UNDERSTANDING AND MOTIVATING ENERGY CONSERVATION VIA SOCIAL NORMS

Project Report: 2004

FINAL REPORT

Robert Cialdini, Ph.D.
Arizona State University

Wesley Schultz, Ph.D.
California State University, San Marcos

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Applicant: California State University and Arizona State University.

Wesley Schultz, Department of Psychology. California State University, San Marcos. CSU San Marcos Foundation. 435 E. Carmel Street. San Marcos, CA 92078-4362.

Robert Cialdini, Department of Psychology. Arizona State University. Tempe, AZ 85287.

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Narrative Report:

The purpose of this 3-year project was to examine the role of normative beliefs in an individual's decision to conserve energy. In our proposal we outlined three sets of studies, with each set to be conducted over the course of a year. In the first set of studies, summarized in our 2002 Yearly Report, we examined the reasons that people gave for conserving energy, and the role of normative beliefs in energy conservation behaviors. Data for these analyses were based on random digit dialing telephone surveys of California residents. The second set of studies, which were summarized in our 2003 Yearly Report, involved the development of conservation messages that were placed in hotel rooms. A series of five experiments were conducted in California and Arizona. The results from these studies clearly indicate that messages targeting the normative aspects of energy conservation can significantly increase conservation behaviors. The third and final set of studies, reported below, examined the effectiveness of a normative feedback intervention for promoting household energy conservation among a diverse sample of community residents.

Each of the studies involved collaboration between researchers at Arizona State University (ASU) and California State University, (CSU) San Marcos. Over the course of the past year, the research teams from ASU and CSU met three times for discussion and planning: twice in Arizona, and once in Austin, Texas, for the annual meeting of the Society for Personality and Social Psychology (SPSP). Each research team consisted of two graduate students, and several undergraduate research assistants. The research meetings allowed us an opportunity to develop research methodology and materials, discuss project activities, and review and analyze data. Following is a summary of the activities and findings from the third and final year of the project.

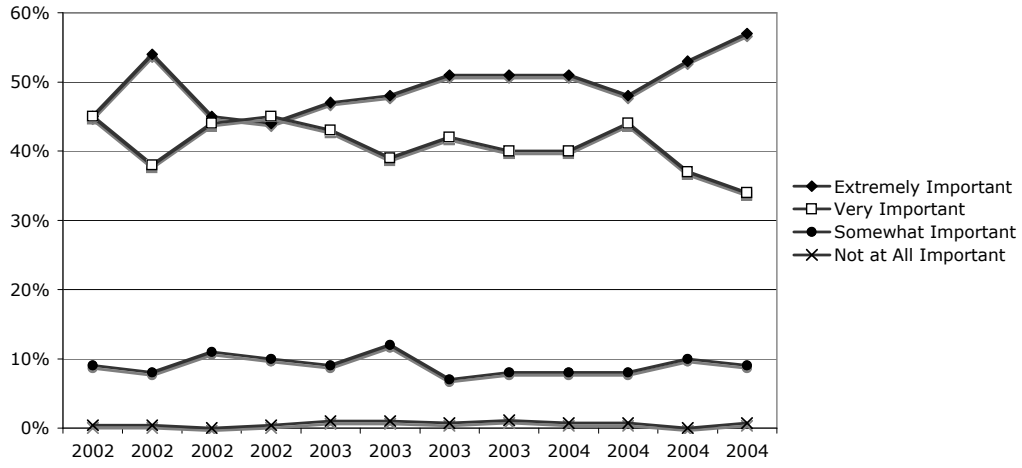
Summary of Activities and Findings

Surveying California Residents

When we began this study in January of 2001, energy was a salient issue in California. There was widespread media coverage, and the State had just come through a summer in which residents had to endure rolling blackouts and the prospects of future blackouts. For the entire 3-year period, we collected random-digit-dialing survey data of California residents. Our final sample contained data from 3,805 completed interviews with a representative sample of Californians. While we revised the survey items each quarter, there was a core set of items that remained stable across the duration. The findings from these quarterly surveys have been summarized in our previous reports. Here we focus on the full sample, with a special attention to changes across time.

1. Californians believe that energy conservation is important, and they regularly engage in conservation behaviors. When asked about the importance of energy conservation, 90% of respondents indicated that it was "very" (41%) or "extremely" (49%) important (*mean*=3.39, on a four-point scale). With regard to energy conservation behaviors, respondents reported regularly engaging in such actions. When asked if they "try to conserve energy," 98% of respondents said "yes," and when asked how often, 58% stated "almost always," 32% "frequently," and 10% "sometimes." Contrary to our predictions, we saw only minor changes in the rated importance of conservation across the 12 quarterly samples, from a low of 3.34 in July, 2002 to a high of 3.46 in October, 2004. Similarly, there were only minor fluctuations in reported conservation behaviors, ranging from 3.40 in July, 2004, to 3.50 in April 2004.

