



**Communication and Collective Actions:
Motivating Energy Conservation in the U.S.**

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Abstract

Government exists in large part to provide collective goods that the market would not otherwise produce. A critical question is what collective goods citizens would produce on their own, notwithstanding market forces. The authors address this question evaluating the impact of exposure to communications posited to shape collective action behavior. They find that communications shape behavior depending on two primary factors: first, to whom responsibility is attributed for collective outcomes; and, second, what effects or consequences are associated with one's actions. They present a novel framework and test predictions with a survey experiment in the domain of energy conservation. The paper adds substantially to what is known about collective action (e.g., unlike past work, the paper does not explore selective incentives or social pressure)—that is, it shows communications drive behavior and this has implications in a domain of immediate relevance: energy sustainability.

Government exists in large part to provide collective goods that the market would not otherwise produce – entities such as highways, clean air, water, law and order, and national defense (Taylor 1987). A critical question is which of these entities citizens would produce on their own, notwithstanding market forces. Olson’s (1965) classic work suggests that in large groups public goods will not be provided sans direct selective incentives (also see Downs 1957). However, the evidence is now clear that factors other than selective incentives shape the efforts of individuals to take collectively beneficial actions (e.g., Hardin 1982, Ostrom 1990, Habyarimana et al. 2007). Nonetheless, we know little about what drives these decisions outside of the literatures on electoral participation and social movements. Moreover, the aforementioned work tends to focus on how selective incentives (e.g., Polletta and Ho 2006) or social pressure from friends and/or groups (Sinclair 2012) shapes a person’s willingness to engage in a collective action. Yet the reality is that in many, if not most, collective action settings social pressure is weak (or nonexistent) and direct selective incentives are lacking (or absent). Thus, why and when do citizens engage in collective actions on their own volition?

We address this question by exploring how communications that affect attributions of responsibility for action and communications that highlight positive or negative effects resulting from that action shape individuals’ willingness to act for the collective good. We focus on actions in the domain of energy conservation. This is an issue of obvious importance given energy demand in the U.S., the environmental externalities associated with a reliance on traditional fossil fuels, and the existence of federal and state incentives to promote the use of alternative energy sources. In the next section, we offer a brief discussion of two distinct types of energy conservation behaviors as this is a necessary precursor to understanding what types of communications may matter in this domain. Specifically, we explain that taking action on energy can involve curtailing energy use and making certain types of investments. We then build on an extant model of collective action behavior (e.g., Lubell, Zahran, and Vedlitz 2007) to introduce how different types of communications (i.e., “frames”) can matter. We merge research on framing effects (Chong and Druckman 2007) with a collective interest framework to study how two types of communications affect behavior: (1) communications that attribute responsibility for collective

outcomes to individuals or to government and, (2) communications that highlight positive or negative consequences resulting from one's behavior. We then describe an experiment that was implemented in the context of a large survey using a population demographically representative of the U.S. to test predictions about the impact of exposure to these communications on two types of energy conservation behaviors (described below). We find that communications can have dramatic effects on whether or not one engages in a collective action. This is an important piece of understanding concerning when and how collective action occurs and what government and/or other entities can do to promote it.

Energy Behaviors

A key aspect of energy policies involves “*activities* aimed at improving energy efficiency in supply and consumption” (Pontera 2009: 2, italics added). While consumption activities come in various guises, of particular note are individuals’ decisions regarding energy use. In recent years, federal, state, and local governments have implemented a variety of programs (e.g., tax incentives) to accelerate the production and consumer adoption of new energy technologies (Gallagher and Muehlegger 2011). Given the importance of individuals’ decisions in this domain, it is perhaps surprising that there has been little research on citizens’ attitudes toward various energy policies or the actions citizens are willing to take to conserve energy (Bolsen and Cook 2008). Prontera (2009: 1) states, “Scholars of political science, even those who deal with public policy, seldom write about energy policy. The field is predominantly occupied by students of other disciplines who have a store of technical knowledge...” This lack of attention may contribute to dis-coordination in attempts to develop a comprehensive national energy policy (Holden 2006).¹

¹ There are at least two exceptions to this general observation including research assessing opinions toward nuclear energy in the U.S. (e.g., Ansolabehere and Konisky 2009) and attitudes toward off-shore developments among California residents (Smith 2002).

