EVALUATION OF THE "LOSE YOUR EXCUSE" PUBLIC SERVICE ADVERTISING CAMPAIGN FOR TWEENS TO SAVE ENERGY

Yaw O. Agyeman, Lawrence Berkeley National Laboratory, Berkeley, CA
Co-authors: Jane T. Bertrand, Tulane University; Patty Goldman, Ad Council; Paul Metz, Erin Barber, Kym Wegenka, C&R Research

ABSTRACT

This study evaluates the 2008-09 "Lose your Excuse" public service advertising (PSA) campaign on energy efficiency targeting 8-12 year olds, intended to increase knowledge, foster proactive attitudes and change energy usage behaviors. Baseline and two follow-up surveys were conducted with online census-representative samples of "tweens." Almost half (46%) recognized at least one ad from the campaign. Ad recognition was positively associated with knowledge, proactive attitudes and energy saving behavior. Propensity score analysis confirmed a small but measureable and statistically significant effect on energy saving behavior. The discussion section compares these results to public health campaigns in terms of ghost awareness, reach, and effect size.

Introduction

The U.S. Department of Energy (DOE), in partnership with the Ad Council, launched a two-part energy efficiency campaign in September 2008, aimed at boys and girls 8-12 years old ("tweens") across the United States. The campaign highlighted the simplicity of making energy efficient changes in the home and asked kids to join millions of others to make a difference by using their energy wisely. TV, radio, and other media outlets nationwide donated a significant amount of free time and space to run this campaign, entitled "*Lose Your Excuse*."

The public service advertising (PSA) campaign had four main objectives: 1) to raise awareness of energy savings; 2) to increase knowledge of energy-saving key facts; 3) to foster a proactive attitude toward energy savings; and 4) to change energy usage habits. Conceptually, campaign-related activities (e.g., distribution and marketing of PSAs and public relations/press outreach) were intended to result in recognition of the campaign messages and press coverage. This recognition, in turn, was intended to increase awareness of the importance of saving energy (including specific measures), promote word-of-mouth discussions, and drive tweens to the campaign websites. The long-term outcomes were to ingrain the value of saving energy to the next generation and to increase daily energy-saving actions. The campaign "*Lose your Excuse*" launched in September 2009 and consisted of the following elements: 1) Two 30-second TV spots, entitled "Malcolm" and "April"; 2) Two 30-second radio spots, entitled "Matthew" and "April"; 3) Three billboards with an energy-saving message aimed at kids; 4) Three web banners via the Internet; and 4) Collateral materials.

The PSAs directed tweens to the interactive website www.LoseYourExcuse.gov, where they could download an Energy Action Plan and learn fun, simple tips on energy efficient behaviors to reduce energy consumption in the home. The Ad Council was also involved in a second campaign, which launched in September 2008 and ran at the same time as the primary campaign.

This second campaign featured the Disney character Tinker Bell[1] in a TV ad, web banners, and outdoor billboards. It aimed to educate 8-9 year olds about energy efficient habits and to drive kids to visit www.energy.gov/tink. Given the similar objectives and overlapping target audiences, we considered the two as a single campaign for purposes of evaluation.

Collectively, the campaign promoted the central message that there are simple steps tweens can take in the home to save energy. Each element highlighted specific recommended individual energy actions. The total value of donated media for the campaign, over the period examined in this evaluation, came to $41,041,261, driven primarily by radio and TV.

Methodology

Three nationally representative surveys were conducted among boys and girls 8-12 years old, as follows: 1) a baseline survey in August 2008, prior to the launch of the campaign, as part of KidzEyes Omnibus ("Wave #1") (n=500); 2) a follow-up survey in August 2009, 12 months after the launch of the campaign to allow for media buildup, also via the KidzEyes Omnibus ("Wave #2") (n=498); and 3) a Custom Survey (CS) in August 2009, using a comparable methodology, among a sample of children (n=1996) ages 8-12; the Custom Survey (CS) allowed for more detailed questions about exposure to the campaign and outcomes of interest.