Figure 1: *How Important is Energy Conservation?*



2. Consistent with our previous reports, respondents identified *environmental protection* as the primary reason for conservation (*M*=3.31, on a four-point scale), with social responsibility (*M*=3.16) and saving money (*M*=3.11) also highly rated. The factors identified as least influential in their decisions to conserve energy were descriptive social norms, which reflect the extent to which others try to conserve (*M*=2.90), and injunctive social norms, which reflect the extent to which others approve of conservation attempts (*M*=2.81). Interestingly, there was very little change in these scores across time, and the pattern was nearly identical at every time period. The

only exception was that "saving money" was rated as more important than social responsibility in our first sample (January, 2002).

3. Using the combined sample, we analyzed the predictors of reported conservation behavior. In a multiple regression analysis, we regressed reported "trying" to conserve energy onto the demographic variables of age, gender, income, education, and household size. In the second step of the regression analysis we entered the five reasons for conservation identified in #2 above, and then on the third step we added descriptive and injunctive normative beliefs (that is, the perceptions by respondents about how many of their neighbors try to conserve, and how many of their neighbors think that they should conserve). The results showed that age (*beta*=06; $p<.05$) was the only significant demographic predictor of conservation behavior. Of the reasons for conservation, protecting the environment (*beta*=.12; $p<.001$), saving money (*beta*=.11; $p<.001$), and other people are doing it (*beta*=.10; $p<.001$) were all significant predictors. On the third step, beliefs about the frequency of conservation by neighbors (*beta*=.31; $p<.001$) was strongly related to conservation behavior. Combined, the variables explained 22% of the variance in conservation behavior ($R=.47$).

The results from these three analyses support the results summarized in previous reports to the Foundation. They show that Californians identify environmental protection and saving money as the two primary reasons for energy conservation. In addition, the results indicate that normative beliefs exert a powerful influence on conservation behaviors, and that respondents underestimate the importance of this variable in deciding to conserve. Interestingly, our analysis of the independent quarterly samples showed very little change across time in the rated importance of energy conservation or the reasons for conserving energy. Based on the media attention and salience of the issue in 2001, we had expected a steady decrease in the perceived costs of energy and an increase in the perceived importance of saving money by conserving. Neither of these predictions was supported by the data.

Promoting Energy Conservation

The findings from the survey data suggest that normative beliefs are correlated with conservation behaviors; but a number of questions remain. One question, germane to the current set of studies, is whether we could use these findings to promote energy conservation. In a previous report to the Foundation, we presented data from a series of studies conducted with hotel guests showing that normative message, integrated into appeals for guests to reuse their towels, produced a significant and substantial decrease in the number of towels used. But would these same principles apply to residential energy consumption? To answer this question, we conducted a field experiment.

Normative information. Participants in this study were 1207 households in a middle-class residential city north of San Diego. Households were selected using 2000 census block group data to represent high, medium, and low ethnic diversity areas with a median household income ranging from $50,000-$72,000.

Energy conservation messages were printed on doorhangers, with English on one side and Spanish on the reverse. A total of four different energy conservation behaviors were promoted during this study: taking shorter showers, turning off unnecessary lights, turning off the air-conditioning at night, and using fans instead of air-conditioning. These behaviors were

selected through a review of publications generated by the local utility, San Diego Gas and Electric (SDG&E). The behaviors were further tested through the phone survey summarized above. Twenty messages, one for each of the four behaviors, were created for each of the five treatment conditions. The title and key elements from each of the five treatment conditions is summarized below:

Condition and Graphic	Doorhanger Text
Descriptive Normative Information 	**Join Your Neighbors in Conserving Energy**. Summer is here and most people in your community are finding ways to conserve energy at home. How are San Marcos residents like you conserving this summer? By using fans instead of A/C! Why? In a recent survey of households in your community, researchers at Cal State San Marcos found that ____% of San Marcos residents often use fans instead of air conditioning to keep cool in the summer. Using fans instead of air conditioning- Your Community's Popular Choice!
Self-Interest 	**Save Money by Conserving Energy**. Summer is here and the time is right for saving money on your home energy bill. How can you save money this summer? By using fans instead of A/C! Why? According to researchers at Cal State San Marcos, you could save up to $54 per month by using fans instead of air conditioning to keep cool in the summer.
Environment 	**Protect the Environment by Conserving Energy.** Summer is here and the time is right for reducing greenhouse gases. How can you protect the environment this summer? By using fans instead of A/C! Why? According to researchers at Cal State San Marcos, you can prevent the release of up to 262 lbs of greenhouse gases per month by using fans instead of air conditioning to keep cool this summer! Using fans instead of air conditioning- the Environmental Choice.
Social Responsibility 	**Do Your Part to Conserve Energy for Future Generations**. Summer is here and we need to work together to conserve energy. How can you conserve energy for future generation? By using fans instead of A/C! Why? According to researchers at Cal State San Marcos, you can reduce your monthly demand for electricity by 29% using fans instead of air conditioning to keep cool this summer! Using fans instead of air conditioning- the Socially Responsible Choice.
Information Only	**Energy Conservation**. Summer is here and the time is right to conserve energy. How can you conserve energy this summer? By using fans instead of A/C!

