efforts—which focused largely on rebating energy-efficient technologies, promoting favorable attitudes toward conservation, or providing prompts and tips about ways to conserve (Stern, 1992)—our focus was on the normative aspects of conservation.

The Props

The research drew on the focus theory of normative conduct (Cialdini, Kallgren, & Reno, 1991). Previous studies had established that behavior could be strongly influenced by perceptions of what was common in a specific setting. According to the focus theory, a descriptive norm is a person's belief about the degree to which other people in a setting engage in a specific behavior. For example, the presence of litter in a public parking lot would spur people to litter at higher rates compared with when it was unlittered because the descriptive norm is to litter. However, it is important that the focus theory also differentiated the descriptive norm—what most people do—from the injunctive norm—the extent to which most people approve or disapprove of a specific behavior.

The Backstory

The study published in Psychological Science was not part of our initial grant proposal to the Hewlett Foundation. Our original plan was to conduct three sets of studies: a series of public opinion polls to identify the reasons for electricity consumption (Göckeritz et al., 2010), a field experiment using descriptive normative information to promote energy conservation (Nolan, Schultz, Cialdini, Griskevicius, & Goldstein, 2008), and a series of studies promoting energy conservation among hotel guests (Goldstein, Cialdini, & Griskevicius, 2008; Schultz, Khazian, & Zaleski, 2008). The Psychological Sciencepiece was a logical extension, developed after seeing the results from the previous three studies. With a few months remaining on the grant, and having completed the proposed research, we had some latitude to test a new hypothesis about the interaction of descriptive and injunctive normative messages.

In conducting the research on residential electricity consumption, the team also faced considerable practical and ethical obstacles. First, we recognized the need to obtain electricity consumption data from individual households in our study. However, when we approached our local energy utility, they refused to provide the data, citing proprietary data and customer confidentiality.[1] Undaunted, we decided that our research team could read the electricity meters for each of the households included in the experiments. Although we could not find previous examples of this in the psychological research literature, it seemed feasible albeit labor intensive.

Reading the meters ourselves raised a second major obstacle; our campus institutional review board was reluctant to approve a protocol in which all households would be included unless they opted out. However, this opt-out protocol was critical to the success of the study because it would allow for a larger and more representative sample. Through a series of conversations with our campus institutional review board, they did eventually approve an opt-out protocol that limited the sample to homes with meters that were easily accessible and visible from the street. Of the 290 households selected for the experiment, 3 opted out.

The Main Plot

The findings reported in the article had both theoretical and applied aspects. The theoretical contribution of our 2007Psychological Science article was in the interaction between descriptive and injunctive norms (Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007). In a field experiment with households in San Marcos, California, we showed that normative information incorporated into feedback about household electricity consumption could exert a strong influence on the behavior of residents. In the experiment, households were provided with weekly feedback about the amount of electricity they used compared with similar households in their neighborhood (i.e., a descriptive norm), coupled with a hand-printed message of social approval (a smiley face for low-consuming households) or disapproval (a frowny face for high-consuming households). The article reported three key findings:

- The constructive finding in the article referred to the reduction in energy consumption for households that received a descriptive normative message that they used more electricity than similar households in their neighborhood.
- The destructive finding in the article referred to the increase in electricity consumption for households that received a descriptive normative message that they used less electricity than similar households—a boomerang effect.
- The reconstructive finding was the interaction effect, showing that low-consuming households that received a descriptive normative message combined with a positively valenced message of social approval (i.e., the smiley face) did not show a boomerang effect by increasing their consumption.

On the applied side, the findings pointed toward novel strategies to promote energy conservation. The

findings suggested that simple feedback about consumption was not enough and that even personalized feedback needed to be framed in a way that made the information motivational.

Enter a protagonist

The findings from the 2007 article were quickly picked up by the media, and the results were referenced in major newspapers, radio spots, and online stories and blogs. The findings also piqued the interest of two entrepreneurs who committed to use the basic principles in a large-scale commercial application. Launched in 2008 with a successful pilot program in California, the startup company Opower provided printed home energy reports that gave residents information about their household's electricity consumption, compared with similar homes in their neighborhood. A key ingredient to the Opower report was the personal feedback, combined with the descriptive norm and an injunctive normative message of social approval. Figure 1 shows an example of the Opower normative comparison. Since its launch in 2008, Opower now reaches more than 60 million households worldwide—to our knowledge, this is one of the largest direct applications of social psychological findings to date.

In addition to the important applied contribution of Opower, the deployments also had an important methodological element. Initially, when an energy utility contracted with Opower to send the energy reports, Opower used a randomized control test design. That is, for a utility serving, say, 100,000 homes, half of these would be randomly assigned to receive the monthly reports and half would be assigned to a no-treatment control. In this way, each of the deployments served as an experimental test of the program. Across their 100+ deployments, the average energy savings ranged from 2% to 5% (Allcott, 2011; Laskey, 2013). The cumulative result over the past 10 years has been more than $1 billion saved in household energy costs, a reduction of nearly 13 billion pounds of CO_2 emissions, and 11 billion kWh saved—enough electricity to power 1 million U.S. homes for a year (based on an average annual household consumption of 10,766 kWh per year; U.S. Department of Energy, 2017).