We follow others (Black, Stern, and Ellworth 1985; Stern 2000, 2005) in classifying energy conservation at the individual / household level into two distinct types. First, *investment* behaviors refer to capital outlays for goods that conserve energy through efficiency gains, e.g., insulating one's home, replacing an automobile, furnace or appliance with one that uses energy more efficiently, etc. Second, *curtailment* behaviors refer to decreasing the amount of energy one consumes, e.g. adjusting ambient home temperature to save energy, using less hot water, and so on. Black, Stern, and Elworth (1985) explain that investment and curtailment behaviors are influenced by distinct factors and that there are greater external constraints associated with large capital investments to conserve energy through efficiency gains relative to curtailing personal energy use. As we explain, we explore how communications affect both investment and curtailment behaviors.

Framework: Collective Interest Model of Action and Framing Effects

Considerable work explores how to mobilize individuals to engage in collective actions (e.g., Arceneaux and Nickerson 2009; Gamson 1992). The dominant framework for understanding these decisions is the collective interest (CI) model, which was originally developed to explain protest behavior and participation in social movements. Within the CI model, people are expected to participate in collective action when the perceived benefits of action outweigh the perceived costs (Finkel and Muller 1998; Finkel, Muller, and Opp 1989; Gibson 1997). Most of the research within the literature on collective action focuses on how selective benefits/reminders (e.g., Gerber and Green 2001; Michelson et al. 2009) or prevailing social pressures/norms (Gerber, Green, and Larimer 2008; Gerber and Rogers 2009) affects individuals' decisions through these beliefs.

The CI model was recently expanded by Lubell, Zahran, and Vedlitz (2007) in an exploration of collective action behavior on global warming. Lubell, et al. added the critical insight that one's perceived influence over the collective outcome, and the perceived likelihood of a group's success, affects an

individual's willingness to take action.² However, Lubell and his colleagues do not explore the origins of these perceptions of influence. This is where communications (i.e., *frames*) enter the picture.³ The concept of "frames" has been used in multiple social and cognitive science disciplines in varying ways; it is important, then, to be clear what we mean by frames (for a detailed discussion, see Druckman 2011).⁴ We focus on frames as part of a story line in describing an issue, highlighting certain aspects of reality at the expense of others (e.g., Gamson 1992). An enormous literature demonstrates that frames can and do shape individuals' behaviors (for a full review see Chong and Druckman 2011). We focus on two types of frames.

Attribution Frames

We build on Iyengar's (1991) seminal initial work on framing in political science that explored how episodic and thematic news frames affect individuals' beliefs about who is responsible for addressing a social problem. This research tested whether exposing individuals to a news story that focused on a specific episode or event (e.g., a specific crime) versus a story that focused more on the

² The CI model builds on theories of reasoned action and planned behavior - in which action is the result of a subjective assessment about the costs, benefits, and likely consequences of doing so (Ajzen and Fishbein 1980; Ajzen 1990) - by incorporating these "collective considerations" into an individual's decision calculus.

³ Indeed, we are following Lubell, Zahran, and Vedlitz's (2007: 408) urging to see if "it is possible for public discourse to increase or decrease the salience of that link, which would have commensurate effects on the relevance of the CI model." There are several studies that explore the voluntary provision of public goods in laboratory experiments (e.g., Andreoni and Croson 2008; Dawes and Thaler 1988; Fehr and Gächter 2000; Fishbacher, Gächter, and Fehr 2001; Hamman, Weber, and Woon 2011; Ostrom 1990; 2000) but do not examine how communications affect individuals' willingness to contribute.