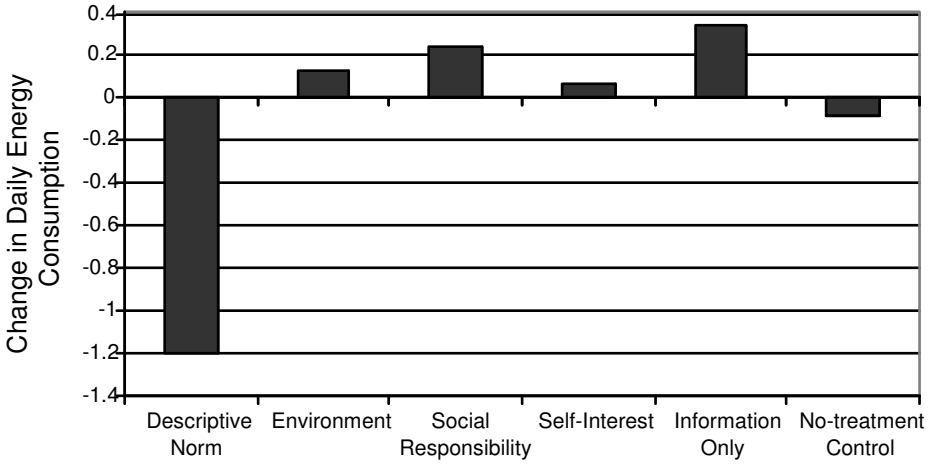
Following four weeks of intervention, we conducted door-to-door interviews with residents at each of the households. After three attempts to each household, we achieved a 54% response rate. In addition to collecting self-report data about energy conservation during the interviews, the research team also read the electricity meters for households where they were accessible. While each reading is not meaningful by itself, subtracting pairs of readings allowed us to calculate an average daily kilowatt usage figure for baseline (7 days), intervention (21 days), and follow-up (28 days).

The results from this field experiment showed that normative messages had a direct effect on both self-reported and actual household energy consumption. In our survey of residents, we asked how often they "tried to conserve energy" (the same wording as the telephone survey). Our analyses showed significant differences across the six conditions for participants who reported

seeing and reading at least one of our messages ($F(5,451) = 2.54$; $p=.03$). Planned comparisons showed significant differences between the no-treatment group ($M=3.02$; $SD=.88$; $N=91$) and the descriptive norm condition ($M=3.32$; $SD=.84$; $N=68$), social responsibility ($M=3.42$; $SD=.68$; $N=74$), and self interest ($M=3.32$; $SD=.76$; $N=75$). The difference between no-treatment condition and environmental condition ($M=3.22$; $SD=.81$; $N=85$) approached significance ($p=.06$). The information condition ($M=3.16$; $SD=.80$; $N=64$) did not differ from the no-treatment control.

Our second set of analyses focused on the energy usage for each of the households, as measured by our reading of the utility meter. A one-way ANCOVA on intervention usage with baseline usage as a covariate. Planned comparisons showed that the descriptive norm condition ($M=12.72$) consumed significantly less energy than the information group ($M=14.20$; $p=.02$) following the intervention. Pairwise comparisons also revealed that the descriptive norm condition used significantly less energy (all p's $<.05$) immediately follow the intervention than all of the non-normative treatment groups: environment ($M=13.87$), social responsibility ($M=14.04$), and self-interest ($M=13.90$). Intervention usage among participants in the no treatment control group ($M=13.64$) was also higher than the descriptive group, however, this difference was not statistically significant ($p<.10$). Figure 2 shows the change in average daily electricity usage from baseline to intervention for the six experimental conditions.

Figure 2. *Change in Average Daily Energy Usage (kwh) from Baseline to Intervention.*



Conclusions: The results from these studies clearly show the power and applicability of normative messages. Across our three-year set of studies, we have consistently found: a) that normative beliefs are correlated with behavior, and b) that normative messages can cause a change in behavior. The results from these studies are currently being written up for peer review and possible publication. In future research, we intend to continue our studies of normative social influence. One question that emerged from these studies concerns the process of social influence. Consistently across our studies, participants rate normative messages as the least effective and believe that they are not influenced by their perceptions of others. But our data show otherwise. This incongruity requires further research to uncover the psychological processes by which normative messages and beliefs influence behavior.