

# Online Experiment Findings: Message Effects on Energy Efficiency Choices among Hispanic and Non-Hispanic Homeowners in California

February 2017

*Prepared for*  
California Energy Commission, Grant #EPC-14-037



This report was prepared by the Center for Sustainable Energy. It is a component of Grant #EPC-14-037, funded by the California Energy Commission, to explore the sociocultural factors influencing the adoption of home energy efficiency retrofits in California. Match funding was provided by Energy Upgrade California®.

Cite this reference as Center for Sustainable Energy, 2017. "Online Experiment Findings: Message Effects on Energy Efficiency Choices among Hispanic and Non-Hispanic Homeowners in California."

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# I. Executive Summary

This report presents results of online experiments conducted in fall 2016 to understand how various messages affect the likelihood of Hispanic and non-Hispanic homeowners to take action on home energy efficiency upgrades. The experiments are part of a larger research project, EPC-14-037, funded by the California Energy Commission with match funding provided by Energy Upgrade California. The experiments were developed based on previous research conducted for the project, including a literature review, market characterization, focus groups, semi-structured interviews and survey; the results of these research activities are published at [www.energycenter.org/sociocultural](http://www.energycenter.org/sociocultural).

We conducted four rounds of online experiments; 800 California homeowners participated in each round, with an even split between self-identified Hispanics and non-Hispanics. Experiments 1-3 (collectively referred to as “Study A”) tested the effects of the following message themes on participants’ likelihood to choose to learn more about installing attic insulation.

- Comfort benefits vs. cost savings
- Family emphasis vs. untargeted
- English only vs. bilingual (English and Spanish) presentation

In experiments 1 and 2, we found that Hispanic participants were overall less likely to opt to learn more about attic insulation than non-Hispanic participants. Hispanics were more responsive to the messages emphasizing cost savings in experiment 3 than the comfort messages used in experiment 2; however there was no significant difference in Hispanic responsiveness to these themes within experiment 1.

Across all experiments, we found that male participants were significantly more likely to make the choice than females; this may be related to the fact that females were consistently less likely to report that they make major household decisions by themselves.

The family emphasis had an interesting effect on Hispanic participants in experiment 2: when paired with messaging around comfort benefits, it resulted in fewer participants making the choice as compared with comfort messaging and no family emphasis.

The language of the messages presented had no significant effect on participant choices among the Hispanic or non-Hispanic groups. However when we focused on participants with lower levels of acculturation, we found that bilingual messaging increased the odds of choosing to learn more about attic insulation.

Experiment 4 (“Study B”) tested the effects of the following themes on participants’ likelihood to choose to see a list of contractors that can help with home energy efficiency upgrades.

- Utility representative messenger vs. local homeowner messenger
- Contractor license status vs. untargeted

The results showed that Hispanic participants were less likely than non-Hispanic participants to respond to the utility messenger, and this difference grew when emphasis on license status was added to the message. However analysis of additional demographic variables revealed that the partial effect of Hispanic ethnicity was no longer statistically significant, and in fact the variables most salient in predicting a positive response were education, gender and presence of children in the home.

Experiment 4 also asked about the sources used to find contractors, attributes used to evaluate contractors and energy information sources and brands. The most common methods of finding a contractor were referrals from family or friends or online reviews/ratings. Non-Hispanic participants were more likely to post on social media or respond to direct marketing than Hispanic participants.

The most important attributes used to evaluate contractors were license status and depth of knowledge and experience. The least important attributes were the ability to conduct business in preferred language and a fast time estimated to complete the project.

Among six brands presented, ENERGY STAR® and Click It or Ticket had the highest brand awareness. Energy Save It (a fake campaign presented as a red herring) and Energy Upgrade California had the lowest brand awareness.

The most common sources where participants get information on energy efficiency were their electric or gas utility and friends, family or neighbor. The least frequently reported sources were school or university, local non-profit or community-based organization and workplace. Those who reported getting energy efficiency information from the state, electric or gas utility, Energy Upgrade California or the workplace were more likely to make the choice to view a list of contractors.

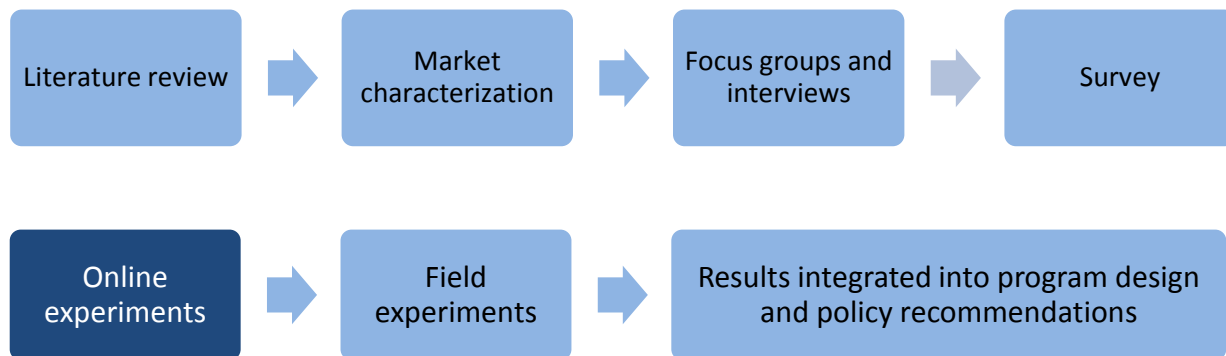
The results of these online experiments will be used to inform field experiments that will ultimately increase the understanding of the roles sociocultural factors play in the adoption of residential energy efficiency measures and inform the design of investor-owned utility programs.

## II. Introduction

Estimates of cost effectiveness primarily drive the current policy framework used to assess the potential for and likely adoption of residential energy efficiency measures. While an important component of the equation, cost effectiveness calculations alone fail to accurately predict adoption and market potential, as they do not capture the multitude of factors influencing the decision-making process of individual market actors. In recognition of this limitation, the California Energy Commission funded a series of projects designed to explore how sociocultural factors influence adoption of home energy efficiency measures. This report summarizes the findings of online experiments conducted in September-November 2016 for one of those projects, EPC-14-037, which focuses on Hispanic owners of single-family homes in California. Match funding for this project was provided by Energy Upgrade California®. The project team is led by the Center for Sustainable Energy (CSE) and includes Research Into Action, Ghoulem Research, Edward Vine and Dena Gromet.

Earlier research conducted for the project – including a literature review, market characterization, focus groups with homeowners, semi-structured interviews with contractors and a survey of homeowners – informed these online experiments, as shown in Figure 1. Findings for each of these research activities are published at [www.energycenter.org/sociocultural](http://www.energycenter.org/sociocultural). Activities subsequent to this survey include field experiments and a final report.

**Figure 1. Research Phases of EPC-14-037**



We conducted four rounds of online experiments to explore the following research questions.

- How do different *motivations* for energy efficiency upgrades resonate with Hispanic homeowners?
- How do different *languages* affect Hispanic homeowners' interest in home energy efficiency projects?
- How do different *messengers* affect Hispanic homeowners' interest in home energy efficiency projects?
- What attributes do homeowners prioritize when choosing a contractor?
- What sources do homeowners use to get information on energy efficiency?

The first two questions are addressed in experiments 1-3, collectively referred to in this analysis as “Study A”. The last three questions are addressed in experiment 4, referred to as “Study B”.

# III. Study A: Motivations and Language

## Background

Homeowners can choose between many different types of projects (e.g., HVAC upgrades, water heater upgrades, window upgrades, insulation, air sealing, etc.) to improve energy efficiency in their homes. Results from our survey of 697 homeowners in San Diego and Fresno counties demonstrated that motivations to pursue these options differ by type of upgrade. For example, the primary motivations for homeowners to replace their central air conditioning were to improve home comfort and replace a unit at the end of its lifespan, whereas the main drivers for installing new windows were to save energy and money (CSE et al., 2017).

Messaging is most effective if it can speak to a specific need; therefore we chose to focus our message testing on one type of energy efficiency upgrade: attic insulation. Attic insulation<sup>1</sup> is often a foundation of a whole-house energy efficiency retrofit. Given that the California Energy Commission's default assumptions for attic insulation in existing homes range from R-13 to R-20 (California Energy Commission, 2013) and California utility programs typically recommend R-38 or higher depending on the climate zone, there are likely considerable opportunities *today* to install attic insulation in homes. This difference between recommended and actual levels of insulation, combined with the relative ease of the upgrade, presents a fertile base for experimental testing measuring interest in this upgrade. In contrast, HVAC and water heater upgrades are usually timed to coincide with the end of the existing unit's lifespan and it would often be cost-prohibitive to replace existing units that are only a few years old. For these technologies it would be more difficult to measure an effect on what could be a hypothetical decision about an upgrade that may be a decade or more in the future for any given home; therefore, mechanical systems were not a focus of our experiments.

Often the first step in engaging with future home energy efficiency upgrade participants is through advertising and face-to-face sales or outreach efforts. How can we more effectively motivate homeowners to pursue upgrades through these efforts? Appealing messages are considered a key aspect in influencing homeowner's attitudes, intentions and behavior in pursuing energy efficiency (Gromet et al., 2013). While studying effective messages is not new in the energy efficiency field, it is unclear how they resonate with different ethnic population segments, such as Hispanic and non-Hispanic homeowners. These ethnic/cultural groups form the core segments of our message testing. Guided by our previous survey, focus groups and interview efforts we identified three message themes that could have an impact on influencing Hispanic and non-Hispanic homeowners to engage in home energy efficiency projects. These are highlighted in the following.

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<sup>1</sup> Attic insulation projects, if performed according to building science best practices, should also include air sealing to align the thermal and pressure boundaries of the home (BPI, 2012). However, to avoid the need to explain the concept of air sealing within the online experiments, we chose to keep the messaging simple and refer only to attic insulation.



