

Improving awareness of energy conservation: Rocky Mountain City

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Abstract

Purpose – The purpose of this research project was to improve public awareness to improve public awareness of the importance of energy conservation and to improve the use of simple conservation strategies. A thorough evaluation of the net gain from the numerous energy campaigns rolled out to the public every year is lacking. This study conducted pre- and post-campaign surveys and focus groups to evaluate one campaign's impact on self-reported energy behaviors.

Design/methodology/approach – The campaign used television public service announcements and a website to improve awareness of the city's efforts to conserve energy and to increase individual energy conservation practices. Focus groups ($n = 40$) were used to identify common barriers to conservation, and pre- and post-surveys ($n = 533, 479$) were conducted to evaluate the campaign's effectiveness.

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The City of Billings received \$53,000 in grant funding from the US Department of Energy START program, and contracted with MSU Billings to implement data input into ENERGY STAR'S Portfolio Manager, which will be used to establish benchmarks of key metrics such as energy intensity and cost and carbon emissions, to develop a website to promote public awareness and education about Energy Star and conservation, to develop and execute a public education/community marketing campaign for the community about Energy Star and conservation practices and to assess public awareness of Energy Star Challenge and effectiveness of marketing campaign in Billings.



Findings – Results indicated that the campaign increased positive changes in changing light bulbs and confidence in taking action to turn down thermostats, unplug devices and turn off lights. While follow-up research is needed on the precise mechanism of the psychological process at work, the findings are consistent with the concepts of self and response efficacy as needed components of any behavior change. The authors advocate the adoption of research-informed message design to maximize communication campaign effects.

Originality/value – This paper demonstrates how the combination of three prominent persuasion theories can be used to develop behavior change campaigns. Also, it is one of the few studies to evaluate the effectiveness of the Energy Star campaign.

Keywords Energy conservation, Environment, Marketing, Persuasion, Service learning, Evaluation, Research methods

Paper type Research paper

1. Introduction

With rising economic costs and environmental concerns, many efforts are conducted around the globe each year to reduce energy consumption. Motivating people to conserve energy has proven to be a difficult task in Europe and the USA (Harris *et al.*, 2008; Notter *et al.*, 2013; Schultz, 2011). Often, efforts to promote energy efficiency are focused on the development of new technology, legislative changes or regulations on industry (Seidl *et al.*, 2017). While structural changes with top-down approaches have shown some success, research indicates that energy behavior at the individual level is key to reducing consumption levels on a broader scale (Dietz *et al.*, 2013; Lutzenhiser, 1993; Socolow and Sonderegger, 1976). Approximately one-fourth of European and US energy consumption is residential (Eurostat, 2017; Capuano, 2019). Increasingly, conservation efforts are focusing on motivating individual behavior change and shifting social norms that influence energy usage patterns (Dietz *et al.*, 2013). This paper examines the success of one social marketing approach to reduce energy consumption in a Rocky Mountain city.

As part of a public awareness effort, university professors and students collaborated with city administrators on a broad energy conservation campaign designed to simultaneously reduce municipal building usage and consumer energy consumption, modeled after the federal Energy Star program (Energy Star, 2018). Started in 1992, Energy Star is a program by the US Environmental Protection Agency to help promote and identify energy efficient products to help decrease the amount of greenhouse gases being produced and placed into the atmosphere (Energy Star, 2018). The ENERGY STAR label is now a household name; most appliances, office equipment, building materials, lightings and so much more are approved to be energy efficient. Since its inception, Energy Star has helped save US consumers over \$450bn (Energy Star, 2018). This paper will focus on the consumer campaign, a project designed to encourage the public to follow the city's lead and broaden individual energy conservation practices.

The Rocky Mountain Energy Star campaign was designed to increase consumers' perceived benefits and reduce their perceived barriers of energy conservation (Keller *et al.*, 2016). The goals were based, in part, on the National Energy Education Development (NEED) project that attempted to portray the use of compact florescent light (CFL) bulbs as a perceived benefit (National Energy Education Development, 2019). Additional objectives were to increase the perceived severity of wasting energy, increase the self efficacy to conserve energy and increase response efficacy to conserve energy, drawing from the Persuasive Health Message (PHM) framework as a model (Witte, 1994).

