Measuring the Impact of Mass Media Campaigns: What Do You Get for Your Research Dollars?

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Abstract

Given limited evaluation budgets, utility and other implementation staff often need to make choices among research designs when determining how to measure the impact of mass media campaigns. These choices are important, especially since the story of the impact of a mass media campaign can change depending on the evaluation method selected. Throughout this article, we draw on data collected in our evaluation of a mass media campaign in California to demonstrate the 1) value, 2) drawbacks, and 3) costs associated with various evaluation approaches. Specifically, our findings are drawn from our evaluation of California's Flex Your Power (FYP) Campaign, a comprehensive, statewide campaign that seeks to change purchasing behaviors (i.e., promoting the purchase of CFLs, high efficiency air conditioners, and heating equipment) and raise awareness of energy conservation.

Introduction

For every mass media campaign evaluation there is a need to make choices among research designs. The choices usually depend on the evaluation budgets and the mass media campaign goals. As media campaigns (particularly those that motivate behavior) become more prominent in energy efficiency program portfolios, evaluation and assessment of impacts become more important.

Below we discuss five methods to assess impacts of a mass media campaign:

1. Post-campaign-only data collection with simple statistical analysis to examine "goals" and differences among sub-groups;
2. Pre- and post- campaign data collection and analysis;
3. Longitudinal or tracking survey and analysis;
4. Data collection and analysis using a comparison group of nonparticipants;
5. Post-campaign-only data collection with complex statistical analysis (such as structural equation modeling).

These methods are not only generally well-known within energy efficiency evaluation, but they are also the best methods considering program and evaluation objectives (see following section). Further, while this is not an exhaustive list of all possible methods, it allows us to demonstrate to the reader the key premise of this paper: **The story of the impact of a mass media campaign can change depending on the evaluation method selected.** As such, to answer desired research questions, the strategic selection of a method is crucial to determining the success of the effort.

Throughout this paper, we base our examples on data collected from a California-based mass-media effort: Flex Your Power (FYP; http://www.fypower.org/). The FYP Campaign is part of California Investor Owned Utilities' 2006-2008 Statewide Marketing and Outreach (SWM&O) effort which consists of three

components: 1. Flex Your Power-General; 2. Flex Your Power-Rural; and 3. Flex Your Power-Spanish. This program is tasked with providing "statewide messages on simple things individual consumers can do to reduce energy consumption and their bills," increasing "consumer awareness of and participation in the statewide programs available to them," and "persuad[ing] consumers to make permanent changes to their homes and businesses so that energy savings are not dependent on behavior once the energy efficiency measures are installed."[1] For the 2006-2008 program cycle, the total budget for the SWM&O programs was $61.5 million.

Understanding Program and Evaluation Objectives

Understanding the program and evaluation objectives can help in selecting the best methods for data collection and analysis. To help with this effort, program implementers (and evaluators) need to ask a few key questions prior to selecting the evaluation method (or ideally, as an integral part of the campaign development):

- What is the goal of the campaign?
  - Are the goals known and measurable?
- How complex is the marketplace?
  - Are there campaigns with similar goals being run locally, statewide or nationally?
  - What is the value proposition of the campaign?
- How important is causality?
  - Is it okay just to know that you've achieved the program goals or do you need to prove that the campaign **caused** changes to reach the goal?
- How important is impact?
  - Is it okay just to know that the program had some effect on the goals or are you interested in knowing how big the effect was?
- It there a reason to consider changes over time?
  - Are there delayed effects such as the purchase of an appliance, or is there a need to look for prolonged levels of awareness?
- What level of rigor is needed by the stakeholders to demonstrate success?

Based on particular program objectives, evaluators might dismiss some methods immediately. For example, if the program materials consist of a unique message to a particular audience, a complex methodology might not be necessary. Or, if managers' objectives are to determine how program components work together (for example, an audit and a media effort), surveying non-participants may not be necessary. In this example, using regression analysis on audit participants can show that program variables are related to each other and to program outcomes in predicted ways that support program theory.

Each of the five methods presented in this paper offer different insights, different degrees of confidence around causality and impact, and varying costs. Thus, the five methods must be considered in conjunction with program objectives and the specific questions asked by evaluators. Below, we walk the reader through five methods and the changing story told based on the method selected.