## Comfort vs. Savings Motivations

Our survey results indicated three main motivations for installing attic insulation: saving energy (cited as the primary motivation by 32% of respondents who had installed or considered installing attic insulation in the last five years), saving money on utility bills (cited by 28%), and making the home more comfortable (cited by 27%; CSE et al., 2017). There were no statistically significant differences between attic insulation motivations reported among Hispanic and non-Hispanic respondents. The overall findings however are in line with many previous studies which often find that saving money, saving energy and improving comfort are important drivers to pursue energy efficiency upgrades (Langheim et al., 2014; McMakin et al., 2014; U.S. DOE, 2013). Savings and comfort messages can carry different emotional appeals to homeowners. The notion of what comfort represents is wider compared to the money saving benefit. Comfort can be associated with physical states such as room temperature; it may also carry more emotional associations – such as a cozy and safe environment. In addition, the concept of comfort can have different connotations across cultures. For these experiments, we chose to focus on the motivational drivers of comfort and saving money<sup>2</sup> in messaging and explore whether differences in appeal exist between Hispanic and non-Hispanic participants.

## Family Emphasis

A number of specific values have been identified as being core to Hispanic culture such as familism, referring to “a cultural value that involves individuals’ strong identification with and attachment to their nuclear and extended families, and strong feelings of loyalty, reciprocity, and solidarity among members of the same family” (Villarreal et al., 2005). Our previous literature review identified that Hispanic Americans are often motivated to conduct activities due to family concerns (Research Into Action et al., 2016). The family is also more physically present in Hispanic households. Our survey revealed that Hispanic respondents were nearly four times more likely to have three or more generations residing in their homes compared to non-Hispanics. The proximity and strong association with family values could also mean that family needs and concerns play a larger factor in home improvement decisions. As such, we chose to test whether an emphasis on family in the messaging impacts Hispanics energy efficiency upgrade actions. We expected to find that Hispanics have a higher propensity than non-Hispanics for making energy efficiency upgrade decisions when messages stress the importance of the decision for the family.

## Bilingual Messaging

During focus groups conducted for this project, we found that Hispanic homeowners voiced a desire for messaging in both English – often the household decision maker’s preferred language for conducting business – and Spanish, to connect with older relatives or first-generation Hispanic Americans who may not be as proficient in English (Research Into Action and CSE, 2016). Furthermore, our interviews with

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<sup>2</sup> We were limited in how many motivations we could test, thus we did not explicitly test “saving energy”. This can be a proxy for other motivations such as saving money, helping the environment and improving comfort.

contractors revealed that they believe speaking some Spanish can help establish trust with Hispanic homeowners – even if the homeowners speak fluent English (Moezzi, 2016). On the other hand, it is not clear whether such an emphasis on addressing a specific cultural group might lessen the appeal among individuals (non-Hispanics) who do not associate themselves with that group. Indeed, one contractor we interviewed reported a negative reaction to Spanish language messages among non-Hispanic clients. We expected to see that including Spanish in messaging frames would increase interest among Hispanics to make energy efficiency upgrades.

## Experimental Design and Methods

### Recruitment and Administration

Survey Sampling International (SSI) recruited 800 California owners of single-family homes, including 400 Hispanics and 400 non-Hispanics, to participate in each experiment in exchange for monetary compensation. SSI research panels meet the Code of Standards of the Council of the American Survey Research Organizations. Experiments 1-3 were conducted on SSI's online platform between September 22 and November 21, 2016 and contained no repeat participants.

### Procedures

At the beginning of the study, participants completed a set of demographics questions to validate participants study characteristics. These questions validated whether respondents resided in California, owned a single-family home, were above the age of 18 and their ethnicity to achieve a balanced sample of Hispanic and non-Hispanic participants.

Then, participants completed two attention check questions adapted from Phillips (2013). Participants that failed to answer both questions correctly could be respondents that provide poor data overall and should be excluded from the study. However, in all three experiments, nobody failed multiple attention checks and therefore no participants were excluded.

Participants were then presented with a short technical description of attic insulation: “Good attic insulation keeps heat inside during the colder months, and prevents heat from penetrating your home during the warmer months.” Within the same view, the participants were presented with one of the messages designed for the experiment.

The experiments followed a factorial design containing four treatments including two main effects in a cross-over design. The treatments (messages) were randomly assigned to the participants. Each message was viewed by 100 Hispanic and 100 non-Hispanic participants. Across the three experiments we investigated three different main effects. First, we were interested in how participants respond to the motivation frames “save money” and “improve comfort” (experiment 1). Second, we tested the effect of including a family emphasis compared to an untargeted focus (experiments 1, 2, 3). Third, we tested whether a bilingual presentation (English and Spanish), as opposed to an English-only message influences participant choice (experiment 2 and 3). The construction of the experiment messages, including main effects and content of messages is shown in Tables 1 and 2.

**Table 1. Content of the Four Messages and Main Effects Tested in Experiment 1**

Condition	Message
Save money, untargeted	Enjoy having more money in your bank account. Get attic insulation! Adding attic insulation can save you money on your energy bill.
Comfort, untargeted	Enjoy more comfortable indoor temperatures year-round. Get attic insulation! Adding attic insulation can help keep your home more comfortable all year round.
Save money, Family emphasis	Benefit the whole family! Enjoy having more money in your bank account. Get attic insulation! Adding attic insulation can save your family money on your energy bill.
Comfort, Family emphasis	Benefit the whole family! Enjoy more comfortable indoor temperatures year-round. Get attic insulation! Adding attic insulation can help keep your family more comfortable all year round.

In experiments 2 and 3 we continued to test the influence of family mentioning as a main effect. In these experiments we strengthened the emphasis on family by including more instances of the word in order to tease out its impact. In experiments 2 and 3 we discontinued testing motivation as a main effect. Instead, we chose to embed all treatments in experiment 2 as comfort messages and all treatments in experiment 3 as saving money messages (Table 2). As a second main effect, experiments 2 and 3 tested whether bilingual presentations of the message influenced choice. Thus, two of the four treatments included English-only messages while the other two included Spanish translations side-by-side with the English messages.

**Table 2. Content of the Four Messages and Main Effects Tested in Experiments 2 and 3**

Condition	Experiment 2 (“Improve Comfort”) Message	Experiment 3 (“Save Money”) Message
Untargeted, English only	Be prepared to get comfortable. Add attic insulation to your home! Soon you’ll be cozier in winter, cooler in summer. Adding attic insulation can help you stay comfy all year round.	Be prepared for more cash in your pocket. Add attic insulation to your home! Watch your energy bills go down and your piggy bank fill up. Adding attic insulation can give you more money to spend.
Family emphasis, English only	Make your family more comfortable. Add attic insulation to your home! Soon your family will be cozier in winter, cooler in summer. Adding attic insulation can help your family stay comfy all year round.	Be prepared for more cash in your family’s pocket. Add attic insulation to your home! Watch your family’s energy bills go down and your piggy bank fill up. Adding attic insulation can give your

		family more money to spend.
Untargeted, English and Spanish	[English version same as above]  Prepárate para estar más cómodo. ¡Añade aislamiento en el ático de tu hogar! Pronto estarás más acogedor en el invierno y más fresco en el verano. Aislamiento en el ático puede ayudar a mantenerte más cómodo todo el año.	[English version same as above]  Pon más dinero en tus bolsillos. ¡Añade aislamiento en el ático de tu hogar! Mira mientras tus costos de energía bajan y tu alcancía se llena. Añadir aislamiento en el ático puede darte más dinero para gastar.
Family emphasis, English and Spanish	[English version same as above]  Haz más cómoda a tu familia. ¡Añade aislamiento en el ático de tu hogar! Pronto tu familia estará más acogedora en el invierno y más fresca en el verano. Añadir aislamiento en el ático puede ayudar a tu familia a mantenerse cómoda durante todo el año.	[English version same as above]  Pon más dinero en los bolsillos de tu familia. ¡Añade aislamiento en el ático de tu hogar! Mira como los costos de energía de tu familia bajan mientras su alcancía se llena. Añadir aislamiento en el ático le puede dar a tu familia más dinero para gastar.

## Valuation

After reading the message in experiment 1, participants indicated yes or no to the following prompt.

*Right now, you can find out about options to install attic insulation in your home. All you have to do is click “Yes” below. Do you want to learn more about installing attic insulation in your home?*

In experiment 2 and 3 we changed the question to the following.

*Right now, you can find an energy specialist to talk about installing attic insulation in your home. All you have to do is click “Yes” below. Do you want to learn more about installing attic insulation from an energy specialist?*

By making the question more specific towards taking action in the later experiments, we expected to see lower incidence rates of participants choosing to take action compared to experiment 1. We refer to participants who selected “yes” to these questions as “making the choice” or “taking action” throughout this analysis.

After seeing the experimental treatment messages and valuation question, participants answered a series of questions about existing and planned home energy upgrades, family values and decision making in the home. They then provided information on house characteristics and additional demographic information (gender, education level, income level, language (Spanish) fluency).