KidzEyes Omnibus Survey is a monthly, quantitative, online omnibus of kids operated in full compliance with federal online privacy legislation (COPPA laws protect the personal information collected online from children under age 13). It includes respondents 6-14; however, this analysis used data from respondents 8-12 only. In order to make the data as representative as possible of the U.S. population of this age, 2007 U.S. Census weights were applied to both the August 2008 and August 2009 data. As a result, one can consider the two waves of the Omnibus Survey data as close to "Census representative" as possible from an online survey.[2]

Respondents for both waves of the Omnibus Survey answered eight questions related to saving energy and the campaign. The online survey included "stimuli" that the respondents could watch or listen to (i.e., TV storyboards, radio scripts, and a billboard image in Wave #1; Wave #2 and the CS included those stimuli, as well as TV videos and radio audio files).

The CS was added for several reasons. First, support for a more extensive evaluation of the campaign became available only after the baseline Omnibus survey was already designed and implemented. Given the need for comparability on the before-after surveys, the evaluators decided to retain the second omnibus survey (with questions identical to the first), but to add this "Custom Survey," implemented at the same time as the second omnibus. Thus the CS differed from the Omnibus in that it (1) contained new and more detailed questions regarding outcomes (i.e., knowledge, proactive attitudes, intention, and energy saving behavior), and (2) measured recognition of the full range of ads included in the campaign, yielding a more complete measure of "dose" (i.e., the number of ads seen or heard).

[1] Specifically, Walt Disney Studios Home Entertainment's DVD and Blu-Ray™ release *Tinker Bell.*

[2] An online sample under-represents certain ethnic and income subgroups that access the Internet at lower rates, specifically children living at or below poverty level. While the market research firm was able to provide some representation of the lowest income group (<$35,000/year household income), this income group was populated primarily with households making $20,000 to $35,000.

Another reason for the CS was to oversample in "high campaign media intensity areas" of the country, to test the hypothesis that higher campaign media intensity areas would show greater campaign effects. To this end, the CS included a sample of 1996 respondents that was "online Census representative" of 8-12 year olds in the United States; it also included a supplemental sample of 500 8-12 years olds selected from supposedly "high campaign media intensity areas." Subsequent analysis revealed flaws in the classification of "high campaign media intensity areas." Thus, we dropped the supplement of 500 cases from this analysis. The response rates for the three surveys were 47%, 40%, and 45%, respectively; the samples were split nearly evenly between boys and girls. Of those kids that accessed the survey, 100, 94, and 74 percent on the three surveys, respectively, completed it – consistent with other panel surveys among children.

The evaluation focused on ad recognition (labeled "reach" in some professional circles[3]) and three outcomes (knowledge, proactive attitudes, and energy saving behavior). Regression analysis was used to test if there is a statistical relationship between ad exposure and the outcomes of interest. However, regression analysis does not allow for causal interpretation since ad recognition is an endogenous variable (that is, the direction of cause-and-effect may be ambiguous). For example, a tween that has grown up in an energy-conscious household might be more likely than his peers to pay attention when a PSA on energy savings airs on TV). Thus, propensity score matching is used to control for the endogeneity of ad recognition to determine the effect of the ad campaign on energy-saving behavior (Babalola and Kincaid 2009).

The idea behind propensity score matching is to match tweens exposed to ad campaign with "equivalent" non-exposed tweens, based on observed characteristics that determine ad recognition. One can think of this as creating a control group that is statistically similar to the group of tweens that reported to recognize at least one ad. Outcome measures for the "equivalent" non-exposed tweens serve as a counterfactual. They allow us to compare the non-exposed tweens with tweens exposed to the campaign (based on ad recognition) to determine the effect of the ad campaign. This measure is known as the "average treatment effect on treated" (ATT). The main underlying assumption of this approach is the conditional independence assumption (CIA), which would mean that in studies of this type, ad recognition is solely determined by observed characteristics (Babalola and Kincaid 2009).