The PHM framework outlines how to develop effective campaigns by combining parts of three prominent persuasion theories – Theory of Reasoned Action (TRA; Fishbein and Ajzen, 1975), Elaboration Likelihood Model (Petty and Cacioppo, 1986) and Protection Motivation Theory (Rogers, 1983) – to offer an integrated approach to generating culturally,

demographically and geographically appropriate messages and campaigns. In this campaign, primary research included interviews, focus groups and a pre-campaign survey to assess the audience's attitudes toward conservation. Using the results of this audience research, students used PHM to develop the appropriate targets and associated messages. "Blueskies/Greenpockets" became the campaign tag line, based on results showing that protecting the environment and saving money were considered to be equally important goals for the target audience. Following the campaign, a post-test survey was conducted to measure changes in awareness or attitudes. The pre- and post-campaign studies were compared to determine the effectiveness of the interdisciplinary effort. It was hypothesized as follows:

- H1. Respondents who were exposed to the Energy Star Campaign would be more likely to engage in actions to save energy than those who were not exposed to the campaign.

Analyses of the project and media campaigns, together with the results of the survey research, are included in the following sections.

2. Background

Today, few people disagree about the need to conserve energy (Seidl *et al.*, 2017). However, progress in residential conservation has been slow. The literature concerning energy conservation campaigns is as diverse as the types of campaigns that have been developed. Several campaigns encouraging the US public to make changes in their daily lives to conserve energy have achieved limited success, but consumers remain reluctant to accept responsibility for the nation's energy crisis on a broad scale.

2.1 Energy conservation campaigns

Change a Light, Change the World was a well-known US conservation campaign from 2000 to 2007, before expanding to the "Change the World, Start with Energy Star" campaign in 2008 (Energy Star, 2008). The campaign tried to increase awareness about global warming and conservation practices by urging consumers to switch to energy saving light bulbs, such as CFL and light emitting diode bulbs (Energy Star, 2008). Messages included testimonials, a multi-city bus tour and strong national media coverage. The NEED project partnered with the Change a Light campaign to produce a guide for elementary schools to teach students about energy conservation. Consumers had the opportunity to make a pledge to change bulbs, and the results were reported daily. Nearly 2.5 million individuals took the pledge to save energy and fight global warming (Energy Star, 2008). If all pledges had been kept, this would have resulted in a collective reduction of over £7bn of greenhouse gas emissions and over \$500m in energy costs (Energy Star, 2008). However, pledging does not guarantee action. Further evaluations were needed to determine the campaign's effects, but the national reach and long running time of the program made this difficult.

Another US national campaign, 2 Degree Pledge, was designed to reduce energy consumption through management of heating and cooling systems. The slogan, "Together, we're saving the planet. . .by degrees," sums up the central message to encourage consumers to turn their thermostats up or down two degrees as necessary to lower energy use due to heating and cooling (Two Degree Pledge, 2008). The campaign's main focus was the website www.2degreepledge.org, featured on the Weather Channel, in an effort to increase knowledge of the campaign. Besides turning thermostats up or down to help reduce energy use, the campaign also tasked consumers with properly maintaining their heating,

ventilation, and air conditioning systems or replacing inefficient ones. Evaluation of this campaign is lacking but pledges continue. When a pledge is made, an email or physical address is generally given, which provides the opportunity for distributing a survey to determine campaign effects.

Another US energy campaign focused on getting children to reduce consumption was the “Energy Hog” campaign. Created in 2004, this campaign ran through 2008 and was sponsored by the Ad Council which partnered with Energy Outreach Colorado, as well as other local and national partners (Energy Hog, 2005). Target audiences were 8–12 year old; it was hoped that engaging children would lead to entire family involvement. The campaign created a cartoon hog to be the spokesperson, highlighting areas around the home where energy is often wasted. Advertisements were broadcast on the radio and television, with additional content provided on a referenced website. The website featured games and training to teach children about conservation. In addition, a school assembly featuring the Energy Hog was also available (Energy Hog, 2005). Successes of the campaign with children lead to an expansion of the campaign to include adults and teachers, which included a separate section of the website. The Alliance to Save Energy evaluated the program in 2005 and found that awareness increased 9% in the first year of the campaign (Alliance to Save Energy, 2010). Positive feelings about energy conservation and increased likelihood of talking to parents about conservation were results of the campaign (Alliance to Save Energy, 2010). However, no additional evaluation was conducted to determine long-term effects.

2.2 Barriers to conservation

Several authors have attempted to pinpoint the keys to public resistance to conservation. Hutton and Collins (1978) identify three main factors in the public’s resistance to adopt conservation practices, including the lack of infrastructure, lack of information and lack of correct economic signals. Although focused more on ecologically friendly purchases, Bonini and Oppenheim (2008) identified five key barriers, including lack of awareness of eco-friendly products, negative perceptions of green products, distrust of green claims, higher prices and low availability. Because consumers rely on retail outlets to provide conservation products and services, they may not be aware of the benefits they could accrue from conserving energy (or buying green). Bonini and Oppenheim argue that companies and public agencies do not properly strategize on how to overcome consumer barriers. These Stanford University innovators recommend:

Companies first need to figure out which customers are likely to want which products. They must then examine how people in these different market segments make their purchasing decisions. No matter which barriers prove most important for a given market segment or product, however, businesses must address barriers in all areas before consumers will change their behaviors (Bonini and Oppenheim, p. 7).