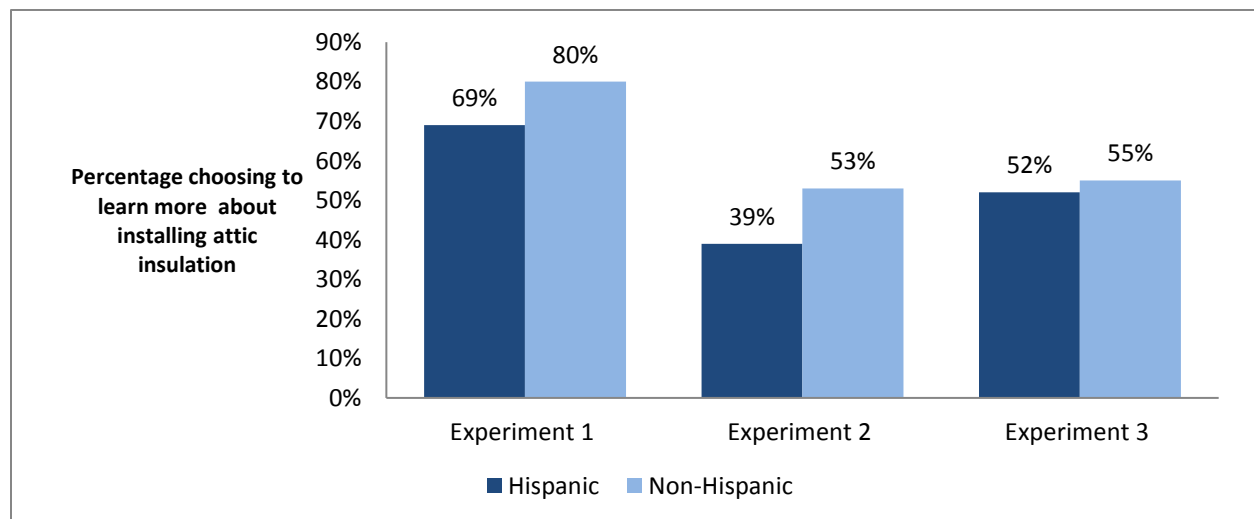
## Results

Because installing attic insulation is only relevant to homes with attics, we exclude homes without attics from this analysis. The sample size used for the analysis is therefore N=687 for experiment 1, N=633 for experiment 2 and N=627 for experiment 3. The number of Hispanics and non-Hispanics remained evenly distributed after the sample adjustment.

Overall, the percentage of participants who made the choice varied considerably between the experiments. Experiment 1 yielded the highest choice incidence (75% compared to 46% in experiment 2 and 53% in experiment 3). This difference is not surprising. The choice question of experiment 1 probed participants about interest in learning about attic insulation, which does not present a call for action to actually engage with an energy specialist. In contrast, experiment 2 and 3 contained a question that presented a higher threshold for participants to make the choice because it involved a decision to talk to an energy specialist to learn more.

Most of the demographic predictors showed a consistent trend across the three experiments. (See Table 3 for odds ratios of all demographic predictors on choice.) Interestingly, we found that Hispanics were notably less likely to make the choice compared to non-Hispanics in experiments 1 and 2. However, in experiment 3 we did not see a statistically significant difference (Figure 2). We found the largest difference between the groups (14%) in experiment 2. While non-Hispanics made the choice to the same extent in experiment 2 and 3 (53% and 55%, respectively), Hispanics seemed to have been more enticed by the messages in experiment 3 than 2. As all messages in experiment 3 used saving money as a benefit (as opposed to improved comfort in experiment 2), the results suggest that Hispanics may respond better to messages about saving money rather than improving comfort as an underlying theme.

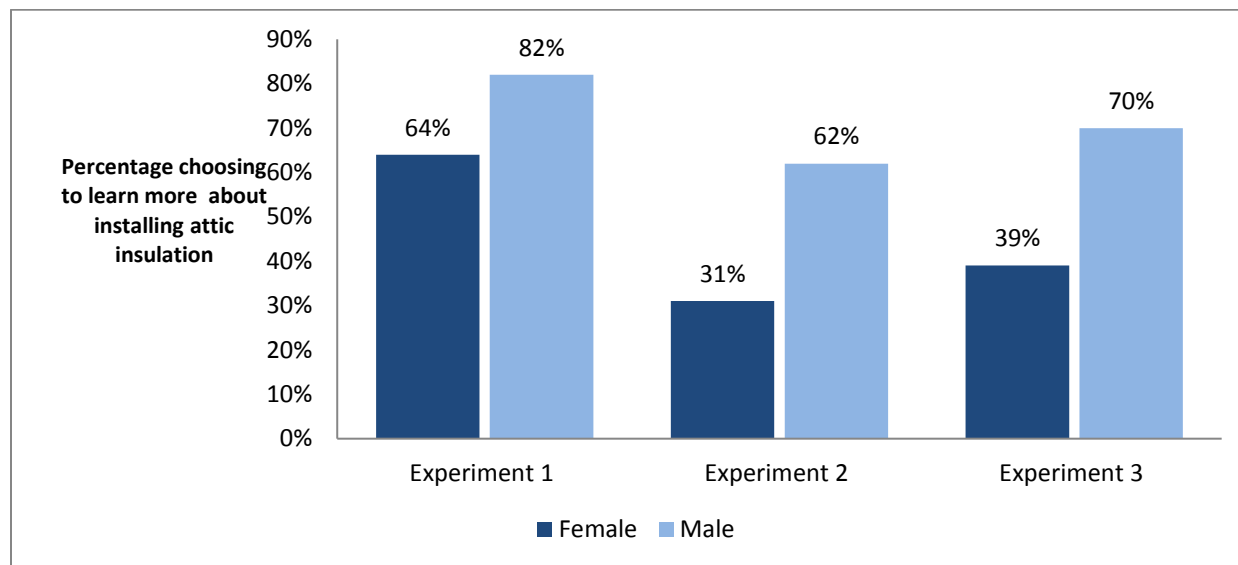
**Figure 2. Choice to Learn about Attic Insulation by Experiment and Ethnic Group**



Note: Experiment 1: ( $\chi^2(1, N=687) = 11.6554, p=0.001$ ), Experiment 2: ( $\chi^2(1, N=633) = 11.7695, p=0.001$ ), Experiment 3: ( $\chi^2(1, N=627) = 0.7323, p=0.392$ )

Across all experiments, women made the choice less often than men. The difference is strongest in the experiments that offer the more action-oriented choice question of talking to an energy specialist (experiments 2 and 3), rather than simply learning more about the topic (experiment 1).

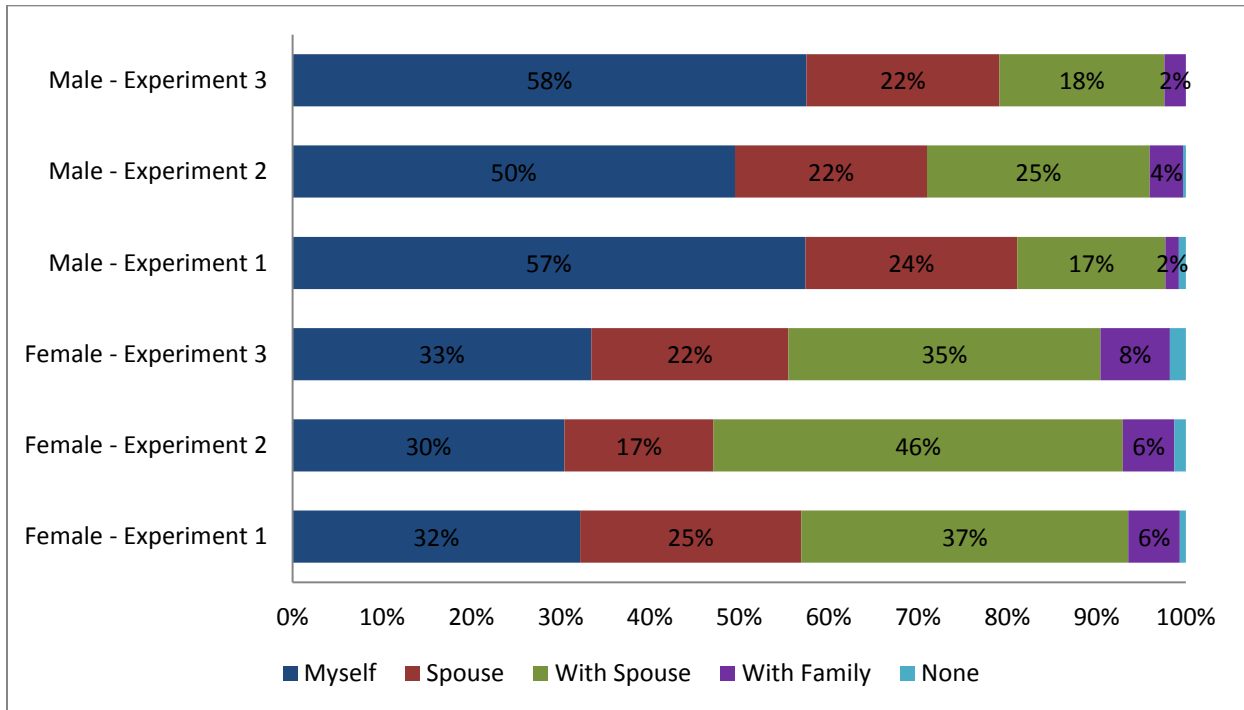
**Figure 3. Choice to Learn about Attic Insulation by Gender**



Note: Experiment 1: ( $\chi^2(1, N=687) = 28.8083, p=0.000$ ), Experiment 2: ( $\chi^2(1, N=633) = 60.7854, p=0.000$ ), Experiment 3: ( $\chi^2(1, N=627) = 57.9812, p=0.000$ )

At first glance, it may look like there could be missed opportunities for energy efficiency upgrades if messaging does not resonate with many female homeowners. However, it is also important to understand how this could relate to decision-making dynamics in the home. After the treatment messages, we asked participants who in the household is primarily responsible for decisions about buying expensive items, managing finances and making home improvements. For the analysis, we averaged scores across these three questions. Figure 4 shows that the majority of men reported to make these decisions by themselves, while women were more likely to make the decisions together with the spouse. Thus, the low incidences of women to action-oriented messaging could in some part be explained by their higher tendency to consult with their spouse on major household decisions. Additional research is needed to test to what extent households' home energy upgrade rates differ over time depending on which gender receives the messaging.

**Figure 4. Answers to “Who in your household is primarily responsible for [various major household decisions]?” by Experiment and Gender**



Note: Responses were averaged across three questions. Difference male/female. Experiment 1: ( $\chi^2(4, N=687) = 58.8483, p=0.000$ ), Experiment 2: ( $\chi^2(4, N=633) = 39.1926, p=0.000$ ), Experiment 3: ( $\chi^2(4, N=627) = 49.5171, p=0.000$ )

Other statistically significant demographic differences include the fact that younger participants were more likely to choose to learn more about attic insulation (experiment 1:  $r(687)=0.39, p<0.01$ , experiment 2:  $r(633)= 0.38, p<0.01$ , experiment 3:  $r(627)=0.30, p<0.01$ ). Participants with more children in the household were also more likely to make the choice (experiment 1:  $r(687)=0.32, p<0.01$ , experiment 2:  $r(633)= 0.32, p<0.01$ , experiment 3:  $r(627)= 0.21, p<0.01$ ). There was no consistent significant relationship between income and making the choice across the experiments.