Results

Socio-demographic characteristics of the tween sample

This analysis focused exclusively on boys and girls aged 8-12 years old. As expected, the distributions were similar across all three waves, given that they were drawn to be "online representative of tweens 8-12 in the United States." The respondents in the two waves of the Omnibus Survey were fairly well distributed across the four geographical regions of the U.S., with a slightly stronger showing from the South in Wave #2. Over 60 percent in both waves lived in urban or suburban areas, while at least one quarter in both waves lived in a rural area. Approximately one-third of tweens lived in households with a household income between $35,000-74,999. Almost one in five lived in households with an income under $35,000,

[3] The terms "exposure," "campaign awareness," "reach," penetration," and "ad recognition" have different meanings in different settings. In this article we have used "ad recognition" for the percent that can recall a given ad, which some others would term as "reach" of the message.

compared to approximately one-third whose household income was $75,000 or more. The majority of respondents were white (67-76% on the two waves). African Americans constituted 10-14%, with Hispanics at 8-11%. Less than three percent each were Asian, other, or preferred not to give their race. On both waves of the Omnibus Survey, more of the respondents were aged 8-10 (58-60%) than ages 11-12 (40-42%), reflecting that the younger category included three single-year ages whereas the older included only two single years of age. The gender breakdown was 51 percent male, 49 percent female.

The characteristics of the respondents on the CS were generally similar to those on the Omnibus Surveys, with a few exceptions. The CS had 51% of the respondents from the South, with fewer than expected respondents from the Northeast (15%) or West (12%); this anomaly resulted from the attempt to sample "high campaign media intensity areas." The Custom Sample was the most "suburban" of the three (although the difference between urban and suburban may be more statistical than reflective of a lifestyle difference). However, the CS was fairly comparable to one or both waves of the Omnibus Survey on income, ethnicity, age and gender.

Ad recognition from the campaign

Category awareness. The CS asked the generic question: "have you seen, heard or read something about saving energy in the past 6 months?" Almost two-thirds of the tweens (64%) reported that they had. Sixty-three percent thought they were hearing more now than a year ago about saving energy (what advertisers call "buzz"), with no difference by age or gender.

Ad recognition from the campaign. The CS included more questions regarding recognition of specific ads than was possible on the Omnibus surveys, although comparable data are available for the recognition of three TV ads (storyboard format only), one radio ad, and one billboard ad. Forty-six percent of respondents recognized at least one campaign ad. The "April" TV ad had the single highest recognition rating at 30%, followed by the Tinker Bell TV ad (24%), the Internet banner ads (23%), and the Tinker Bell billboard (19%). The percentages for ad recognition increased significantly between the baseline and follow-up survey for ads that were included in both waves. The repeated ads and their corresponding recognition percentage were as follows: "Malcolm": 4%-13% (baseline to follow-up); "April": 2%-23%; "Tinker Bell": 15%-24%; "Matthew": 5%-7% (not statistically significant); "What's Your Excuse?": 4%-9%.

Between 2-5% of kids reported to have seen or heard an ad that had not yet aired (referred to as "ghost awareness"). The exception to the average was the "Tinker Bell" ad, at 15% perceived recognition at baseline. In this case it is highly likely that the respondents recognized the character within the storyboard – Tinker Bell – and confused this with recognition of an ad with Tinker Bell on saving energy. We explore this further in the Discussion section.

Total number of campaign items seen/heard ("dose"). Only the CS asked respondents about ad recognition of all elements from the campaign. The survey employed split samples; respondents only answered the ad recognition question for two of the three TV ads, one of the two radio ads, and one of the two billboards; all were asked about the banner and the website. The possible number of items seen/heard ranged from 0-7. The actual numbers reported ranged from 0 to 5. The mean number of ads/items seen or heard was 0.9. Socio-demographic correlates of having seen or heard something from the campaign were as follows: (differences reported are statistically significant at the 0.05 level): 1) on average, girls had seen a larger number of ads than boys (1.0 vs. 0.8), and girls 11-12 reported a higher number than those 8-10 (1.1 vs. 0.9); 2) non-Caucasians reported recognition of more items (1.1) than Caucasians (0.8); 3) urban tweens

reported recognition of more items (1.0) than their suburban or rural counterparts (0.8); 4) income and geographical region did not influence number of ads recognized.