In short, public agencies interested in promoting changes in public behavior must educate consumers about the benefits of green alternatives, be honest about the pros and cons, design better products and increase their availability. For conservation, this might involve educating consumers about the available practices to reduce energy consumption, the costs and benefits of such practices, the availability of conservation products and services and how to access them.

2.3 Shifting consumer’s perceived cost–benefit ratio

Even though motivating individual behavior change has proven to be the biggest challenge when it comes to conservation, social marketing can be effective if done correctly (Dietrich

et al., 2016). Longtime social marketing scholars argue, “Social marketers can contribute to social change at an individual level by employing crafted programs that use well-tested commercial concepts and tools to induce voluntary personal change – as opposed to laws that force people to act or merely educating people hoping they will act” (Andreasen, 2002, p. 10).

According to Dietrich *et al.* (2016), social marketing techniques include segmentation, formative research, competitive analysis and the employment of a full marketing mix. Formative research is often touted as the most important step, to understand audience perceptions related to the marketing objective. Our effort started with formative research which helped us understand targeted audiences as well as barriers and benefits.

When it comes to the development of messages to reach those connected to an issue, construction of a negative message is easier than a positive message (Murphy *et al.*, 2012). Negative arguments simply personalize the costs allowing a simple negative message. However, positive arguments are more complex, as they emphasize the benefits to a larger community. Audience research in this campaign indicated that individuals were more likely to act if they perceived their actions would be taken on by a collective audience, enough people to make an environmental difference.

In terms of creating a successful social marketing campaign, it is important to understand the views of the target audience in the areas of perceived susceptibility of threat, individual attitudes and behavior of social threat, perceived norms in the community of the threat and individual’s confidence in helping change the threat (Randolph and Viswanath, 2004, p. 421). In a review of 38 peer-reviewed studies in the fields of social and environmental psychology, Abrahamse *et al.* (2005) conclude:

Most studies focus on voluntary behavior change, by changing individual knowledge and/or perceptions rather than changing contextual factors (i.e. pay-off structure) which may determine households’ behavioral decisions. Interventions have been employed with varying degrees of success. Information tends to result in higher knowledge levels, but not necessarily in behavioral changes or energy savings. Rewards have effectively encouraged energy conservation, but with rather short-lived effects. Feedback has also proven its merits, in particular when given frequently (Abrahamse *et al.*, 2005, p. 273).

Concern for energy consumption has been studied as far back as the 1973 energy crisis.

The strategies used to change energy usage patterns in prior efforts were very similar to those in this campaign, relying mainly on appeals to people’s logic as a means of persuasion. In early campaigns a wide variety of media and methods were used to communicate campaign messages. However, it is uncertain what the effectiveness of most campaigns were, due to a pervasive lack of reported evaluations.

3. Theoretical strategies

Theoretical strategies can be applied to social marketing campaigns such as energy conservation efforts. Social marketing applies the methods of for-profit marketing to campaigns that work for the greater good (Kotler and Lee, 2008). The previous example campaigns used many theories, including the Social Cognitive Theory, Health Belief Model, Parallel Process Model and TRA, which are particularly well suited for social marketing.

Social cognitive theory is also known as social learning theory (Kotler and Lee, 2008) and focuses on two major reasons affecting a person’s chances of changing behaviors. First, perceived self efficacy is a person’s “beliefs that they can exert control over their motivation and behavior and over their social environment” (Witte *et al.*, 2001, p. 40). Self-efficacy is at least partially learned from observing social norms and developing new skills; it does not typically change from complete disbelief in a person’s abilities to complete belief in one step. Instead, self efficacy can be affected by practicing new behaviors one step at a time and

reinforcing the changes. The second aspect of the social cognitive theory the influences changes in behavior is a belief “that the benefits of performing the behavior outweigh the costs” (Kotler and Lee 2008, 170). This model can be seen in the Power of One’s attempts to show individual power over their circumstances (Sustainable Energy Authority of Ireland 2010). In addition, the same model can be seen in the Change a Light, Change the World’s emphasis on the financial benefits of changing light bulbs (Energy Star, 2008).