[1] Decision D03-01-038, January 16, 2003

Method 1: Post-Campaign-Only Data Collection with Simple Statistical Analysis

The first method that we discuss is a post-campaign-only data collection effort with the reporting of simple statistical analysis.[2] Often evaluators are selected after the campaign has run; in these cases, unless the program has gathered baseline data, a post- only data collection effort is the only option. Post- only surveys are deployed after a media campaign (or a stage of the campaign) has been completed.

This type of data collection effort allows evaluators to demonstrate whether the goals of the mass media effort were met **if** the goals are known and measurable—for example, one measurable goal could be 80% of the population is aware of the message. Establishing a measurable goal is important: a less definitive goal such as "educate consumers about energy efficiency" is harder to measure since there is no known point of success.

This relatively low cost method can provide insights on the current market. For example, a post-survey can demonstrate differences between owners and renters (or other demographic variables) in the level of goal attainment. However, this method is extremely limited in the ability to make statements about causality which we discuss in the following section.

A post- survey with a basic statistical analysis is one of the lowest-cost, most basic method we discuss in this paper. If used correctly, it can provide value to stakeholders depending on their evaluation needs. In sum, the value of post- surveys includes the following:

1. Determining whether or not program goals were met by measuring indicators and metrics against a **known** goal;
2. Contextualizing results through comparison to earlier studies that include similar programs and/or indicators which might serve as a baseline for your effort;
3. Testing for differences between demographic variables (e.g., renters vs. owners) and providing key insights on the market;
4. Serving as a baseline for future studies.

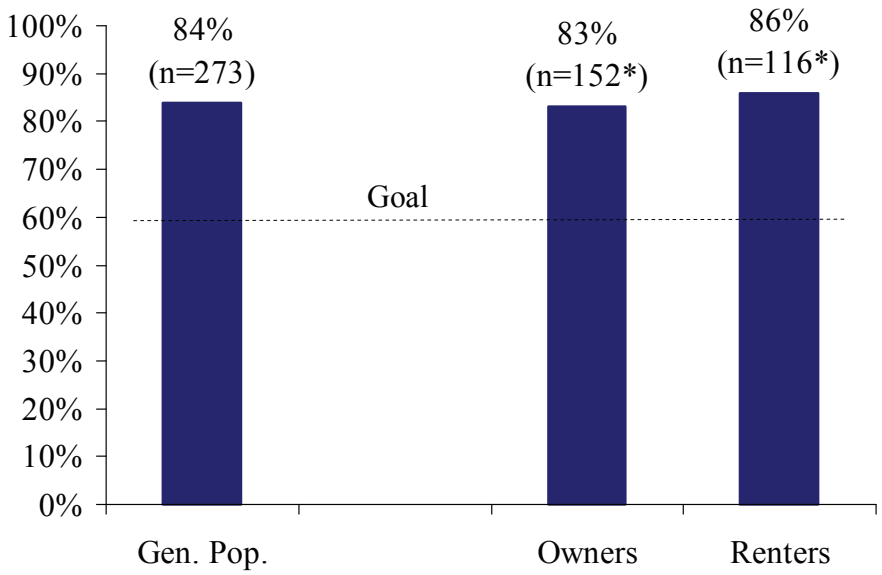
The Story Told by Post- Survey with Simple Statistical Analysis

Using the data gathered from our California-based mass media effort for illustrative purposes, if we were to assume that the goal of the FYP campaign was to have at least 60% of the individuals in the market for lighting purchase a CFL[3], then based on post- data (see **Figure 1**), this goal has been achieved: 84% of the respondents reported purchasing a CFL. As 84% exceeds the program goal of 60%, the post- method allows us to answer "yes" to the question, "Has the program goal been met?"

Additionally, we used simple descriptive statistical analysis to determine whether or not there was a difference between renters and owners. Although **Figure 1** indicates a small difference between these two groups, it is not a significant one at the 0.90 confidence level. Nevertheless, the comparison provides insight on whether this mass media campaign differs by home ownership (e.g., it does not differ). Because program implementers may target specific audiences, this information can be useful.

[2] For ease of reading, from here on we will refer to "post-campaign" as "post-", and "pre-campaign" as "pre".

[3] Note, this was not a stated goal of the program. We use this for illustrative purposes only.



*The number of renters and owners do not sum to the general pop due to "others".