Knowledge of key facts related to energy savings

The CS measured tweens' knowledge on three key energy-saving facts, two of which were addressed by one or more of the campaign messages. (The Omnibus did not include these knowledge questions, making it impossible to compare levels of response before and after the campaign.) On all three questions, at least 70% of kids chose the correct answer, as follows: 1) if a cell phone charger is plugged in, it is still using energy (true-82%); 2) watching TV with the computer on saves energy (false-73%); 3) energy-saving light bulbs last 6 times longer than regular bulbs (true-71%).

Knowledge of the correct answer on these three points was not strongly correlated with gender or age. The survey purposely contained one knowledge question not addressed in the campaign ads: "watching TV with the computer on saves energy". The percent of correct answers to this question (73%) fell in the same range as the other two questions covered by the campaign ads (71%-82%), suggesting that tweens may already have had a fairly high level of knowledge on aspects of energy saving or were able to guess the most plausible answer.

Correct knowledge did relate to ad recognition: a higher percentage of tweens who recognized at least one ad answered correctly to both knowledge items from the campaign. Moreover, we found a statistically significant association between recognizing a particular message and giving the correct answer regarding the fact covered in that ad. Those that saw or heard an "April" ad were more likely (88%) than others (81%) to know that if a cell phone charger is plugged in, it is still using energy. Similarly, those that saw the "Malcolm" TV ad or heard the "Matthew" radio ad were more likely (82%) than others (70%) to know that energy saving light bulbs last six times longer than regular bulbs ($p<.05$).

Proactive attitudes toward saving energy

All three surveys asked the tweens "how important is saving energy to you?" The percent manifesting a favorable attitude increased from 82% on Wave #1 to 87% on Wave #2 (not statistically significant). The CS showed a similar level post-campaign (86%), underscoring the consistency in responses.

The CS explored tweens' reasons for believing that saving energy was important. Among those believing it to be important, common reasons were to save money (37%) and help the planet (31%), followed by environment (16%), future (13%), and limited supply (10%). Among kids that did not think it important, reasons given were irrelevance to kids, and they just don't think about it. Tweens on all three surveys responded to the question: "how hard do you think it is to save energy on a daily basis?" (a proxy for self-efficacy). The data showed changes in the expected direction, but they were not statistically significant. All three surveys asked tweens how likely they were to talk to their parents about saving energy (considered to be a measure of behavioral intention). The observed increase (52% to 57%) from Wave #1 to #2 was not significant. Respondents on the CS gave a similar post-campaign response to this question (58%), but few had actually done so (6% and 5% over Wave #1 and #2, 9% on the CS).

Ad recognition did yield the hypothesized association to proactive attitudes. Those reporting to have seen at least one ad were more likely to feel that saving energy was very/somewhat

important (88%) than those that had not (83%); p<.05. Also, those reporting to have seen at least one ad expressed a greater likelihood that they would talk to their parents about saving energy (70%) than those not having seen any ad (65%); (p<.05).

Energy-saving behaviors

The Custom Survey asked tweens to describe their current level of involvement with saving energy; their answers allowed us to classify them along a "stages of change" continuum,[4] ranging from "I don't really think too much about saving energy" on one end, to "I do things to save energy often" on the other. Although the variable had five possible responses, the respondents were fairly evenly divided between the "doers" (those that do things to save energy often or once in a while; 45%) and others that just think about saving energy or don't even think much about it (48%). This variable served as a control variable in the regression model, as a measure of "predilection to act."

The CS asked tweens if they had already spoken to someone about saving energy. Just over half (56%) had, with little variation by gender or sex. Among those, the most frequent responses were "parent" (68%) and teacher (62%), followed by "friend" (37%), other adult (23%), someone online (5%), or someone else (8%).

All three surveys asked tweens (in an unaided format) "what have you done personally to save energy?" In addition, the CS asked the same question in a prompted format with 10 possible actions. The post-campaign results from these questions were quite similar, with over 90% reporting at least one behavior. Heading the list (based on aided recall) were turning off lights (94%), shutting off computers or other electronic devices (82%), and unplugging a video game device when not in use (61%). Other actions that the respondents reported doing were: switching to energy saving light bulbs (57%), unplugging the cell phone charger (57%), and talking to parents about making changes at home to save energy (46%). A third mentioned using a digital thermostat or natural heat/cooling/light. One quarter (25%) reported using "smart" power strips, and only 14% talked to parents about Energy Star appliances. Responses to this same question in unaided format were very similar to those found with the aided format. Of note, the percent that reported unplugging equipment when not in use increased from 0% to 9% (unaided recall). There was no statistically significant change in behavior between Waves #1 and #2 on the Omnibus, possibly because the baseline level was already so high.