The Health Belief Model uses several key descriptors for predicting a person’s likelihood of changing a behavior (Kotler and Lee, 2008). Perceived susceptibility is a person’s belief they will be adversely affected by a condition, and the perceived seriousness is the person’s feelings about how severe the results of the condition will be (Witte *et al.*, 2001). These descriptors are balanced with the perceived benefits and barriers to taking action. For example, if a person feels susceptible to a serious condition and the benefits to taking action outweigh the barriers, then they are likely to make changes (Kotler and Lee, 2008). In order to make changes, people generally need a cue to action, which can be provided through strategies given in a social marketing campaign. The Environmental Defense Fund used it’s, Ride, don’t drive, public service announcement to bring attention to the perceived seriousness of global warming for polar bears, as well as attempting to decrease perceived barriers to taking action, by showing that using mass transit is an easy, desirable action (Environmental Defense Fund, 2010).

In the PHM Framework, the appraisal of threats and self efficacy resulting from health risk messages determine if people feel personally are threatened and if they can make any changes to avoid the threat, leading to either no action, a danger control action or a fear control action (Witte *et al.*, 2001). If people do not feel threatened, they do not take action. However, if they feel threatened but do not believe they can control the threat they will control their fear about the subject through denial, defensive avoidance or reactance (Witte *et al.*, 2001). When a person believes they are threatened and can control the threat, a danger control action will be taken. Actions for controlling the danger are often the subject of social marketing campaigns, such as the use of CFL bulbs to control the danger of global warming (Energy Star, 2008).

The TRA focuses on the “beliefs about outcomes associated with the behavior and perceptions of how people we care about will view the behavior in question” (Kotler and Lee 2008, 170). Like other models, the TRA states that a behavior’s outcome must be viewed as unfavorable for people to consider making changes. The Change a Light, Change the World and 2 Degree Pledge campaigns both urged visitors on their websites to take a pledge about their actions. By taking the action this enforces the belief in a person that making changes is a social norm and something others will view positively.

These models, and many others, have common themes. The behavior to be changed must be perceived as having potentially negative outcomes, and barriers to making the change cannot overwhelm the benefits of taking action. When a behavior change is viewed as a positive social action, people are more likely to take action. Self-efficacy is important in many models; people will not make changes if they believe they are unable to make a difference, and change generally occurs in small increments. Finally, social marketing must provide viewers with a cue to take an alternative action.

4. Methodology: formative and evaluation research

We conducted field experiment with a simple two group pre/post-test design to compare the change that occurred within two different groups on self-reported energy conservation behaviors and attitudes (the outcomes) by measuring those variables at two time periods, before and after the campaign. Prior to the campaign, we conducted in-depth and group

interviews to identify perceived attitudes about energy conservation to inform the campaign design. We also used the baseline survey results to inform the campaign design.

4.1 Formative research: interviews

The methods of choice for formative research pertaining to this campaign were focus groups and subject interviews. This approach enabled researchers to collect rich data from two-way conversation for low to no cost (Andreasen, 202). Subjects ($n = 40$, 23 males, 17 females, ages 22–56) were recruited via snowball marketing to reach diverse members of the target audience (adult residents of the city, ages 18+). Research was conducted at the university campus, the city library and places of student employment. In all, 10 focus groups were conducted ($n = 2\text{--}4/\text{group}$) and five individual interviews (5 females, ages 43–65).

In each interview (group or individual), the discussion was started by the researcher, with a list of open-ended questions about respondents' perceptions of the risk of wasting energy, perceived importance of conservation, awareness of the city's Energy Star effort, awareness of conservation practices and attitudes toward a wide range of conservation approaches. Additional questions probed on respondents' perceived benefits and barriers to energy conservation and the person's readiness for change. Transcripts were made of interview and focus group results using tape recordings or copious notes. The transcripts were submitted to the instructor for analysis, as well as summarized in discussion boards and class online chat sessions. Results were analyzed using Grounded Theory (Miles and Huberman, 1994). After the initial analysis, results were incorporated into creative marketing strategies for the campaign.

4.2 Survey research

Baseline and post-campaign surveys were administered by mail to 2,000 registered voters in the city. The survey instrument was designed based on the focus group results, asking respondents to rate their perceived threat of energy waste; perceived barriers to conservation changes; perceived benefits of conservation; and perceived efficacy related to a wide range of energy conservation practices. The total valid responses included 533 for the pre-test and 479 for the post-test. A two-tailed Fisher's Exact Test and Chi-Square analyses were used to compare campaign viewers to non-viewers in terms of the energy conservation practices and beliefs (Fleiss, 1981).