The Opower application of our findings also allowed for tests of the long-term effect of normative messages (Allcott & Rogers, 2014). Typically, households would receive the home energy reports on a monthly basis.

had a strong field component, and many of the classic studies—particularly in the social influence and the prosocial behavior literatures—were conducted in real-world contexts. However, the trend in the discipline has been for laboratory-focused methodologies. Laboratory studies are typically faster to conduct, and it is possible to turn out multiple studies using the same basic protocol in order to establish, replicate, and mediate a basic effect—the obligatory three-study sequence required to publish in many top-tier journals. This has become commonplace, and most journals require a series of linked studies for publication (Cialdini, 2009). The 2007 Psychological Science publication highlighted the potential for field experiments to get published in mainstream journals and that field experimentation continues to be a viable method for testing theoretically derived hypotheses.

New research directions

The third contribution of the article was the inspiration for new research questions. Here, we note two lines of research that emerged following publication of our article. The research findings reported in the 2007 publication examined the influence of "similar households in your neighborhood." Although the reported results were clear, social psychological research suggests that the referent group is a critical consideration (Graffeo, Ritov, Bonini, & Hadjichristidis, 2015; Terry & Hogg, 1996). In a reanalysis of Opower data, Costa and Kahn (2013) showed that although the mailed home energy reports were effective at reducing electricity overall, the effect was different for politically liberal versus conservative households. For households that were politically conservative and that used more electricity than the norm, did not donate to an environmental organization, and did not pay for renewable energy, their electricity increased upon receiving the normative message. For these households, the norm of conservation presumably pertained to an out-group from which they wanted to distance themselves. Subsequent work has shown that identification with the referent group can moderate the influence of normative messages (Berger & Heath, 2008; DeDominicis, Sokoloski, Jaeger, & Schultz, 2017).

A second research question that emerged concerned what constitutes a strong descriptive norm. In the reported research, we used the mean as the metric for normative comparison. In other studies, we used the percentage of a group that engaged in the behavior as the norm—for example, 88% of households in your neighborhood use fans instead of air conditioning on hot summer days, or 75% of guests who stay in this hotel choose to reuse their bath towels. These messages worked, and we were able to show an increase in behavior in response to these normative messages. However, what if the norm were weak—for example, 40% of households in your neighborhood wash their laundry in cold water. Would this be sufficient to induce behavior change? Although this area of research is just beginning, there is some evidence that trending norms can make a difference. That is, a low-but-rapidly-increasing percentage of people engaging in a behavior can be motivational, whereas a high-but-decreasing percentage is not (Mortensen, Jacobson, Goldstein, & Cialdini, 2015; Sparkman & Walton, 2017).

Audience Applause

This special issue of Perspectives on Psychological Science focuses on the most frequently cited articles over the past 30 years. We are honored to have been among these influential articles, and we attribute its prominence to several factors.

Timing

First, the article's conceptual impact was influenced by the existing professional context. Oftentimes, the success of a set of information is more about its timing than its content (Cialdini, 2016). Whereas the conceptual groundwork had been set for the study more than a decade previously with work on the focus theory of normative conduct, the publication coincided with the growing popularity of behavioral economics (e.g., Levitt & Dubner, 2005). The behavioral economics perspective drew heavily on principles from psychological science, and our findings regarding social norms provided a nice illustration of a "nudge" (Thaler & Sunstein, 2009).

Social relevance

In addition to the academic timing of the publication, the article also coincided with a growing national concern about climate change. Our findings showed that residential demand for energy could be reduced, and this aligned with calls for reduction in CO_2 emissions and a rising awareness about the connection between energy consumption and greenhouse gasses. Although the scientific evidence for human-caused global warming had been clear for nearly 20 years, our publication coincided with a 2007 report from the Intergovernmental Panel on Climate Change. Because the dependent variable in the study was electricity consumption, it fit with the social narrative of the time.

Simplicity

Although the timing and social relevance of the piece were critical, the (apparent) simplicity of the findings made it

an excellent source for media posts. Operationalization of the injunctive norm with the smiley face emoticon resonated with the bourgeoning use of texting and social media. At the time, social media was relatively new. Facebook had just launched in 2004, and Twitter in 2006, so the idea that emoticons and social messages could exert an effect on behaviors of social importance was quickly used to show the potential positive side of social media.

Curtain

In closing, our 2007 publication in Psychological Science had both theoretical and applied importance. On the theory side, the findings showed that injunctive and descriptive social norms could work synergistically, and the findings opened up new lines of research in the area of normative social influence. On the applied side, the findings were incorporated into large-scale efforts to encourage energy conservation, and the basic principles are currently at work in a range of environmental domains, including energy, water conservation, and recycling (Schultz, Estrada, Schmitt, Sokoloski, & Silva-Send, 2015). We also attribute the success of the article to the timing of the publication, the contemporaneous concern about climate change, the explosion of social media, and the emergence of behavioral economics.

Declaration of Conflicting Interests

The author(s) declared that there were no conflicts of interest with respect to the authorship or the publication of this article.

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Note

1. Access to consumption data from public utilities has greatly improved since the time of our study, and in 2012, the U.S. Department of Commerce and the U.S. Department of Energy launched the Green Button initiative. Currently, more than 60 million U.S. households have access to their energy data, and through the initiative, authorized research teams can get access to disidentified household-level data. See greenbuttondata.org for details. With proper safeguards in place to protect the confidentiality of the data, it is also possible to get ID-identified consumption data.

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