However, as with the other outcomes, there was a significant association between ad recognition and energy saving behavior. We classified tweens by the number of energy saving behaviors they reported: 0-3, 4-5, or 6-10. The percent of tweens reporting the most energy saving actions (6-10) was higher among those that recognized at least one ad (50%) than among those recognizing none of the ads (35%); (p<.05). Finally, we examined whether tweens that had seen either of the ads on two specific behaviors were more likely to have performed those behaviors than others. We found that tweens that had seen or heard either of the "April" ads were more likely (69%) than others (52%) to report unplugging their cell phone chargers in the past 6

[4] The "stages of change model" (SCM) refers to the transtheoretical model developed by Prochaska and diClemente in the late 1970s and early 1980s in relation to smoking cessation. It posits that behavior change does not happen in one step. Rather, people tend to progress through different stages on their way to successful change. As of 1997, the model consisted of the following six stages: pre-contemplation, contemplation, preparation, action, maintenance and termination. It is arguably the dominant model of behavior change programs (Prochaska and Velicer 1997).

months. Similarly, tweens that had seen the "Malcolm" ad or had heard the "Matthew" ad were more likely (66%) than others (55%) to have switched to energy saving light bulbs ($p<.05$).

Regression analysis of campaign effects: factors associated with positive outcomes

We used multivariate analysis of data from the Custom Survey to test the hypothesis that ad recognition would be positively associated with each of the three outcomes of interest – knowledge, proactive attitudes, and energy-saving behavior – after controlling for other factors (Table 1).

Table 1. Regression results on independent factors associated with three separate outcomes: knowledge, attitude and energy-saving behavior

	Dependent Variables (3 separate regressions)		
	Knowledge	Proactive attitude	Energy-saving behavior
Independent Variables:	Odds Ratio		
How hard to save energy	1.21**	1.05	1.18**
Predilection to act	1.33**	1.88**	1.86**
Female	0.95	1.43**	0.96
Age	1.10**	0.93*	1.05
Rural	0.80*	0.88	0.92
Nonwhite	1.02	1.48**	1.35**
New England	1.04	1.33	1.11
South	0.91	1.18	1.14
West	0.80	1.10	1.16
Income: $35,000-$74,999	0.95	0.96	1.21
Income: >$75,000	0.98	1.04	1.15
# ads recognized: 1	1.17	1.09	1.12
# ads recognized: 2	1.48**	1.28	1.95**
# ads recognized: 3+	1.59**	1.38*	1.96**
Threshold: 1	-0.23	-2.90	2.00
Threshold: 2	1.80	-0.75	3.70
Threshold: 3	-	2.15	-
Number of observations	1,678	1,623	1678
Pseudo R-squared	0.0388	0.1085	0.1113

Notes:

- Reference (omitted) categories: male, urban/suburban, white, Midwest, no ads recognized, and income less than $35,000.
- Significance level: ** means $p<0.05$; * means $p<0.10$.
- All three models are estimated using ordered logit.
- The variable "how hard to save energy" takes values from 1 "very hard" through 4 "not at all hard."
- The variable describing predilection to act takes values from 1 "I don't really think too much about saving energy" through 5 "I do things to save energy often".

- Although "how hard to save energy" and "predilection to act" are categorical variables, we treat them as a propensity and treat them in the regression analysis as continuous variables.
- Those that responded "don't know" to the questions "how hard to save energy" or "how important is saving energy to you" were excluded from the analysis.
- Thresholds represent estimated cut points on the latent variable that represents propensity, for example in case of knowledge equation, to give the correct answers to the knowledge questions. That is, tweens with the omitted group characteristics and with the latent variable with values below the first threshold will be classified as having zero correct answers.