5. Results

5.1 Qualitative research

The results of individual and group interviews were consistent in most cases. A majority of subjects perceived a threat in the form of potential energy shortages, which would produce economic or environmental problems. Perceived personal risk from this threat, however, was mixed across the subjects. One subject (male, age 23) stated, "I do worry about running out of gasoline and coal." However, a different subject (female, age 43) worried that, "Prices will go up, supply will go down, rationing will occur. The government will force us to implement certain energy saving techniques that could be costly." Yet, most interviews and focus group respondents reported little worry over the personal impacts of energy consumption.

The audience was split over the perceived costs of doing nothing (i.e. not conserving energy). Two distinct segments emerged. One group was most concerned over environmental issues resulting from overuse of resources, while the other segment focused on the monetary costs of energy use. One interviewee stated, "I honestly think it's more of a moral obligation than a financial obligation." Others felt that saving resources was

important, but saving money was a bigger motivation. Such an interviewee stated, “The more we use and waste the higher the cost is for using it, and then the effects on our world.” Both segments agreed that conservation was a good idea, although for different reasons.

The perceived barriers to conserving energy included the cost of replacing appliances and vehicles, lack of knowledge about how to conserve, job losses relating to conservation, the general inconvenience, difficulty and discomfort associated with the idea.

Perceived benefits included cost savings, environmental advantages, potential time savings, positive feelings and tax credits. High self efficacy (i.e. behavior-specific self-confidence) was reported for low-investment actions such as changing to CFL light bulbs, lowering or raising thermostats and turning off lights when not in use. Perceived self efficacy for unplugging appliances when not in use was not as high, as it was for high investment behaviors, such as changing appliances or installing solar panels.

Respondents expressed a desire to have assurance that others would implement similar practices, if they were to make changes. This was expressed partly through perceived low response efficacy (i.e. low belief in one’s potential impact) of implementing small conservation practices. One subject said, “Every one person that does is someone else helping, and there’s strength in numbers.”

When asked who would be perceived as a credible source on conservation, respondents mentioned energy experts and scientists. These individuals were much preferred over celebrities or government officials. Other recommendations included publicly tracking progress of community energy conservation, using games or competitions either online or amongst communities and presenting testimonials on the website.

Indeed, [Costanzo *et al.* \(1986\)](#) found that people were more likely to make permanent changes in their energy behavior if the new behaviors were easy and convenient to perform, and when neighbors and friends were changing in similar ways. Conservation practices were re-enforced when community members made commitments to change in public settings ([Costanzo *et al.*, 1986](#)).

5.2 Baseline survey results

Baseline survey results indicated low use of energy saving ideas. The results also indicated that cost and inconvenience constituted the greatest barriers to energy efficiency. Prior to the campaign, 41% of respondents ($n = 211$) believed money was a barrier to conservation; and 22% of respondents ($n = 113$) believed that time was a barrier ([Table 1](#)).

Similarly, saving money ($n = 483$, 91%) and environmental conservation ($n = 441$, 83%) were the strongest perceived benefits ([Table 1](#)). Respondents were willing to implement small changes to make a difference, if convenient. But they lacked confidence in the effectiveness of small energy-saving actions, such as changing a light bulb. They had more confidence if it was perceived to be a collective effort.

		Pre-campaign			Post-campaign	
	Barriers (<i>n</i>)	% Total (<i>n</i> = 516)	Benefits (<i>n</i>)	% Total (<i>n</i> = 533)	Barriers (<i>n</i>)	% Total (<i>n</i> = 431)
Money (agree)	211	41	483	91	174	40
Money (disagree)	189	37			122	28
Time	113	22	NA			
Protecting environment	NA	NA	441	83		
Preventing climate change	NA	NA	277	52		

Table 1.
Perceived barriers
and benefits of
conservation

5.3 Analysis of formative research

Attitudinal results from both the survey and interviews were analyzed based on the following seven concepts: perceived threats, perceived personal risk, perceived costs of not conserving, perceived barriers to conserving, perceived benefits of conserving, self efficacy for conservation acts and response efficacy for conservation acts. Beginning with perceived threats, most individuals perceived energy resource shortage to be a problem. This was either for cost reasons or the environmental reasons. There were mixed emotions from the focus group pertaining to perceived personal risk. However, two different segments emerged, based on whether individuals perceived cost or environmental damage to be the greatest negative consequence for not conserving.

Both barriers and benefits emerged from the focus group. The concept of perceived barriers to conserving included the idea it cost more to conserve, lack of knowledge when it came to conserving, fear of job loss, conserving being inconvenient, conserving being a difficult task or the person was just uncomfortable conserving. On the other side, perceived benefits to conserving included cost savings, time, saving the environment, feeling good, peace of mind, guilt free attitude and tax credits.