Figure 1. Percent of Those Buying CFLs

A drawback of this method is that while we know that the campaign exceeded its goal of reaching more than 60% of the individuals in the market, it is impossible to conclude that the campaign is responsible for meeting the goal. It is possible that other CFL messages were in the market. It is even possible that a poorly constructed campaign advertisement might obscure the message, thereby actually having none of the intended effect on the market. In other words, while the goal was met, it may not have been due to campaign efforts. If the message is the only influence in the market (such as being the only campaign promoting wearing purple socks), it becomes easier to ascribe influence to the program. However, if the program needs stronger proof of causality or is implemented within a more complex market, methods beyond a post- survey using only simple analysis are needed.

Method 2: Pre- and Post- Data Collection

When the evaluation is planned in advance, a pre- and post- survey effort can be used to measure change over time. In a pre- and post- survey effort, a survey is typically employed once before and once after a program or program element is implemented. Similarly, it might also be used when a program is withdrawn from the market to measure the "hole" left behind. Evaluators use differences between the two surveys to suggest effects that may be attributed to the program.

Since pre- and post- survey efforts include a post- survey, the list of values of this method necessarily includes the list of values associated with a post- only survey (Method 1, above). Consisting of exactly two surveys, the simplest form of the pre- and post- survey method has two basic values. First, the pre- survey provides a baseline to which the post- survey's results can be compared. Second, as these two surveys occur before and after program implementation, changes in indicators can offer support for the causality and impact of the program. Thus, the additional value of pre- and post- survey efforts includes the following:

1. Providing a baseline against which to measure change over time;

2. Providing support for program's causality and impact.

In general, with a pre- and post- survey design, the idea is to look at changes in the target population over time. As such, evaluators usually employ a simple statistical analysis. The pre- and post- survey design with a simple statistical analysis is described further below through the use of our FYP data.

The Story Told by a Pre- and Post- Survey with Simple Statistical Analysis

If we return to the example we used to discuss Method 1, this time examining pre- survey data test results in addition to post- survey results, we see a different story. By testing prior to the launch of the campaign, the program would be able to better align its goals with the starting point of the market. In the example above, the original goal of respondents purchasing a CFL was set at 60%, but through our pre-survey, we see that the baseline at the beginning of the campaign effort is already 75% of the market (Figure 2).

When we look at change over time, we find that compared to post- test data, the 9% increase is significant at the 90% level (see **Figure 2**). As the media campaign was implemented between these two points, it is reasonable to believe that the program's impact is reflected in this increase. Results from this pre- and post- method provide some evidence for the causality and impact of the campaign.

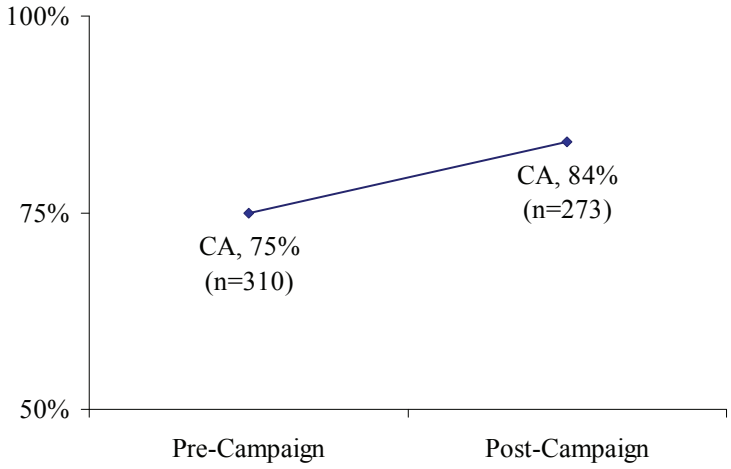


Figure 2. Percent of Those Buying CFLs

One limitation of this method, however, is that it does not account for other efforts or influences in the marketplace. If there is a lot of messaging in the marketplace or there are other efforts also trying to reach a similar goal, the pre- and post- method can not show if the measured change is totally or even partially a result of the media campaign being evaluated. As such, while the method can demonstrate that change exists, additional support for causality may be needed in a complex marketplace.