**Table 3. Logistic Regression Analysis of Demographic Variables as Predictors of Participants Making Choice to Learn about Installing Attic Insulation**

	<b>Experiment 1</b>	<b>Experiment 2</b>	<b>Experiment 3</b>
<b>Predictor</b>	<b>Odds Ratio</b>	<b>Odds Ratio</b>	<b>Odds Ratio</b>
Ethnicity	0.591*	0.557**	1.009
Hispanic	(0.14)	(0.12)	(0.221)
Income	0.854*	0.949	1.019
	(0.0621)	(0.0632)	(0.0646)
Education	1.393***	1.211**	1.235**
	(0.0993)	(0.0773)	(0.0801)
Age (as in year born)	1.051***	1.051***	1.060***
	(0.0117)	(0.0103)	(0.0105)
Gender	0.456***	0.362***	0.299***
Female	(0.103)	(0.0736)	(0.0615)
Retirement	1.035	1.856	1.117
Non-retired	(0.35)	(0.674)	(0.412)
Generation	1.178	0.715*	0.705*
	(0.228)	(0.119)	(0.119)
Children	1.714***	1.337**	1.388***
	(0.225)	(0.133)	(0.132)
Climate zone	1.414	0.741	0.608*
Inland	(0.34)	(0.171)	(0.136)
Years lived in house	1.015	0.999	1.011
	(0.0123)	(0.0115)	(0.0121)
Future years in house	0.997	0.995	0.998
	(0.00731)	(0.0069)	(0.00379)
Air conditioning in house	1.860*	1.519	1.296
A/C in home	(0.487)	(0.373)	(0.331)
N	651	595	576

Odds ratios; Standard errors in parentheses

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

Note: Odds ratios above 1 mean that the predictor has a positive impact on choice. Odds ratios between 0 and 1 mean that the predictor has a negative impact on choice. In the case of dummy variables (e.g., gender) the odds ratios need to be interpreted in comparison to each other. For example, females were less likely to make the choice than males.



## Main effects

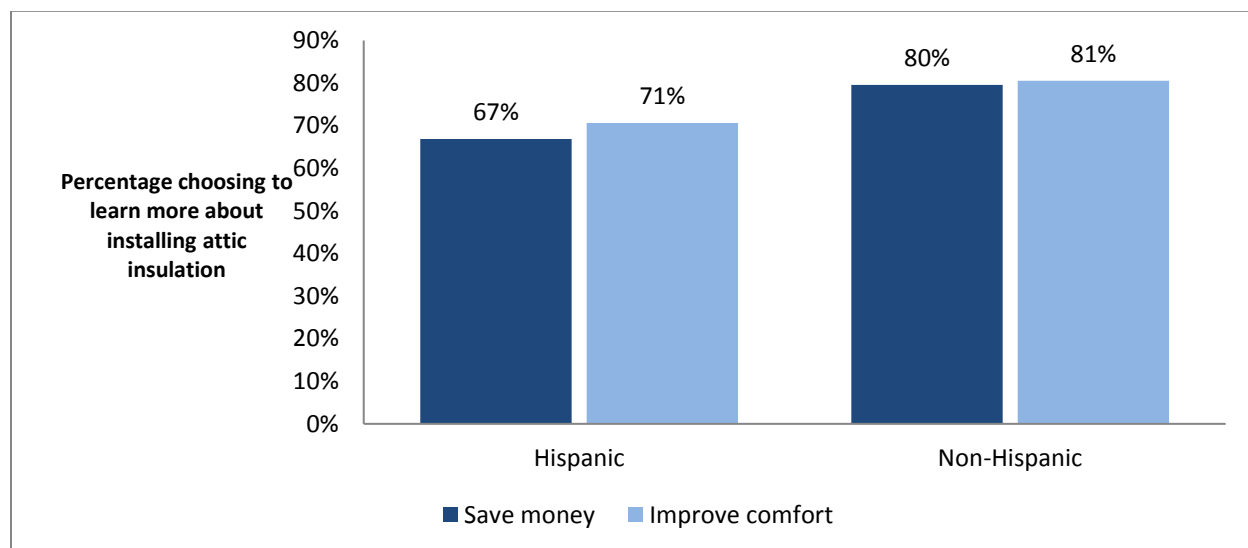
We investigated whether the choice of motivation used in the messaging (experiment 1), the inclusion of family emphasis in messaging (experiments 1-3) and the inclusion of a bilingual English-Spanish version (experiments 2 and 3) impacted participant choice. The results are presented by main effect.

### A. Motivation

Experiment 1 was the only experiment that tested the impact of different motivational frames in the message. We observed that presenting attic insulation as a means to save money did not yield a statistically significant different incidence compared to presenting attic insulation as a means to provide comfort (Table 4). Thus, the results of experiment 1 indicate that the choice of motivational frame used in marketing messages might not be important for stimulating interest in installing attic insulation. However, this result appears to contradict the comparison of experiments 2 and 3, which found that a savings message was more effective than a comfort message. More research is needed to clarify these results.

Our findings did not reveal any interaction effects between the motivations and family emphasis in the messages. The motivation main effect also did not prove to differ by ethnicity. Neither Hispanics nor Non-Hispanics showed preference for either comfort or money saving messages in the first experiment (Figure 5).

**Figure 5. Motivation Main Effect Investigated in Experiment 1 by Ethnicity.**



Note: Hispanics: ( $\chi^2(1, N=326) = 0.5351, p = 0.464$ ), Non-Hispanics: ( $\chi^2(1, N=361) = 0.0559, p = 0.813$ )

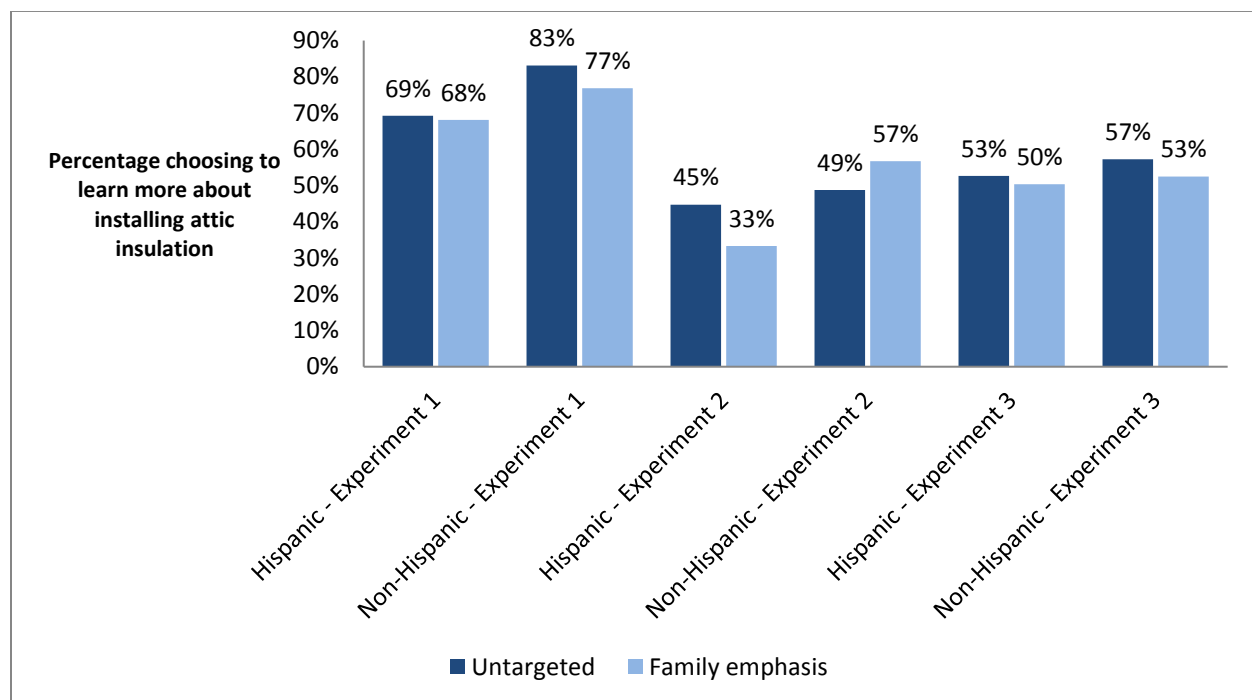
### B. Family emphasis

Overall, the emphasis on family in the messages did not yield statistically significant different incidence rates to untargeted messages. The finding is consistent across all three experiments (Table 4). The picture becomes more nuanced when we look at the effects for Hispanics and non-Hispanics separately

(Figure 6). While the effect was found to be consistent (non-significant) with the overall population in experiment 1 and 3, it was actually significant in experiment 2. In this experiment, messages including a family emphasis resulted in fewer Hispanics participants making the choice, while the opposite was true for non-Hispanic participants. All messages in experiment 2 appealed to comfort motivations for installing attic insulation, as opposed to saving money in experiment 3. One could therefore argue that messages describing comfort benefits with a family emphasis are not as powerful to spur action among Hispanics compared to messages that describe money saving benefits focused on the family (33% vs. 50%, Figure 6).

Our findings did not reveal any interaction effects between the family emphasis and motivations (experiment 1) nor between family emphasis and bilingual presentations (experiment 2 and 3).