The final concepts included self efficacy acts involved with conserving. These acts were rated high, medium and low. Self-efficacy for conservation acts included unplug appliances (low), change light bulbs (high), change to energy efficient appliances (low), thermostat (high), turn off lights (high). In addition, response efficacy for conservation acts included changing bulbs (low), on-demand water heater (high), changing appliances (high), solar panels (high), energy-efficient furnace (high), thermostat (medium).

6. Intervention

The campaign strategy focused on promoting small-scale acts of energy efficiency, such as replacing standard light bulbs with energy saving ones. The formative research results indicated the general public believed in the effectiveness of such acts of energy conservation but lacked confidence to make the changes. In addition, the baseline survey results suggested campaign goals were identified as needing to decrease the perceived barriers to energy conservation and increase public self efficacy to take action.

Attitudinal goals of the campaign were three-fold. First, the campaign was designed to increase perceived benefits of energy conservation among the general public. Second, the campaign was intended to increase the perceived risk of energy waste. Third, organizers hoped to increase individuals' perceived self efficacy to conserve.

Behavioral goals of the campaign focused on promoting small-scale, individual acts of energy conservation. For example, an individual could change light bulbs to more energy efficient ones; shut off lights when not necessary, turn the thermostat up or down depending on the need and unplug appliance when not in use.

Once the campaign strategy and behavioral goals were determined, students were tasked with developing an advertising campaign. Drawing from the Means End Chain Conceptual Advertising Strategy, the students focused on the values of the attitudes and efficacy established in the research (Bagozzi and Dabholkar, 2000) (Table 2).

From Table 2, a teaching campaign approach was developed to remind people how the future of the planet was important to their children. Each message would present data on the energy-saving effects of small changes and other easy-to-do energy saving actions, calculating the collective amount of energy saved by individual efforts. One ad, for example, involved a little girl not knowing the answer to why her parents made certain choices in their lives, choices to save energy. In the end, they had to explain to her why they were making such choices.

Based on participants' reservations about acting individually, the campaign adopted the slogan, Blue Skies, Green Pockets, placing a collective emphasis on the campaign. Participants also requested strategies to keep the collective community motivated, such as a game on the website where a person can earn points for doing different energy conservation acts around the house. Another idea was to include a city-wide progress tracker. Therefore, a billboard-size thermometer was stationed downtown, marking energy savings during the campaign period. In addition, based on perceived credibility, character sources were changed to energy experts and scientists rather than celebrities or government officials.

Once the theme was established, students in the applied marketing communications course produced a television campaign with three unique 30 second advertisements. The campaign aired for two years in a flighted media buy. In addition, a website www.blueskiesgreenpockets.com/ was developed by students in the Web design course and Information Technology Club. The blueskies/greenpockets campaign tag line was developed, based on market research indicating that protecting the environment and saving money were considered by the community to be equally important. The website included information about the city's initiatives related to energy conservation. It detailed information for residences and businesses about energy saving opportunities and a section with games for children (City Conservation Campaign, 2010).

7. Post-campaign results

This section summarizes the impact of the Rocky Mountain Energy Star campaign on energy conservation attitudes and self-reported behaviors. We first present the impact of the intervention on residents' self-reported conservation practices. We offer measurable evidence that residents exposed to the campaign did engage in behaviors that reduced their energy use relative to those who had not seen the campaign. The raw data set consisted of survey results of a direct mail survey, using similar variables as the pre-test survey, sent to 2,000 potential respondents, with 479 valid response.

7.1 Outcomes influenced by study groups

At least four Fisher Exact Tests revealed a significant probability that outcomes had been influenced by the study intervention (campaign), or that the null hypothesis was rejected (that there is no association between the rows and columns of the 2×2 table, or that the probability of a subject being in a particular row is not influenced by being in a particular column) (Fleiss, 1981).

Table 3 depicts that the study groups for changing light bulbs have a 7.58E-14 probability of dependence between those who did not take action and have not seen the ads, and a similar

Attributes	Physical	Psychological	Values
Sustainability of Resources	Protects Environment	Take Care of Future	Universalism / Benevolence
Save Money	Disposable Income	Responsible	Hedonism / Self Direction
Personal Efficiency and Dependability	Control Resources	Provide Safety for Family	Security
Latest Technology	Energy Consumption	Innovator	Power / Achievement
	Best way of Harvesting Energy (Wind and Solar)		
Elements	Benefits	Hook	Driving Force

Table 2.
Means end chain for
improving
conservation
awareness

probability of dependence between those who did take action and have seen the ads. Only 13% ($n = 35$) of 264 respondents who did not see the ads reported having changed light bulbs after the campaign, compared with 44% ($n = 89$) of 202 respondents who saw the ads ($p = 9.57\text{E-}14$) (Table 3).