Method 3: Longitudinal or Tracking Surveys

Notably, because of the nature of mass media, timing really is everything. Evaluators must determine when to implement the survey effort based both on recall and timing of the effect. Recall may not last, or may be confounded by other messages unless data collection occurs shortly after the campaign. On the other hand, the effects that are supposed to follow the implementation of the program may occur on different time

scales (for example, it may take individuals nine months to purchase a new appliance or make a major change as opposed to a few days or weeks to purchase a CFL).

Evaluators usually make use of only one survey before program implementation (pre-) and one survey after (post-). However, longitudinal or tracking studies may be able to deal better with the issues of recall and timing. These studies can include multiple pre- surveys at intervals that establish more constant baselines and/or multiple post- surveys that can show how program effects grow or decay over time. Considering that this method is composed of combinations of pre- and post- data collection, its total value includes that associated with the pre- and post- data collection (Method 2, above). The additional value of the tracking studies method is in:

1. Providing a more stable baseline when two or more pre- surveys are used;
2. Highlighting growth and decay of program effects over time when two or more post- surveys are used;
3. Offering additional support for program causality;
4. Offering additional support for program impact.

The Story Told by a Longitudinal or Tracking Survey

In the following example, we look at the changes in percent of light bulb purchasers who bought CFLs before, immediately after, and three months after the FYP Summer '08 Campaign. Because there are two post- data collection efforts, we can answer the question "Does the program effect change over the long term (i.e., over some length of time)?" **Figure 3** shows that 75% of light bulb purchasers were buying CFLs before the campaign; this establishes a baseline. Following the campaign there was a significant 9% increase (to 84%) in CFL purchasing among light bulb buyers. Comparing the pre- and immediate post- data provides support for the program's causality. In other words, it is likely not a coincidence that the percentage of CFL purchasers increased while the campaign was in the market.

Three months after the campaign ended, 80% of light bulb purchasers were buying CFLs. This second post- survey provides additional information on which to evaluate the campaign. In this case, however, as in many others, the story about the long term impacts of the program can change depending on how "delayed" or "sustained" effects are defined. Let's say that the two kinds of long term effects are defined by comparison to the baseline (delayed) or by comparison to the first post- data collection effort immediately following the campaign (sustained). Because there is no significant difference between the pre- and second post- percentages (75% and 80%), we might conclude that there is no delayed effect of the campaign. However, because there is also no significant difference between the two post- data collection results (84% and 80%), the immediate effect of the campaign might also be further classified as a sustained effect.

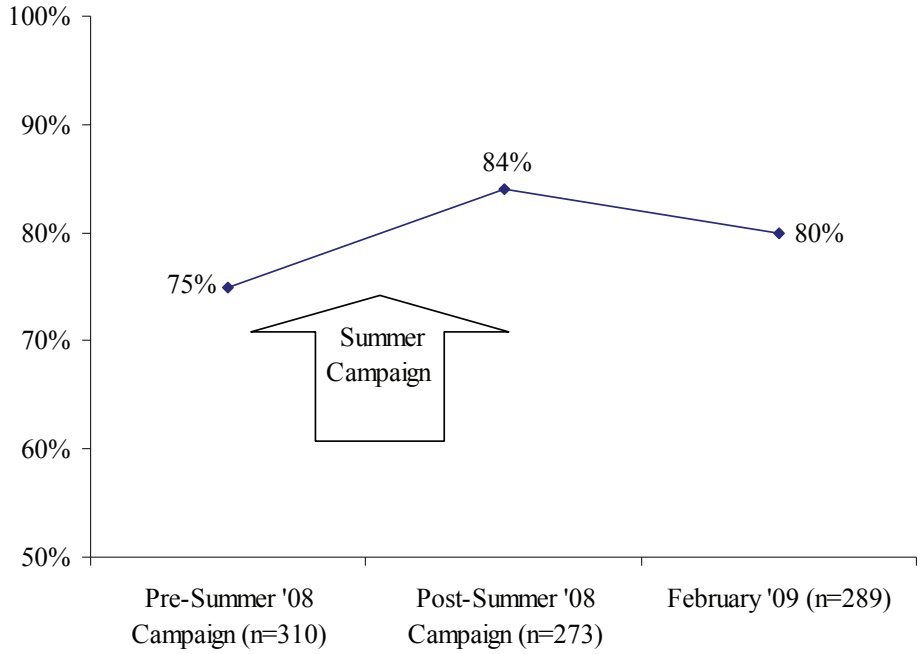


Figure 3. Percent of Those Buying CFLs

Method 4: Pre- and Post- Survey with Comparison Group

While a significant increase between a pre- and post- survey effort suggests an effect of the campaign, it may be important to contextualize that effect or make a stronger argument for the causality of the program. Evaluators must contend with the possibility that the results may have been caused, at least in part, by external events or processes. By using a pre- and post- survey with a comparison group, evaluators gain insight on causality, but by doubling the number of respondents surveyed, the approach also greater cost.

