goals: What people adopt, what they recommend, and why." In her everyday life, Shahzeen is a vegetarian and walks whenever possible. She encourages all of us Average Joes to start decreasing our energy consumption in practical ways like tuning up our cars, using energy efficient products, changing/programming our thermostats and finally spreading these actions to others.

Shahzeen is currently an Assistant Professor at Indiana University School of Public and Environmental Affairs. She is also completing a year-long fellowship at the Center for Advanced Study in the Behavioral Sciences at Stanford University.

> *"I am really fortunate to have received the EREF scholarship to pursue my passion – research that is a mix of engineering and psychology to investigate how to minimize waste and foster conservation and sustainability."*
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> *- Shahzeen Attari*

Francois Fiessinger, P.E., Ph.D., an engineering graduate of Rutgers University, was a founding director of the Environmental Research and Education Foundation (EREF). Francois believed in scholarly research and was one of very few people who had a long-term research and development vision for the solid waste industry. In 1997, based on a contribution from Lyonnaise des Eaux, the Francois Fiessinger Memorial Scholarship Fund was established to recognize excellence in Ph.D. or postdoctoral environmental research and education. One Fiessinger Scholar is awarded annually.

EREF is a 501(c)(3) class charity that fund and directs scientific research and educational initiatives for waste management practices to benefit industry participants and the communities they serve. EREF allocates between $0.5 and $1 million annually in research grants and graduate level scholarships, with focus areas that include:

- Transport/Collection
- Policy/Economics
- Recycling/Waste Minimization
- Combustion/Waste-to-Energy
- Equipment/Safety
- Conversion Technologies
- Life Cycle Inventory/Analysis
- Landfills