⁴ One prominent usage which we do not pursue is valence frames (positive versus negative) as popularized by Tversky and Kahneman (1981). Also, some scholars distinguish between framing and priming; however, the processes appear to be conceptually indistinguishable when it comes to communication effects (see Druckman 2011: 286-288).

general causes of a problem (e.g. the causes of crime) caused subjects to alter their views regarding who is primarily responsible for the social ill (e.g., individuals versus government policies). Our key question is: do descriptions of who is primarily responsible for providing for the collective good affect one's willingness to engage in a collective action?⁵ The focus on attribution frames coheres with the CI model given that it posits that perceptions about the impact of one's actions on collective outcomes are an important determinant of behavior in collective action settings. The more individuals see their own actions as making a difference in terms of affecting the collective outcome, the more likely they are to take action. In other words, if individuals see themselves as responsible for collective outcomes, and they focus on their own culpability instead of other potentially relevant considerations (e.g., selective costs), they may be more likely to take action.

As far as we know, we are the first to account for attributions of responsibility as an independent variable influencing individuals' willingness to take collective action. Malhotra and Margalit (2009: 8) explain, "No previous study in political science has specifically looked at... attribution cues. Rather, some experiments have considered attribution as a dependent variable and examined the effect of party and other informational cues on whom individuals blame..." It follows from our discussion that we expect attributions of responsibility to affect collective action behavior primarily because collective action problems introduce disincentives for the individual to act (i.e., there are incentives to free-ride), and frames that directly link individuals' decisions with collective outcomes are central to mobilizing collective action (e.g., see Benford and Snow 2000; Gamson 1992, Polletta and Ho 2006).⁶ In short, the more individuals see themselves as responsible for dealing with a collective action problem, the more likely they will be to take action. Alternatively, the less people see themselves as responsible, the less

⁵ We thus focus on treatment attributions (not causal attributions) since they are presumably more directly relevant to taking actions that make a difference.

⁶ Frames that attribute responsibility to individuals for collective outcomes also may resonate with a deeply entrenched value of *individualism* in American culture (Feldman 1988).

willing they may be to take action – and they are less likely to see themselves as responsible if told that the responsibility lies with the government to provide the collective good. This leads to the following two hypotheses:

Hypothesis 1: Individuals will be more likely to express a willingness to curtail home energy use and make capital investments to save energy following exposure to a frame in a communication that emphasizes individuals' responsibility for dealing with the nation's energy situation.⁷

Hypothesis 2: Individuals will be less likely to express a willingness to curtail home energy use and make capital investments to save energy following exposure to a frame in a communication that emphasizes the government's responsibility for dealing with the nation's energy situation.

Effect Frames

The other related type of frame that we explore is often called an issue or emphasis frame (Druckman 2001). These refer to how one describes an issue; for example, one can frame a hate group rally as a free speech or public safety issue, or campaign finance as an issue of free speech or democratic corruption, with significant consequences for levels of public support (see Druckman 2011 for an exhaustive review). For us, the key dimensions when it comes to energy conservation are: (1) the selective costs or benefits associated with taking an action (upfront costs for investments versus immediate savings for curtailment) and, (2) the collective benefits of national energy conservation. Each frame's foci are consistent with the CI model, which notes the central role of the perceived collective benefits of an action (e.g., environmental benefits) and the perceived costs (e.g., initial capital investment). We emphasize that by using a "cost frame" we do not see ourselves as merely incorporating a long studied hurdle to collective action, but rather examining a communication that primes an important consideration in this domain of behavior. In other words, we seek to explore if highlighting costs affects two distinct classes of behavior. Our hypotheses are as follows:

⁷ We recognize that this prediction may be culturally confined to the U.S. Future work would benefit from exploring competing responsibility attributions in distinct cultures.

Hypothesis 3: Individuals will be more likely to express a willingness to curtail home energy use and to make investments to save energy following exposure to a frame in a communication that emphasizes the collective environmental benefits associated with taking action.

Hypothesis 4: Individuals will be less likely to express a willingness to make capital investments to save energy following exposure to a frame in a communication that emphasizes the economic consequences associated with these behaviors; however, individuals will be more likely to express a willingness to curtail energy use.