Evaluators assume that the comparison groups are not affected by the program and so they become quasi-control groups. If external events or processes have affected program results, it is likely that they would affect those in the comparison group as well. Thus, by comparing groups, evaluators hope to distinguish between program effects and external effects. Evaluators must choose comparison groups that are as similar to the program group as possible to ensure that differences among the groups may be attributed to the program and not to intrinsic differences between groups.

Pre- and post- survey with comparison group is one of the more advanced methods among the methods presented in this paper. The two main areas of increased value are causality and impact. By using properly chosen comparison groups, evaluators can rule out alternative explanations and make more plausible claims for the likelihood of a program's causality and impact. Thus, the value of pre- and post-survey efforts with comparison groups include the following:

1. Ruling out effects due to external processes and events;
2. Offering greater support for program causality even in cases where there are no changes in the program group (e.g. if program group stays level, but comparison group decreases, the program may be having an effect by preventing a drop off);

3. Offering greater support for program's impact especially when combined with tracking surveys (e.g. the long term or delayed effects of the program can be seen).

We note, however, that additional data is not always necessary depending on what the evaluator wants to measure. For example, if the key indicator is exposure to the messaging, such as the phrase "Keep Cool Seattle," then additional efforts to collect data in a comparison state are not necessary.

The Story Told by a Comparison Group

During the summer of 2008, there were many messages in the marketplace commenting on CFLs, including some that were more nationally based (e.g. Al Gore's "We" campaign; http://wecansolveit.org/). To see if national campaigns or events might have had an effect on respondents' purchase of CFLs, we compared our California results to those from a comparison state. As **Figure 4** shows, while there was a significant 9% increase in CFL purchases in California immediately following the campaign, the comparison state did not show any significant change. Further, there was a significant difference between California and the comparison state (84% vs. 71%) following the campaign when there had been no such difference between California and the comparison state before the campaign. Considering both the increase within California and the increase over the comparison state, it is very likely that the Summer '08 Campaign caused the increase of CFL purchasing among Californians as opposed to any external, national messaging.

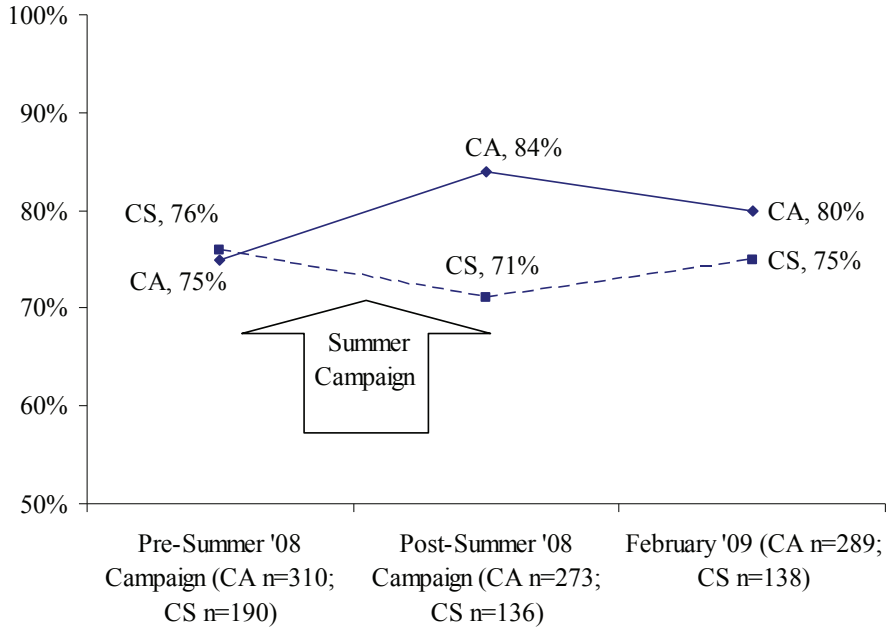


Figure 4. Percent of Those Buying CFLs in CA and in Comparison State (CS)