**Figure 6. Family Emphasis Main Effect Tested in Experiments 1, 2 and 3 by Ethnicity**

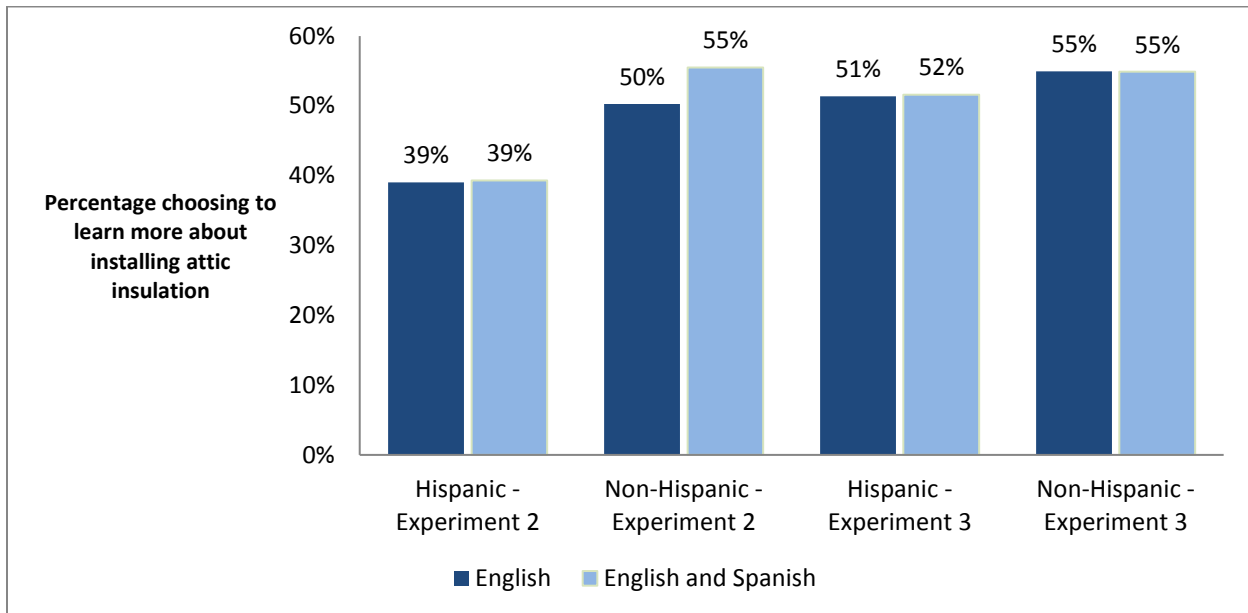


Note: Experiment 1: Hispanics: ( $\chi^2(1, N=326) = 0.0503, p= 0.823$ ), Non-Hispanics: ( $\chi^2(1, N=361) = 2.2540, p= 0.133$ ), Experiment 2: Hispanics: ( $\chi^2(1, N=296) = 4.0350, p= 0.045$ ), Non-Hispanics: ( $\chi^2(1, N=337) = 2.1255, p= 0.145$ ), Experiment 3: Hispanics: ( $\chi^2(1, N= 301) = 0.1588, p= 0.690$ ), Non-Hispanics: ( $\chi^2(1, N=326) = 0.7359, p= 0.391$ )

### C. Bilingual presentation

Including Spanish versions of the messages alongside English messages did not result in different choice rates compared to messages that were only presented in English. This result was consistent across experiment 2 and 3 as well as across Hispanic and Non-Hispanic participants (Figure 7). Essentially it means that adding a Spanish version did not seem to spur Hispanic participants more, nor deter non-Hispanic participants to find energy specialists to talk to about installing attic insulation.

**Figure 7. Bilingual Main Effect Tested in Experiments 2 and 3 by Ethnic Group**



Note: Experiment 2: Hispanics: ( $\chi^2(1, N=296) = 0.0027, p= 0.959$ ), Non-Hispanics: ( $\chi^2(1, N=337) = 0.9131, p= 0.339$ ), Experiment 3: Hispanics: ( $\chi^2(1, N=301) = 0.0018, p= 0.966$ ), Non-Hispanics: ( $\chi^2(1, N=326) = 0.0001, p= 0.991$ )

We theorized that acculturation, or the process of cultural and psychological change that results from interactions between cultures, may impact how Hispanic participants responded to the bilingual presentation. To test this, we used the Brief Acculturation Scale for Hispanics (BASH) to measure acculturation based on language preferences for various activities. The scale assesses the language preference for doing five tasks, taken from Marin and Sabogal’s (1987) Language Use subscale of the Short Acculturation Scale for Hispanics where respondents can chose: Only Spanish (1), more Spanish than English (2), both equally (3), more English than Spanish (4), only English (5). An acculturation score is created by summing the values of the response for each task and dividing this sum by the number of tasks with responses. A dichotomous level of acculturation (low, high) can be created; scores less than or equal to 3 indicate a low level of acculturation, and scores greater than 3 indicate a high level of acculturation (Davis and Engel, 2011).

We found that a marginally significant effect exists when considering acculturation level in the main effect of bilingual messaging on choice. Participants that indicated low acculturation (preference for Spanish language) were more likely to make the choice to talk to an energy specialist when the Spanish messaging was present compared to participants that indicated higher acculturation (Experiment 2: Logit (N=220) Odds: 13.79, SE: 19.696, p=0.066; Experiment 3: Logit (N=223) Odds: .145, SE: .1900, p= 0.140). Thus it may be worthwhile to present energy efficiency messages in both languages if targeting a Hispanic population with lower acculturation levels.

**Table 4. Logistic Regression Analysis of Motivations, Family Emphasis and Bilingualism as Predictors of Making the Choice**

	Experiment 1 Hispanic	Experiment 1 Non-Hispanic	Experiment 2 Hispanic	Experiment 2 Non-Hispanic	Experiment 3 Hispanic	Experiment 3 Non-Hispanic
Predictor	Odds Ratio	Odds Ratio	Odds Ratio	Odds Ratio	Odds Ratio	Odds Ratio
Comfort	1.271 (0.428)	0.713 (0.284)				
Family emphasis	1.018 (0.336)	0.462* (0.179)	0.744 (0.254)	1.789 (0.55)	0.718 (0.239)	0.787 (0.249)
Comfort x family emphasis	0.874 (0.419)	2.077 (1.113)				
Bilingual			1.224 (0.4)	1.622 (0.507)	0.8 (0.261)	0.952 (0.299)
Bilingual x family			0.691 (0.333)	0.587 (0.258)	1.592 (0.736)	1.102 (0.491)
N	326	361	296	337	301	326

Odds Ratios; Standard errors in parentheses

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

## IV. Study B: Messengers and Contractor Attributes

### Background

While the previous study tested various motivation messages, we also wanted to better understand how Hispanic homeowners may react to different *messengers*. Our literature review indicated that Hispanic Americans trust people within their peer group more than utilities for information on energy conservation (Research Into Action et al., 2016). Our focus groups revealed different feedback on utilities; overall Hispanic participants had a high level of awareness of utility programs and many viewed their utility as a trusted source of information. Hispanic focus group participants also mentioned the importance of trusting a program before engaging with it (Research Into Action and CSE, 2016). A lack of trust in utilities as messengers can present a challenge to utility programs seeking to motivate an audience to participate. Thus we decided to test the impact of delivering similar messages from a local utility representative vs. a local homeowner.

We chose to build the messenger experiment around the theme of hiring a contractor to conduct home energy efficiency upgrades. Although we found in our survey that Hispanics were more likely than non-Hispanics to do DIY projects, a majority (51% of foreign-born Hispanics and 63% of U.S.-born Hispanics) had hired a contractor in the past. Moreover, hiring a contractor is required to participate in whole-home energy efficiency utility programs such as Energy Upgrade California Home Upgrade.

Our survey indicated that, out of a list of 11 choices, license/bonding/workman's compensation insurance was the third-most important for selecting a contractor among Hispanic respondents, with 39% of foreign-born Hispanics and 48% of U.S.-born Hispanics calling this quality "extremely important". (Professionalism and depth of knowledge/experience were ranked as the two most important attributes.) Given that a license from the Contractor State License Board is a definitive requirement for contractors to participate in utility programs, we decided to test the impact of emphasizing license status in addition to the impact of different messengers.

Outside of the experimental treatments, additional information was collected on contractor selection criteria, energy efficiency information sources and Energy Upgrade California brand awareness.

### Experimental Design and Methods

#### Recruitment and Administration

SSI recruited participants for and administered experiment 4 in the same manner as the first three experiments. The only exception was that participants from experiments 1-3 were permitted to participate again in experiment 4, due to the challenge of recruiting a sufficient Hispanic sample within the project timeline. This experiment was administered from November 8 to 30, 2016,

## Procedures

Participants in the fourth wave were subject to the same demographic and validation characteristics as participants in the first three experiments. Participants who did not screen out were then presented with a short description of the experiment and told we were interested in learning about how they choose contractors and the qualifications that are most important. They were then presented with one of the messages designed for the experiment.

The experiment followed a factorial design containing four treatments including two main effects in a cross over design. The treatments (messages) were randomly assigned to the participants; each message was viewed by 100 Hispanic and 100 non-Hispanic participants. For this experiment we tested the effects of the messenger (a local utility representative vs. a local homeowner) and emphasis of contractor license status on an individual's decision to view a list of home energy upgrade contractors. The construction of the experiment messages, including main effects and content of messages is shown in Table 5.