Table 4 depicts the same with a $7.40\text{E-}12$ probability for turning down thermostats. Only 14% ($n = 36$) of 264 respondents who did not see the campaign reported turning down thermostats, compared with 42% ($n = 84$) of 202 respondents who did see the campaign ($p = 1.39\text{E-}11$).

Table 5 depicts the same with a $1.37\text{E-}10$ probability for turning off devices. Only 14% ($n = 38$) of respondents who did not see the campaign reported turning off devices when they were not in use, compared with 41% ($n = 82$) respondents who did see the campaign ($p = 1.69\text{E-}10$).

Table 6 depicts the same with a $5.09\text{E-}13$ probably for turning of lights. Only 16% ($n = 42$) respondents who did not see the campaign reported turning off lights when not in use, compared with 47% ($n = 94$) of respondents who saw the ads.

Table 3.
Changed light bulbs
in my home or
business to energy
efficient bulbs

Action Bulbs	Not Seen Ads		Seen Ads	
Category	<i>n</i>	% Total	<i>n</i>	% Total
No	229	86.7	113	55.9
Yes	35	13.3	89	44.1
Total	264	100.0	202	100.0
Fisher's Exact				
Left <i>p</i> -value	Right	Two-tail		
1.00E + 00	7.58E-14	9.57E-14		

Table 4.
Turned down/up the
thermostat in my
home or business

Action Thermostat	Not Seen Ads		Seen Ads	
Category	<i>n</i>	% Total	<i>n</i>	% Total
No	228	86.4	118	58.4
Yes	36	13.6	84	41.6
Total	264	100.0	202	100.0
Fisher's Exact				
Left <i>p</i> -value	Right	Two-tail		
1.00E + 00	7.40E-12	1.39E-11		

Table 5.
Turned off devices
when they were not
in use

Action Devices	Not Seen Ads		Seen Ads	
Category	<i>n</i>	% Total	<i>n</i>	% Total
No	226	85.6	120	59.4
Yes	38	14.4	82	40.6
Total	264	100.0	202	100.0
Fisher's Exact				
Left <i>p</i> -value	Right	Two-tail		
1.00E + 00	1.37E-10	1.69E-10		

This Fisher Exact test reveals that our campaign was not the cause of the outcomes for the study groups overall. However, the results of the research did reveal a significant change in the three areas mentioned above (turning off thermostats and devices, and changing bulbs).

Awareness of
energy
conservation

7.2 Self efficacy for behavior change

A chi-square comparison between those exposed to the campaign ($n = 197$) compared with respondents not exposed ($n = 261$), shows a significant greater self-efficacy for changing the lightbulbs among the exposed group. While 76% ($n = 197$) of the respondents who did not see the ads agreed they could change to more efficient light bulbs, 84% ($n = 165$) of campaign viewers expressed high self efficacy for changing to more efficient light bulbs after the campaign ($p = 0.08$) (Table 7).

A chi-square comparison between campaign viewers and non-viewers also showed higher self efficacy among viewers for a range of conservation behaviors of any sort. A total of 87% of 199 campaign viewers ($n = 174$) expressed high self-confidence for taking energy conservation actions, compared with only 78% ($n = 203$) of 259 non-viewers (Table 8).

Action Lights Category	Not Seen Ads		Seen Ads	
	<i>n</i>	% Total	<i>n</i>	% Total
No	222	84.1%	108	53.5
Yes	42	15.9	94	46.5
Total	264	100.0	202	100.0
Fisher's Exact				
Left p-value	Right	Two-tail		
1.00E + 00	5.09E-13	6.20E-13		

Table 6.
Turned off lights in
rooms when not in
use

Bulbs Category	Did Not See Ads		Saw Ads	
	<i>n</i>	% Total	<i>n</i>	% Total
Disagree	24	9.2	14	7.1
Neutral	40	15.3	18	9.1
Agree	197	75.5	165	83.8
Total	261	100.0	197	100.0
Pearson chi-sq	df	<i>p</i> -value		
4.96	2	0.08		

Table 7.
Confidence to change
light bulbs

Confident Actions Category	Did Not See Ads		Saw Ads	
	<i>n</i>	% Total	<i>n</i>	% Total
Disagree	7	2.7	3	1.5
Neutral	49	18.9	22	11.1
Agree	203	78.4	174	87.4
Total	259	100.0	199	100.0
Pearson chi-sq	df	<i>p</i> -value		
8.35	2	0.04		

Table 8.
Confidence in taking
action for
conservation
behaviors

7.3 Pre/post-test comparison

A two-group pre/post-test analysis was conducted to compare change that occurred within the two different groups (baseline and post-test respondents) on the dependent variables – self-reported energy practices, perceived self efficacy for conservation, and perceived barriers and benefits to conservation. Pearson’s chi-squared test was used to determine whether there were statistically significant differences between the frequencies for each dependent variable at time one and time two. Only one variable changed significantly after the campaign – the perception of money as a barrier to conservation. As previously mentioned, 41% ($n = 211$) respondents agreed that money is a barrier to conservation in the baseline survey, while 37% disagreed ($n = 189$). After the campaign, the number of respondents who disagreed that money is a barrier significantly declined to 28% ($n = 122$) ($p = 0.045$) (Table 1).