This pattern of results is strong evidence not only for the causality, but also for the impact of the campaign. The significant 9% increase can be seen as a measure of the impact. Had the comparison group also increased significantly but less sharply, we might still conclude that the Summer '08 Campaign had some impact on purchasing, but we might not conclude that it accounted for much or all of the 9% increase. Meanwhile, neither group changed significantly between the two post- surveys. This indicates that the effect of the campaign may have diminished by the time it ended three months later. Had the comparison state

decreased significantly between the second and third surveys when no such change was seen in California, there would be some evidence for a prolonged campaign effect.

Altogether, the use of a comparison group yields important information beyond what a pre- and post- only survey can provide by qualifying overly simple interpretations of an increase in California alone and by suggesting impacts from the program.

Method 5: Post-Only Data Collection with Complex Statistical Analysis

Collecting more data (to compare over time and against comparison groups) may not always be the answer. It is also possible to achieve a greater level of rigor—and additional support for causality and impact—through complex statistical analysis of post-only data. This is particularly valuable when there are no baseline data or control groups available. It is important to mention, however, that this type of analysis is often based on one specific indicator (such as CFL purchases). Moreover, including complex statistical analysis methods may be much more expensive than the other methods mentioned depending on the type of analysis that is employed.

To support program hypotheses, relationships among selected indicators included in a post- survey can be tested. Indicators can also be chosen based on relationships described in relevant secondary research or uncovered in focus groups or pre-testing – both of which increase cost. Examples of complex statistical analysis techniques include different kinds of regression, ANOVAs, development of program influence indices, and structural equation modeling. These same statistical methods can also examine the validity of program theory and logic models by testing for theorized relationships among program elements.

As this method is similar to the post- only method discussed (Method 1) above, it naturally includes the value inherent in that basic method as well. The additional value of a post- survey employing complex statistical analysis includes:

1. Testing for relationships among current indicators selected through secondary research, thereby laying a possible framework for explaining how the program works;
2. Providing support for causality and impact.

Below we discuss the changing story when a more complex statistical analysis is used. Notably, in the example below, we conducted focus groups and pre-tests to ensure that the survey tool would collect the correct information for this kind of analysis. However, findings culled from secondary research can also be used to inform complex data collection design and statistical analysis when determining which indicators should be included on a post- survey.

The Story Told by a Post-Only Survey with Complex Statistical Analysis

In the case of FYP, we used structural equation modeling to look at the relative influences of the campaign and other competing influences in the market on the intention to purchase CFLs and the actual purchase of CFLs. Structural Equation Modeling (SEM) is a statistical technique that is used to model and test relationships between variables. It is important to note that although we use SEM to test causal relationships, this does not mean that we have demonstrated causality. The SEM approach begins with constructing a hypothesized model involving causal relationships and then testing the model with data. The model was developed based on current theory and research on attitudes and behavior in the area of "green" behavior, or behavior that involves an altruistic component.[4] SEM allows the researcher to tease apart

[4] Bamberg & Schmidt, 2003; Barr, 2007; Black, Stern & Elworth, 1985; Corraliza & Berenguer, 2000; Davies, Foxall, & Pallister, 2002; DeGroot & Steg, 2008; Diekmann & Preisendorfer, 2003; Dietz, Dan, & Shwom 2007; Dietz, Fitzgerald, &

multiple factors that are related to one another and that influence a behavior. **Figure 5** shows the role that the FYP campaign plays on purchase intention and behavior amidst other influences on the same measures. Indicators are connected to the variables they predict by arrows that highlight direct or indirect paths.[5] We found that *FYP Messages* mainly has an indirect effect on *CFL Purchase Behavior*, through *Awareness of Consequences*, and then through the three variables that *Awareness of Consequences* affects, and so on. As we move through any one path of indicators, the indirect effect of one variable is the product of the p-values[6] along that path. The total effect of FYP is the sum of the products from all possible paths shown below.