**Table 5. Content of the four messages and main effects tested in experiment 4**

Condition	Message
Utility recommendation, untargeted	<p>Save energy and make your home more comfortable.</p> <p>Contractors participating in your electric utility’s program can help you save energy by installing attic insulation, a high efficiency heating/cooling system, or other upgrades.</p> <p><i>"Our participating contractors are ready to help you."</i> – Sarah Covarrubias, local utility representative</p>
Utility recommendation, contractor licensing emphasized	<p>Save energy and make your home more comfortable.</p> <p>Licensed contractors participating in your electric utility’s program can help you save energy by installing attic insulation, a high efficiency heating/cooling system, or other upgrades.</p> <p><i>"Our participating contractors are licensed by the state of California through the Contractors State License Board (CSLB) and ready to help you. The CSLB protects you by ensuring that licensed contractors have the proper skills and education before performing work on your home."</i> – Sarah Covarrubias, local utility representative</p>
Local resident recommendation, untargeted	<p>Save energy and make your home more comfortable.</p> <p>Contractors who have worked with your neighbors can help you save energy by installing attic insulation, a high efficiency heating/cooling system, or other upgrades.</p> <p><i>"I had a great experience working with my contractor."</i> – Sarah Covarrubias, local homeowner</p>
Local resident recommendation, contractor licensing emphasized	<p>Save energy and make your home more comfortable.</p> <p>Licensed contractors who have worked with your neighbors can help you save energy by installing attic insulation, a high efficiency heating/cooling system, or other upgrades.</p> <p><i>"I had a great experience working with my contractor. He was certified and licensed by the state of California through the Contractors State License Board (CSLB). Because he was licensed I felt secure because I know CSLB ensures that licensed contractors have the proper skills and education before performing work on your home."</i> – Sarah Covarrubias, local homeowner</p>

**Valuation**

After reading the message in experiment 4, participants were asked the following question, with the option to select “yes” or “no”.

*Right now, you can view a list of [licensed]<sup>3</sup> contractors that can help you with installing attic insulation, a high efficiency heating/cooling system, or other energy-saving upgrades. Would you like to see this list?*

<sup>3</sup> The word “licensed” was inserted only for the two treatments that emphasized license status.

## Results

We used a logistic regression to identify predictors of taking action or selecting “yes” to the valuation question. The first model contained the main effects and an interaction term to identify the effect of any particular component of the message framing on the choice to view a list of contractors. Model 2 introduced Hispanic origin as a predictor to analyze the effect of ethnicity. Model 3 and 4 took additional demographic characteristics and experience with energy related items into account as predictors. Results are displayed in Table 6.

**Table 6: Logistic Regression Models Identifying Main Effects and Demographic Variables Associated with Choice to View List of Contractors**

Predictor	(Model 1) Main Effects	(Model 2) Main Effects + Hispanic	(Model 3) Demographics	(Model 4) Demographics + Experience
Utility (vs homeowner) referral	1.157 (0.237)	1.160 (0.239)		
License (vs no license) effect	1.110 (0.226)	1.111 (0.228)		
Interaction (referral x license)	0.882 (0.256)	0.881 (0.257)		
Hispanic (vs Non-Hispanic)		0.602*** (0.0881)	0.758 (0.155)	0.717 (0.130)
Education			1.279*** (0.0789)	1.308*** (0.0710)
Income			0.949 (0.0598)	0.928 (0.0520)
Age			0.977* (0.00888)	0.979** (0.00763)
Male			2.525*** (0.501)	2.202*** (0.381)
Retired			0.879 (0.275)	0.831 (0.240)
Occupants in household			1.002 (0.0733)	1.002 (0.0688)
Children in the home			3.302*** (0.884)	2.752*** (0.641)
Years in the home			0.991 (0.0106)	0.989 (0.00900)
Build year of home			1.004 (0.00406)	
Has hired a contractor before				1.650* (0.332)
Aware of Energy Upgrade California brand				1.5265* (0.267)
N	800	800	601	765

Odds ratios, standard errors in parentheses

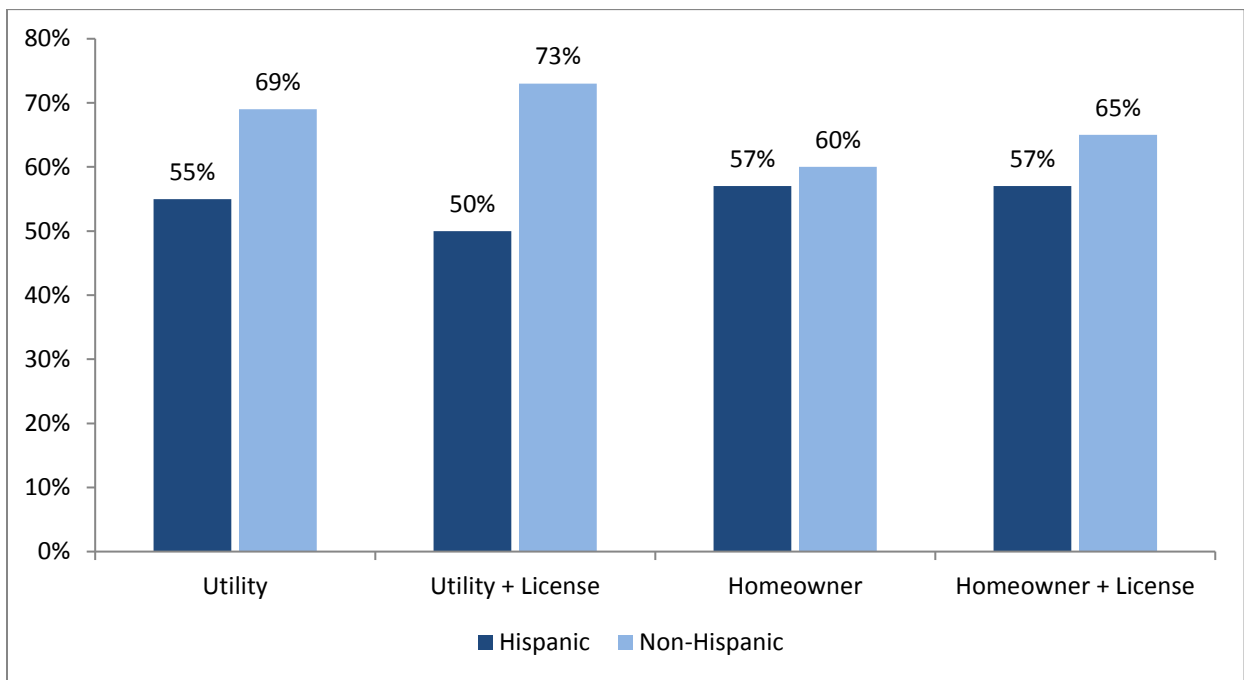
\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$



Overall, 61% of participants made the choice to view a list of contractors. Without separating by ethnic group or other demographic factors, Model 1 showed no statistically significant impact of either the utility vs. homeowner treatment or the license status treatment.

When we analyzed the results by ethnic group (Model 2), we found that Hispanics were 12% less likely overall to make the choice ( $\chi^2(1, N=800) = 12.0783, p = 0.001$ ). When we parsed these results based on the message frame, we observed that Hispanics were less likely than non-Hispanics to respond to the utility messenger; this difference grew when emphasis on the license status was added to the message (Utility + license:  $\chi^2(1, N=800) = 11.1709, p = 0.001$ ). Although Hispanics appeared slightly less responsive to the utility messenger as compared to the homeowner messenger, these differences were not statistically significant. Figure 8 shows how Hispanics and Non-Hispanics responded to each message.

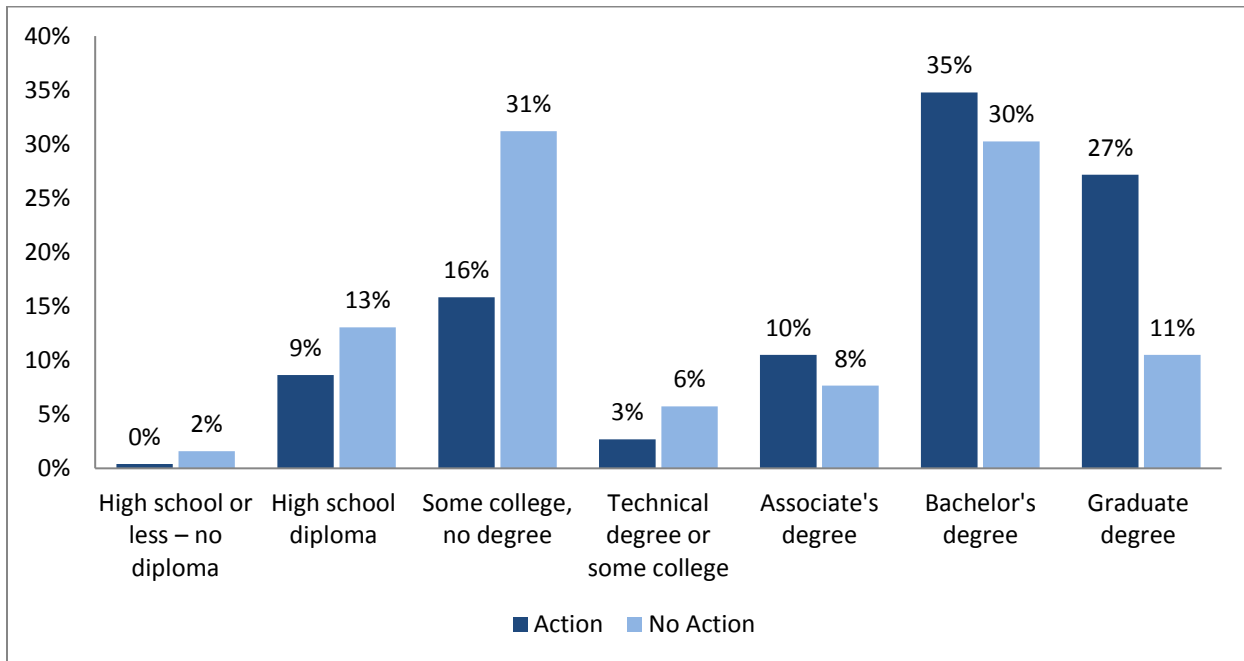
**Figure 8: Percent Choosing to View List of Contractors for Each Message Frame (N=800)**



Note: Message Frames: Utility: ( $\chi^2(1, N=800) = 4.1596, p = 0.041$ ), Utility + License: ( $\chi^2(1, N=800) = 11.1709, p = 0.001$ ), Homeowner: ( $\chi^2(1, N=800) = 0.1854, p = 0.667$ ), Homeowner + License: ( $\chi^2(1, N=800) = 1.3451, p = 0.246$ ).