8. Conclusion and policy implications

This paper presents an addition to the literature on quantitative field studies about conservation consumption behavior. We investigated the self-reported conservation practices and attitudes of city residents in response to a mass media campaign and found evidence that people exposed to the campaign adopted conservation behaviors. In the attitudes category the campaign seemed to effectively increase perceived self efficacy and response efficacy to conserve. Respondents who viewed the campaign were more likely to report high self efficacy for conservation behaviors, such as changing light bulbs and other small acts of conservation, compared to individuals who had not seen the campaign. In the practice category, the campaign-exposed individuals were more likely to report having taken action in terms of turning off devices, lowering thermostats, and changing lightbulbs. Yet, at the same time, we lacked a true control group and the longitudinal comparison did not show significant changes from time one to time two.

While we do not have proof of the causality of the campaign, our findings are consistent with the PHM framework used to design the campaign. According to PHM, individuals with higher self efficacy for behavior change are more likely to change (Witte, 1994). Our campaign was designed to make small conservation practices seem simpler and easier to adopt; indeed, individuals exposed to campaign messages reported increased self efficacy for conservation behaviors in addition to increased adoption of the behaviors.

While no significant changes were identified between pre- and post-campaign audiences – aside from the perception of money as a barrier to conservation – we did not find iatrogenic effects in response to the campaign. Most respondents changed their attitudes in the direction of increased favorability for conservation practices after the campaign, even if the changes were not statistically significant. This is reassuring, given the evidence of moral licensing that has been shown in other studies to accompany conservation behaviors (Tiefenbeck *et al.*, 2013). Indeed, more objective measures of individuals’ total energy conservation behavior are needed to verify that campaign respondents did not compensate for their energy savings in other areas of their lives.

If verified with energy usage data, the implications of our results are relevant not only for future environmental campaign design but also for energy policy. Our findings raise several questions for future energy efficiency endeavors. First, the formative research for this campaign indicated that consumers were more likely to engage in small, low-investment behaviors, especially if encouraged that these behaviors can be effective in reducing overall energy usage. The caveat of such an “every bit helps” approach is that consumers might engage in moral licensing to justify waste in other areas of their lives once they feel

confident that they are “doing their part,” having adopted any conservation practices, no matter how small.

Second, our findings are relevant for environmental policy debates about the balance in investments between individual responsibility and broader, structural changes to promote energy efficiency. Given the incremental changes that we found in response to one energy campaign, it seems important for policymakers to engage in careful cost–benefit analyses of the conservation impact of investing in each approach. The emphasis on changing individual attitudes, values and behaviors has been criticized for yielding incremental improvements and deflecting attention from much needed changes in energy practices by large institutions and technologies used across our social system (Shove, 2010). Investments in individual conservation promotion should be made carefully, in a theoretically-informed and research-based manner and should not be conducted at the expense of other important conservation investments needed at a societal level.

The results of this study are subject to a number of limitations. Our research focuses on the analysis of self-reported short-term behavior change. Although we do measure theoretical variables that may be predictive of long-term behaviors, that is not substantiated by our data. We are aware that most behavior changes require longer-term reinforcements to become sustainable. Also, as mentioned, it would have improved the validity of our results to combine self-reports with objective measures of energy usage, as done by Tiefenbeck *et al.* (2013). Furthermore, causality cannot be assumed given the cross-sectional nature of our results, and the lack of a control group. It is possible that campaign viewers – those who recalled having seen the ads – were a self-selected group; those who were more environmentally inclined may have been more likely to pay attention to conservation ads and subsequently take action. Although the two-group design of this study could have enabled us to determine whether each group of respondents (sympathetic viewers and non-sympathetic audiences) changed in association with campaign exposure, differences from pre- to post-test were not statistically significant.

Despite these caveats, our research underscores the importance of using theoretically informed strategies when designing consumer conservation campaigns, and the possibility of influencing broad-scale individual behavior changes if such changes are presented in a meaningful, easy-to-engage-in manner.

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