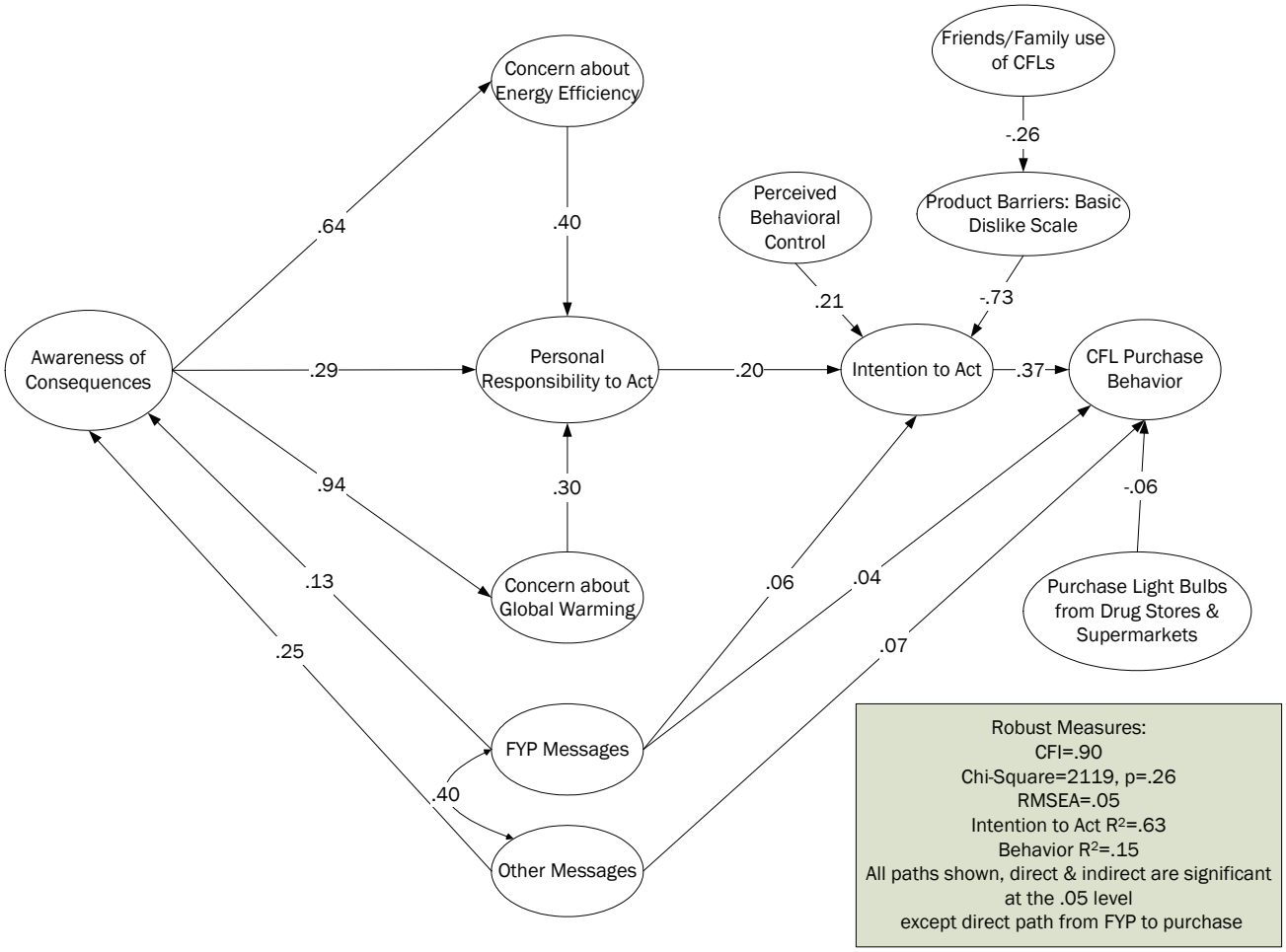


Figure 5. SEM Model Predicting Intention to Act and CFL Purchase Behavior

In short, through SEM analysis, we can measure the relationship between FYP messages and intentions and behavior, as well as understand how the program achieves these results. Based on our analysis, we found that:

Shwom 2005; Fishbein and Ajzen 1975; Kaiser, Ranney, Hartig, & Bowler, 1999; Lavidge & Steiner 1961; Lee & Holden, 1999; Norlund & Garvill, 2002; Oom do Valle, Reis, & Menezes, 2005; Schwartz, 2007; Soonthonsmai, 2001; Stern, Dietz & Kalof, 1993; Stern, Dietz, & Guagnano, 1995; Tarrant & Cordell, 1997; Thogersen, 2002; Wall, Devine-Wright, & Mill, 2007; Weigel & Weigel, 1978.