"Other factors" fall into two categories: socio-demographic characteristics of the study population (gender, age, place of residence, race, family income, and region of the country) and pre-existing levels of motivation. Regarding motivation, some tweens might be more interested in saving energy than others, independent of this campaign. Moreover, the theory of selective exposure predicts that such tweens would be more likely to attend to the messages of this campaign. In the current analysis we have included two control variables to serve as a proxy for motivation:

- Predilection to save energy: Measured in terms of position along the stages-of-change continuum. The survey asked: "*What best describes you?* Possible answers (from least to most): "*I don't really think too much about saving energy; I think about saving energy sometimes; I am planning to do something soon to save energy; I do things to save energy once in a while; I do things to save energy often."*
- Self-efficacy: Measured as the perceived difficulty of saving energy. The question on the survey read: *"People do different things at home to save energy. How hard do you think it is to do this on a daily basis?"* Possible answers: *"Very hard, somewhat hard, not very hard, not at all hard, don't know."*

In all three regressions, ad recognition was significantly associated with the outcome – knowledge, proactive attitudes, and energy-saving behavior – after controlling for other factors. In addition, pre-existing motivational factors played a role, as did some socio-demographic traits, though no trait was consistently related to all three outcomes.

Propensity Score Analysis and Sensitivity Analysis

Prior to the propensity score analysis, the difference in mean number of reported energy savings actions between those that recognized one or more ads ("treatment group") and the non-exposed ("control group") was 0.718. After propensity score matching, this difference was reduced to 0.561. That is, the effect of the campaign was to increase the number of energy saving behaviors by half a behavior. This difference of 0.561, though small, is statistically significant at the p=.01 level. Thus the campaign had a measurable effect on behavior, after removing the bias related to selectivity.

Table 2 presents the results of a sensitivity analysis to assess the robustness of the findings to possible deviations from the conditional independence assumption (CIA). The study simulated potential unobserved confounders that would mimic the behavior of some important observed covariates, such as predilection to save energy, self-efficacy, and race. The results show that the finding of the propensity score is very robust to the potential violation of the CIA. Another approach to sensitivity analysis would be to simulate a "killer" confounder – a confounder that would potentially eliminate the observed effect. That is, by simulating a confounder that could wipe out the effect of the ad campaign and by examining the relationship between a confounder

and ad recognition and a confounder and outcome variables, we can determine the plausibility of this unobserved variable. We found that in order to eliminate the effect of ad recognition on energy saving behavior, this unobserved characteristic would have to increase the odds of ad recognition by more than 12.8 times and the odds of performing energy-saving actions by more than 3.5 times. Thus, the existence of a "killer" confounder appears to be unrealistic, which supports the robustness of our estimate.

Table 2. Results of sensitivity analysis of the estimates of the effects of ad recognition to violation of the conditional independence assumption (CIA)

Potential Confounder Comparable in Size of Effect to …	Potential Size of Effects on Outcome: Odds Ratio	Potential Size of Effects on Exposure Odds Ratio	Simulated Effects of Exposure on Outcomes When Potential Confounders are Included. That is, the "Average Treatment Effect on Treated" [ATT] (Standard Error)
How hard to save energy	0.694	0.933	0.497^{***}(0.171)
Predilection to act	2.558	1.455	0.438^{**}(0.171)
Nonwhite	1.372	1.474	0.495^{***}(0.172)
"Killer" Confounder	3.541	12.829	0.083 (0.222)

Notes:

- Significance level: *** means $p<0.01$; ** means $p<0.05$.
- Odds ratio describes the effects of the potential unmeasured confounder on the outcome/exposure if included in the model.
- "Killer" confounder is a confounder that would potentially wipe out the observed effect.
- The variable describing "how hard is it to save energy" was converted to a binary variable with 1 corresponding to "very hard" or "somewhat hard" and zero corresponding to "not very hard" or "not at all hard."
- The variable describing "predilection to act" was converted to a binary variable with 1 corresponding to "I do things to save energy once in a while" or "I do things to save energy often" and zero corresponding to "I don't really think too much about saving energy," "I think about saving energy sometimes," or "I am planning to do something soon."