When we incorporated other demographic variables into the logistic model (Model 3) the partial effect of Hispanic ethnicity was no longer statistically significant. The variables most salient in predicting action were education, gender and the presence of children in the home. Those with children in the home had 230% odds greater of taking action (Model 3: Logit (N=601) Odds: 3.302, SE: .884,  $z = 0.001$ ).

**Figure 9: Choice to See List of Contractors by Highest Level of Education in Home (N=800)**



Note:  $t(6, 800)=60.2937, p=0.000$

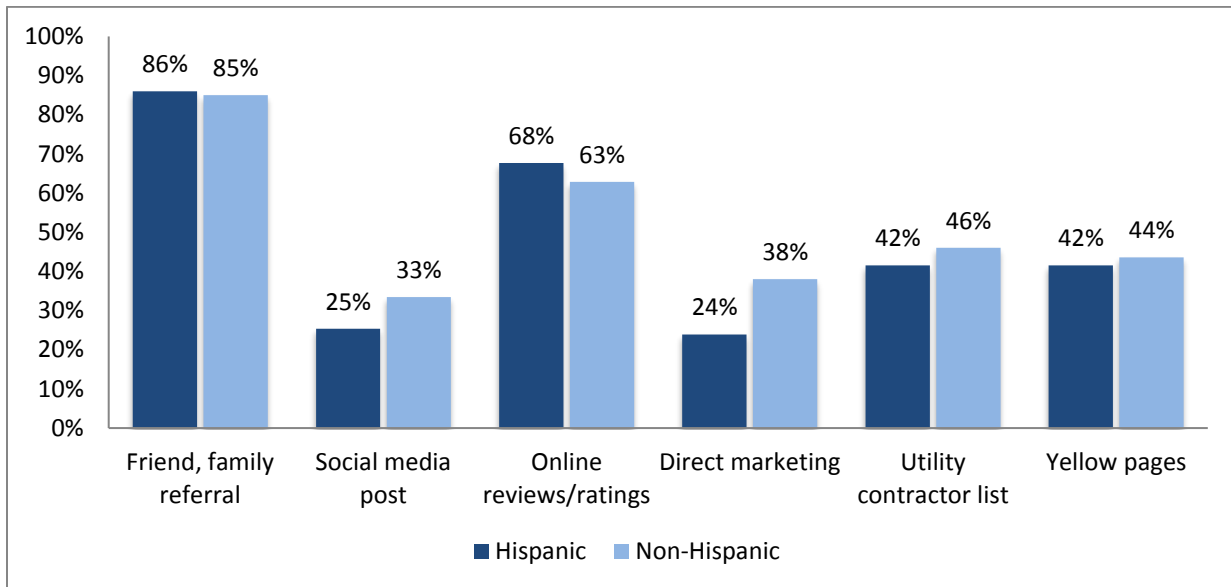
Model 4 added two experience-related variables – whether the individual had ever hired a contractor to perform work in their home and whether the individual had knowledge of the Energy Upgrade California brand – to the demographic variables. Both of these predictors had a positive, statistically significant relationship with taking action across all four treatment groups. More details on Energy Upgrade California brand awareness is discussed later in this report.

### Finding and Evaluating Contractors

After seeing the experimental treatment messages and valuation question, participants answered a series of questions past home energy upgrades and whether these were completed by a contractor or DIY projects. Those who had previously hired a contractor were asked about the resources used to find them. Figure 10 shows the percentage of respondents reporting to use each resource, with referrals from family/friends being the most popular option overall. When examining statistically significant differences between Hispanic and non-Hispanic respondents, we found that non-Hispanics were more likely to use social media ( $\chi^2(1, N=598) = 4.6168, p=0.032$ ) and respond to direct marketing ( $\chi^2(1, N=598) = 13.7147, p=0.000$ ) to find their last contractor.

Despite the fact that respondents of both ethnicities relied most heavily on referrals from friends and family to find their contractors, the message framing with a recommendation from a “local homeowner” did not influence participants to take action any more than the “utility” frame ( $\chi^2(1, N=800) = 0.6081, p=0.895$ ).

**Figure 10: Sources Used to Find the Last Contractor Hired by Ethnicity (N=598)**

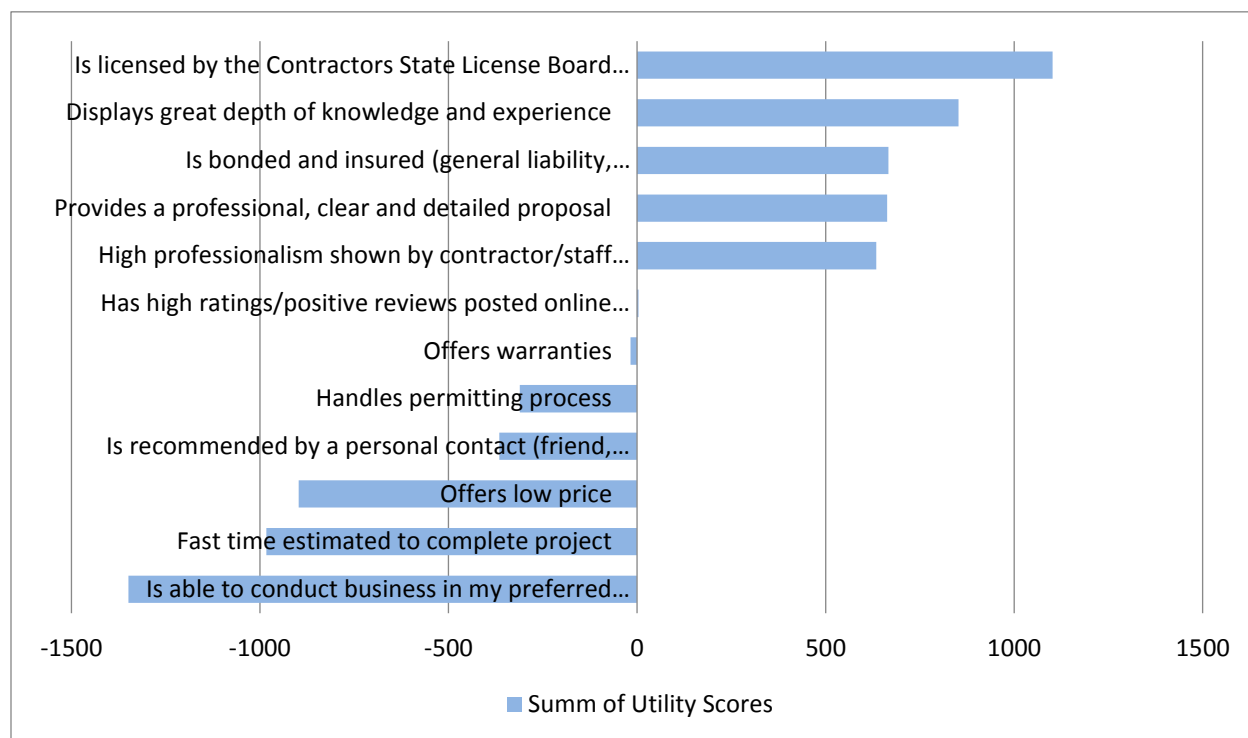


We also sought to understand which attributes were most important to homeowners when evaluating which contractor to hire. We used a Max Diff methodology (also known as Best-Worst) to obtain preference/importance scores among 12 attributes, ranging from low prices to high online ratings to license status (see Figure 11 for full list). Respondents were presented with seven sets of five attributes each in order to create a balanced design (SSI Web Help, 2016). For each set, they were asked to select the *most* and *least* important item when selecting a contractor to perform work in their home. According to which items were ranked most and least important across all seven sets, we generated a utility score for each feature. The sum of the raw utility scores was used to identify the relative order of preference or importance among all features (Figure 11; Daly, 2013).

License status emerged as the most important attribute, followed by depth of knowledge and experience. Despite the fact that nearly two-thirds of respondents stated they used referrals from friends and family to find their last contractor, when asked to identify the most and least important features sought in a contractor, personal recommendations ranked far below professional qualifications. Low prices were not a highly desired qualification. These findings are fairly consistent with those of our survey (CSE et al., 2017). Interestingly, the ability to conduct business in the homeowner’s preferred language was ranked as the least important attribute; this contrasted with our survey findings in which preferred language ranked 4<sup>th</sup> out of 11 attributes.<sup>4</sup>

<sup>4</sup> The attributes presented in the online experiments were the same as those presented in the survey, except that the survey option of licensed/bonded/workman’s compensation insurance was broken into two options in the online experiments: licensed by the Contractors State License Board and bonded/insured

**Figure 11: Contractor Attributes in Order of Most to Least Important Based on Utility Scores (N=800)**



### Energy Upgrade California Brand Awareness and Familiarity

Energy Upgrade California is a statewide marketing, education and outreach effort that helps individuals learn how to manage their energy use through behavior changes and home upgrades. In addition, Energy Upgrade California provides customers access to lists of licensed contractors who can help with upgrade projects and provide access to rebates. To measure Energy Upgrade California’s effectiveness in reaching consumers, participants were asked a series of questions on brand awareness, familiarity and website visits.

First, participants were shown a list of six brands/campaigns, primarily energy-related, and asked whether they had heard of each one.<sup>5</sup> The list included Energy Save It, a red-herring option, to check for respondent guessing. Aided brand awareness of Energy Upgrade California was the lowest (46%) among the actual brands or campaigns; ENERGY STAR was the highest at 84% (Figure 12).