Hypothesis 4 highlights a key distinction between the two types of conservation behaviors we examine. Energy curtailment involves reducing one's consumption of energy, which *saves* money but also may involve sacrifices (Stern 2000). Capital investments, meanwhile, usually require spending additional money up-front in order to potentially reap long-term savings. In sum, we anticipate that highlighting the economic consequences of energy conservation is likely to promote energy curtailment (because it saves money) but discourage intentions to make capital investments (because it costs money).

In the study we describe below, some participants received different mixes of an attribution frame and effect frame. In the cases where the frames are directionally consistent in terms of their anticipated effect on behavior, our hypotheses are straightforward.

Hypothesis 5: Individuals will be more likely to express a willingness to curtail energy use and make capital investments to save energy following exposure to a frame in a communication that emphasizes the environmental consequences of action and individuals' responsibility for addressing the nation's energy situation.

Hypothesis 6: Individuals will be less likely to express a willingness to make capital investments to save energy following exposure to a frame in a communication that emphasizes the economic consequences of these actions and government's responsibility for addressing the nation's energy situation.

We do not offer a prediction for how curtailment behaviors will be affected by exposure to a cost effect frame (saving money) paired with a government responsibility attribution frame (posited to

demobilize collective action, see hypothesis 2). Although highlighting costs may increase the likelihood of curtailment, if this frame is pitted against competing frames attributing responsibility for collective outcomes to government, then the individual effects of the frames may cancel. Importantly, in employing these frames, we ensured that they were equally effective/strong (see Chong and Druckman 2007). We did so by implementing a pre-test on a sample of 211 individuals who did not take part in the survey to verify the direction and effectiveness / strength of the opposing cost / benefit frames, and to ensure that the attribution frames portrayed either government or individuals as primarily responsible for dealing with the nation's energy situation. The results confirmed that the cost / benefit frames do not significantly differ from one another in perceived strength, but they do in perceived direction. In addition, the attribution manipulation effectively portrayed either individuals or government as primarily responsible for dealing with the situation (the pre-test analyses are available upon request from the authors). Our study also can be seen as a contribution to the emerging literature on competitive framing effects (e.g., Chong and Druckman 2007, Druckman et al. 2012), because we pit opposing frames against one another in an experimental context.

Survey Experiment

To test our hypotheses, we implemented a survey experiment in August 2010. We used the Internet to draw a sample that was representative of the U.S. population.⁸ A total of 1,600 respondents

⁸ The survey was funded through a grant from the Institute for Sustainability at Northwestern (ISEN). We contracted with a survey research company (Bovitz Inc.) to collect the data. The sample was drawn from a panel of respondents who have opted in to complete online surveys. The panel was originally developed based on a random-digit-dial (RDD) telephone survey, where to enter the panel a respondent needed to have access to the Internet (In this sense, it is a non-probability sample in the same way as those taken by firms such as YouGov are non-probability samples). The panel has continued to grow based on ongoing RDD recruiting and referrals. From the panel, which has approximately 1 million members, a given sample is drawn using a matching algorithm (based on likely response

completed the survey. Respondents began by completing an initial survey that measured attitudes toward various energy sources, laws, and technologies. Respondents next answered a series of questions measuring values, knowledge, political affiliation, and other individual-level control variables, followed by exposure to one of the experimental treatments. All respondents were informed, *“We are now going to ask you about energy choices you may make.”* This is the only information that individuals who were randomly assigned to a control group received and was followed by the dependent measures we will describe below. Before discussing these measures, we first describe how we manipulated responsibility attributions and frames regarding the effects resulting from one’s actions.