[5] Direct paths have no interceding variables between any two indicators, while indirect paths might consist of several interceding indicators between any two indicators.

[6] The p-value here is the path model coefficient indicating the strength of the relationship between variables. p-values range from -1.0 to 1.0. The closer to either end of the range, the stronger the relationship.

- FYP messaging has a small, but statistically significant, total effect on *CFL Purchase Behavior* (p=.07) and *Intention to Purchase CFLs* (total p=.08). Its effect on *Intention* is direct. Its influence on *CFL Purchase Behavior* is indirect[7], and operates through awareness and attitudes (i.e., *Concern for Global Warming*, *Personal Responsibility to Take Action*, and *Concern for Energy Efficiency*).

- FYP's greatest effect is on awareness and attitudes, rather than intention or behavior.

- In addition, to help with future campaign efforts, we found that the level of general dislike of CFLs is, by far, the strongest predictor of *Intention to Purchase CFLs* (total p=-0.73). This indicates that focusing the campaign on the product itself and consumer perception of the product is an important way to influence intention and behavior. In contrast, attitudes are low on the list for influencing intention and behavior.

The SEM analysis demonstrates what our last method, post- survey with complex statistical analysis, can achieve. This effort, however, can be costly, and designing a survey instrument that will measure the intended effects can be time-intensive.

Summary

Understanding desired research questions is critical to selecting the most appropriate method(s) for a particular evaluation effort. We have demonstrated that one can obtain useful information from different types of methods. We have also shown that when additional information is obtained through more surveys or use of more complex statistical analysis, the resulting story changes and can answer different questions. Using CFL purchasing behavior as our example and the array of methodologies presented here, our five evaluation findings were: 1) "the program met its goal;" 2) "there was a 9% increase that appears to be due to the program;" 3) "the program does not seem to have a prolonged effect;" 4) "there was a 9% increase that appears to be due to the program (known with a bit more certainty);" and 5) "there is a small, but stable and significant impact of the media campaign."

The value of the different methods were illustrated by examining actual data collected through a 2008 quantitative survey effort to evaluate California's FYP mass media campaign. A summary of the value of each method is shown in **Table 1** below, along with an indicator of the relative costs of these efforts[8].

[7] Although there appears to be a direct effect of FYP messages on purchase behavior, it is actually an insignificant path/effect. The path was left in the model because it is part of a total program effect that is significant.

[8] Note that the exact costs will depend on the degree of precision desired of the results, size of the target population, as well as the incidence and length of the survey effort.

Table 1. Summary of Methods

Method	Benefits/Value	Indicator of Cost
1. Post- survey with simple descriptive statistics	o Determining whether or not program goals were met by measuring indicators and metrics against a known goal o Contextualizing results through comparison to earlier studies that include similar programs and/or indicators. (That is, where another study has already set a baseline for your effort.) o Testing for differences between demographic variables (e.g., renters vs. owners) and providing key insights on the market o Serving as a baseline for future studies	$
2. Pre- and post- messaging survey	o Providing a baseline against which to measure change over time o Providing support for program's causality and impact	$$
3. Longitudinal or tracking survey	o Providing a more stable baseline when two or more pre- surveys are used o Highlighting growth and decay of program effects over time when two or more post- surveys are used o Offering support for program's causality and impact	$$$-$$$$ (Depending on number of time periods)
4. Pre- and post-survey with a comparison group	o Ruling out effects due to external processes and events o Offering greater support for program's causality o Offering support for program's impact, even in cases where there are no changes in the program group (i.e. "mitigation of drop off") o Offering support for program's impact, especially when combined with tracking surveys (i.e. delayed or long term impacts)	$$$$
5. Post- survey with SEM or other complex statistical analysis	o Testing for relationships among current indicators selected through secondary research, thereby laying a possible framework for explaining how the program works o Providing support for causality and impact	$$$

It is important to recognize that the story of the impact of a mass media campaign can change depending on the evaluation method selected and to understand that the strategic selection of a method is crucial to determining the ability to answer stakeholder questions.

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