In short, when one takes into account all the measured factors that determine ad recognition (by creating a statistically equivalent control group to the exposed group), as expected, the effect of the campaign on behavior decreases. However, the fact that we obtain a statistically significant result indicates that the campaign did have a measurable effect on energy-saving behavior. The result for this campaign is an effect size correlation of r=.11. This magnitude of effect, while "small" in terms of all possible interventions, falls in the mid-range for behavior change communication programs, as further explained in the Discussion section.

Discussion

The findings from this evaluation demonstrate that the "Lose your Excuse" campaign did have a measurable and statistically significant effect – albeit small – on energy saving behavior among tweens. This analysis represents one of the first systematic attempts to document the effectiveness of a media campaign on saving energy on behavioral outcomes. A review of the

literature reflects the dearth of evaluation on this topic to date. The "Flex your Power"[5] campaign in California in 2000 reportedly lowered energy use by 14 percent, but the basis of this conclusion is unclear. The Disney Ratatouille CFL campaign in 2007 reported important lessons learned about investing in creative design versus purchasing media time, but did not include an evaluation of effectiveness. The DOE's "Smart Power Echo Boomer" Social Marketing initiative targets teens and young adults using new media, but no evaluation results are available as yet.

Because so little evaluation has been conducted on energy savings campaigns, it is useful to consider how the results of this campaign compare to campaigns on other behavior change topics. By far the greatest number of socially-oriented behavior change campaigns in the U.S. involve public health. Thus, we look to the literature on campaign effects in public health and the experience of the Ad Council to gain some perspective on the results obtained in this evaluation.

Within this literature, few campaigns have targeted tweens 8-12 years old. The majority target adults and/or adolescents (e.g., smoking, HIV prevention, mammograms, etc.). Campaigns intending to benefit children often target the care-takers, rather than the kids themselves (e.g., immunization). Perhaps the most comparable data come from the VERB campaign (on youth physical fitness), the Legacy Foundation's Truth campaign against youth smoking, and the national anti-drug youth campaign sponsored by the Office of National Drug Control Policy (Farrelly et al.2005; Hornik et al. 2005; Huhman et al. 2005). We compare our findings with other campaigns across several dimensions: ghost awareness, reach, and effect size.

"Ghost awareness." This term refers to the phenomenon of respondents' claiming to recognize an ad on the baseline survey before it has ever been broadcast. For TV ads in the baseline survey, ghost awareness ranged from 2% for "April" to 4% for "Malcolm" and a surprising 15% for "Tinker Bell." For other media, ghost awareness was 5% for the "Matthew" radio ad and 4% for the "What's Your Excuse?" billboards. The Ad Council reports an average of 6% ghost awareness of ads at baseline, based on 14 other socially-oriented campaigns that this organization has conducted (Goldman 2009). Thus, ghost awareness in this campaign – with the exception of "Tinker Bell" – was the "norm" reported by the Ad Council in other campaigns.

Campaign reach. "Reach" is the term used by many evaluators of behavior change communication programs to refer to the percent of respondents that recall having been exposed to at least one campaign ad/item (Snyder and Hamilton 2002). In this report we have instead used the term "ad recognition" to avoid any ambiguity, but in this discussion section we treat the two as synonymous. Based on meta-analysis of 48 behavior change campaigns in the United States, Snyder and Hamilton (2002) reported average reach to be 40 percent of their target audience. A second source of comparative data is The Ad Council. Although these data do not relate to campaigns about energy or campaigns targeted to tweens, the average post-campaign recognition of a given TV spot is 14% of the intended audience (Goldman 2009). With this perspective, the reach from this energy efficiency campaign (46%) puts it in the average range for behavior change communication campaigns as a whole. Moreover, the ad recognition for a single ad – the "April" TV ad with 30 percent ad recognition – is markedly higher than the average for Ad Council spots in previous campaigns (14%).