Energy Upgrade California brand awareness elements were cross tabbed with demographic variables to identify sub-groups most knowledgeable about the brand. Those who have heard of Energy Upgrade California were:

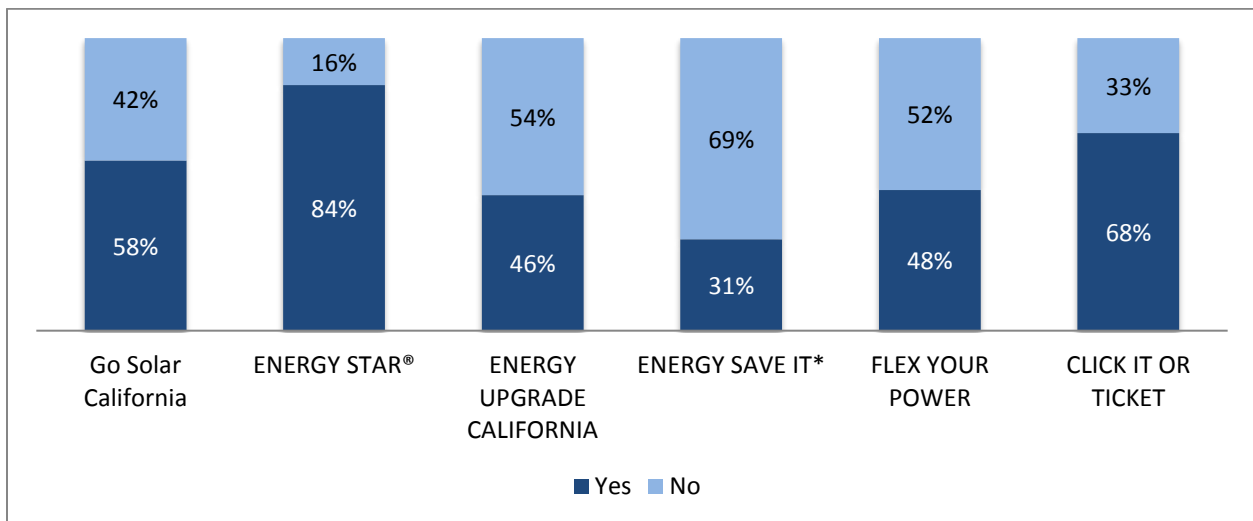
- More likely to be non-Hispanic ( $\chi^2 (1, N=800) = 4.8304, p= 0.028$ )

<sup>5</sup> This question was previously developed by Opinion Dynamics to measure Energy Upgrade California brand awareness (Opinion Dynamics, 2016)

- More likely to be male ( $\chi^2 (1, N=800) = 9.7976, p= 0.002$ )
- More likely to have higher levels of education ( $t(2, N=800) = 4.0671, p= 0.0001$ )
- Less likely to be retired ( $\chi^2 (1, N=800) = 3.2191, p= 0.073$ )
- More likely to be married ( $\chi^2 (1, N=800) = 15.2517, p= 0.000$ )
- More likely to have larger households

When analyzed in conjunction with the treatment and valuation question described above, we found that those participants aware of Energy Upgrade California were statistically more likely to have taken action and chosen to see a list of contractors than those who were unaware of the brand (Table 6,  $\chi^2 (1, N=800) = 36.5111, p= 0.000$ ). The results of these tests were the same when we filtered out participants who said they had heard of Energy Save It (the red herring name).

**Figure 12. Awareness of Brands/Campaigns (N=800)**

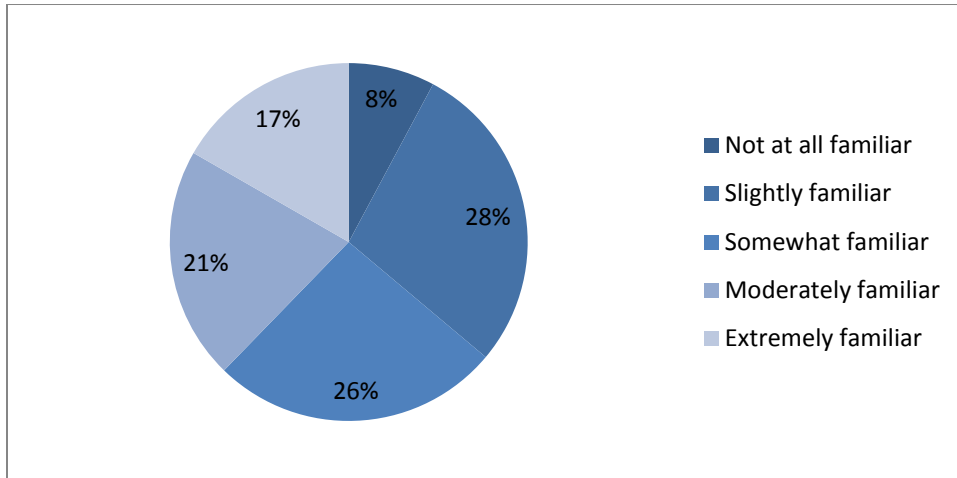


Note: “Energy Save It” is denoted with an asterisk because it is not an actual brand and was used to check for respondent guessing.

Individuals who said they had heard about Energy Upgrade California were asked additional questions about their level of familiarity and use of Energy Upgrade California resources (N=371).<sup>6</sup> Participants were asked to rate their level of brand familiarity on a five-point Likert scale (Figure 13).

<sup>6</sup> Because filtering out respondents who reported awareness of Energy Save It did not change the demographic profile of the Energy Upgrade California-aware group, we used the full set of this group to assess the remainder of the Energy Upgrade California related metrics to avoid differences due to small sample size.

**Figure 13: Level of Familiarity with Energy Upgrade California Brand, Among Participants with Brand Awareness (N=371)**



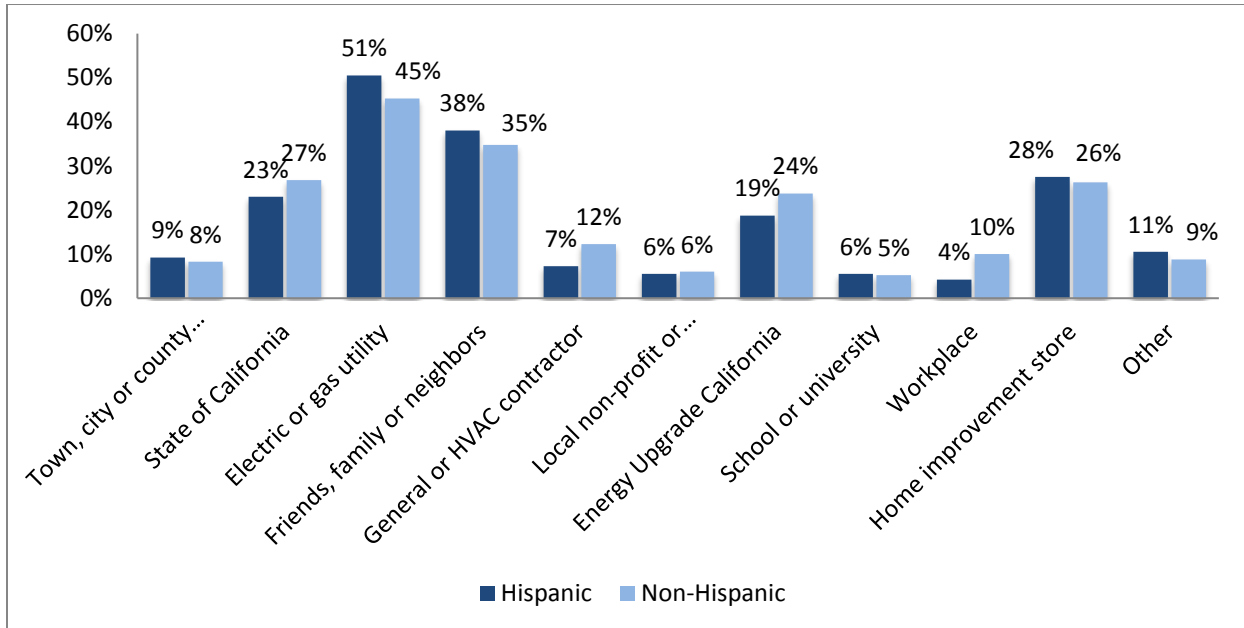
Familiarity with the Energy Upgrade California brand varied; though nearly 40% displayed low levels of familiarity, more than 35% reported high levels of familiarity. Hispanics were marginally less familiar with the brand than non-Hispanics (N=371,  $t=1.71$ ,  $p=0.0874$ ). Younger individuals tended to have greater levels of familiarity ( $\rho = -.3044$ ,  $p=0.000$ ). Income ( $\rho = 0.1080$ ,  $p=0.00377$ ) and education ( $\rho = 0.1704$ ,  $p=0.001$ ) had weak but statistically significant positive correlations with greater levels of brand familiarity. Married individuals and non-retired individuals displayed greater familiarity as well ( $t(369, N=371)=2.4573$ ,  $p=0.0145$ ).

### Energy Efficiency Information Sources

Respondents were asked where they get information about energy efficiency and provided a list of 10 options plus “other”. The top information sources were electric or gas utility (48%); friends, family or neighbors (36%); home improvement store (27%) and the state of California (25%). The least frequently reported sources were school or university (5%), local non-profit or community-based organization (6%) and workplace (7%).

Figure 16 shows the percentage of respondents referencing each source broken out by ethnic group. We found that non-Hispanics were more likely than Hispanics to get their info from their workplace ( $\chi^2 (1, N=800) = 9.9927$ ,  $p= 0.002$ ) and marginally more likely to say they get info from Energy Upgrade California ( $\chi^2 (1, N=800) = 2.9879$ ,  $p= 0.084$ ). Hispanics, on the other hand, were almost twice as likely to get their energy efficiency information from a contractor ( $\chi^2 (1, N=800) = 5.6822$ ,  $p= 0.017$ ).

**Figure 16: Percentage of Respondents Getting Energy Efficiency Information from Various Sources (N=800)**



Looking back to our experimental treatments, we found that those who reported getting energy efficiency information from the state, electric or gas utility, Energy Upgrade California or workplace were significantly more likely to make the choice to view the list of home energy upgrade contractors. (State: ( $\chi^2(1, N=800) = 8.2101, p= 0.004$ ), Utility: ( $\chi^2(1, N=800) = 3.9270, p= 0.048$ ), Energy Upgrade California: ( $\chi^2(1, N=800) = 22.3743, p= 0.000$ ), Workplace: ( $\chi^2(1, N=800) = 12.1271, p= 0.000$ )).

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