Effect size. It is possible to measure and compare the effectiveness of media campaigns, even when they are on different topics (although it is important to recognize that some behaviors are inherently more difficult to change than others). The approach to doing so involves meta-analysis (Snyder 2007). The "effect size" refers to the magnitude of change in the desired behavior. It has been found, for example, that in U.S. health communication campaigns, the

[5] http://energy.dow.com/energy_plan/efficiency_education.htm, accessed on 1/31/10

average effect size correlation is r=.05. Moreover, Snyder (2007) has found that the effect size of U.S. campaigns differs by the specific behavior that is promoted. For example, seat belt campaigns (r=.15), dental care campaigns (r=.13) and adult alcohol reduction (r=.11) have had the greatest levels of success. Topics with moderate effect sizes include family planning (r=.06), youth smoking prevention (.06), and heart disease prevention, which include diet and physical activity behaviors (r=.05), sexual risk-taking (r=.04), mammography screening (r=.04), adult smoking cessation (r=.04), youth alcohol prevention and cessation (r=.04 to .07), and tobacco prevention campaigns (r=.04). Programs with the least success to date include youth drug and marijuana campaigns (r=.01-.02).

The current analysis did not calculate effect size as the difference of two percentages but rather using a formula (Rosenbaum et al. 1983), based on the t-score produced by STATA in the propensity score matching. The effect size correlation was r=.11, which according to Cohen (1988) should be considered a "small effect." At first blush, one senses a contradiction between the finding of "small effect" (based on Cohen's classification) and "falling in mid-range for behavior change campaigns' (based on Snyder's meta-analysis). In fact, Cohen's assessment relates to interventions of any type, not to behavior change campaigns in particular. To assess the relative effectiveness of a given campaign such as "Lose Your Excuse," it is important to compare it to other interventions in the same category, which is what Snyder (2007) has done. In this light, the "small effect" that Cohen describes is not inconsistent with the fact that this campaign (with its r=.11) falls midrange among other behavior change campaigns in its effectiveness.

REFERENCES

Babalola, S., and D.L. Kincaid. 2009. New Methods for Estimating the Impact of Health Communication Programs. *Communication Methods and Measures*, 3:61-83

Cohen, J. 1988. *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.

Derzon, J.H. and M.W. Lipsey. 2002. A meta-analysis of the effectiveness of mass-communication for changing substance-use knowledge, attitudes and behavior. In W.D. Crano and M. Burgoon (eds), *Mass Media and Drug Prevention: Class and Contemporary Theories and Research.* Lawrence Erlbaum Associates, Mahway, NJ. Pp. 231-258.

Farrelly, M.C., K.C. Davis, M.L. Haviland, P. Messeri and C.G. Healton. 2005. Evidence of a dose-response relationship between "truth" anti-smoking ads and youth smoking prevalence. *American Journal of Public Health* 95:425-431.

Goldman, P. 2009. Ad Council, New York. Personal communication.

Hornik, R. (ed). 2002. *Public Health Communication: Evidence for Behavior Change.* Mahwah, NJ: Lawrence Earlham Associates.

Hornik, R., D. Maklan, D. Cadell, C.H. Barmada, L. Jacobsohn, A. Prado, A. Romantan, R. Orwin, S. Sridharan, E. Zanutto, R. Baskin, A. Chu, C. Morin, K. Taylor, and D. Steele. 2003. Evaluation of the National Youth Anti-Drug Media Campaign: Fifth Semi-annual Report of Findings. Rockville, MD: Westat.

Huhman, M., L.D. Potter, L.F. Wong, S.W. Banspach, J.C. Duke and C.D. Heitzler. 2005. Effects of a mass media campaign to increase physical activity among children: Year 1 results of the VERB campaign, *Pediatrics* 116:277-284.

Prochaska, J.O. and W.F. Velicer. 1997. The transtheoretical model of health behavior change. *American Journal of Health Promotion.* Sep-Oct; 12 (1):38-48.

Rosenbaum, P. R. and D.B. Rubin. 1983. The central role of the propensity score in observational studies for causal effects. *Biometrika*, *70*(1):41–55.

Rosenbaum, P. R. 1987. Sensitivity analysis to certain permutation inferences in matched observational studies. *Biometrika*, *74*(1):13–26.

Snyder, L. and M. Hamilton. 2002. Meta-analysis of U.S. health campaign effects. In R. Hornik (ed), *Public Health Communication: Evidence for Behavior Change.* Mahwah, NJ: Lawrence Earlham Associates.

Snyder, L. 2007. Health communication campaigns and their impact on behavior. *Journal of Nutrition Education and Behavior*. 39(2), suppl, S32-S40.