Attribution Frame Manipulation

We manipulated responsibility attributions by asking respondents to read an explicit statement about the agent responsible for dealing with the nation’s energy situation. Specifically, the individual attribution treatment stated, *“The ultimate success of our nation’s energy policy depends largely on individuals’ choices about energy consumption. Individuals need to step up to the plate – something they have done throughout American history without having to rely on the government.* Conversely, the government attribution treatment stated, *“The ultimate success of our nation’s energy policy depends largely on governmental decisions about the energy supply. Government needs to step up to the plate – something they often do when individuals alone cannot resolve a problem.”*

Effect Frame Manipulation

We manipulated the consequences associated with an action by including an explicit statement about its economic impact or its environmental impact. The cost frame stated, *“These choices have important economic consequences. For instance, switching from regular light bulbs to energy saving bulbs will cost consumers, in general, billions of dollars each year by causing them to pay a cost premium.”* The environmental effect frame stated, *“These choices have important environmental*

rates) to ensure that those screened to qualify for the survey constitute a sample that demographically represents the United States.

consequences. For instance, switching from regular light bulbs to energy saving bulbs will help ensure that individuals, in general, live in a healthy environment by saving the world from millions of metric tons of greenhouse gases.”

Table 1 displays the conditions to which respondents were randomly assigned (along with the N within each condition). Our first condition served as a baseline control (no attribution frame / no effect frame); these respondents read only the initial statement (see above), and then answered questions about investment and curtailment behaviors. In conditions 2 and 3, respondents read either the individual responsibility attribution treatment (condition 2) or the government responsibility attribution treatment (condition 3) with no effect / consequence frame. These conditions allow straightforward tests of hypotheses 1 and 2 regarding the impact of different attribution frames on behavior. Conditions 4 and 7 included statements about either the economic consequences associated with taking action (condition 4) or the environmental consequences of taking action (condition 7) in the absence of any responsibility attribution frame. These conditions allow for straightforward tests of hypotheses 3 and 4.

[Table 1 About Here]

The remaining conditions combine multiple statements, including one of two versions of the responsibility attribution treatments and one of two versions of the effect frame treatments. In these conditions (i.e., conditions 5, 6, 8, and 9), the effect frame always preceded the attribution frame.⁹ We offer explicit hypotheses only for conditions where the frames are directionally consistent in terms of their anticipated effect on behavior – i.e., increase the likelihood of both investment and curtailment behaviors for respondents randomly assigned to condition 8 (hypothesis 5) and decrease investment behavior (but not curtailment) for respondents randomly assigned to condition 6 (hypothesis 6). We do not offer predictions for the conditions in which an individual attribution frame is paired with an

⁹ We did this because we believe the order could potentially matter which would build a confound into our design, doubling the number of conditions; this is an area for future work and our approach of keeping the order constant is consistent with others such as Chong and Druckman (2007, 2010), and Druckman et al. (2012).

economic effect frame (condition 5), or when a governmental attribution frame is paired with an environmental effect frame (condition 9). In these cases, the treatments highlight competing considerations and we have no *a priori* theory or empirical work on which to draw to infer which frames will be more determinative of behavior.

Dependent Measures

We chose to focus on behaviors people were likely to understand and in which there would likely be variance in individuals' willingness to perform: (1) investing in insulation or weatherization for one's home or apartment; and, (2) lowering one's thermostat setting in the winter and/or raising it in the summer to save energy. Both behaviors were identified in pre-tests as familiar (i.e., people knew what the behavior entailed), as behaviors with variance in terms of individuals' willingness to perform, and as behaviors that contextual factors can shape. We included three dependent measures for investment behaviors that were asked immediately after exposure to one of the experimental treatments (see above). First, respondents were asked: "How likely are you to invest in insulation or weatherization for your home or apartment?" on a 7-point fully labeled scale ranging from 1 = "extremely unlikely" to 7 = "extremely likely." Second, to measure *information-seeking* behavior, we asked respondents: "Would you be interested in receiving more information about how to insulate or weatherize your home or apartment?" If the answer was "yes," then participants were asked to provide their email address to receive *one* email with the corresponding information from a *non-profit, non-partisan* organization (0 = did not enter email and 1 = entered email address). We focus on participants who actually provided an email address. We do not include those who checked "yes" to request more information and then chose not to provide an email address because providing an email address requires more of an active commitment to receiving information. Third, respondents were asked: "What is the maximum amount you would be willing to spend to insulate or weatherize your home or apartment to save energy? Enter an amount ranging from \$0 to \$500." This is a contingent valuation measure of underlying support for a public good (Green et al. 1998).

We included two dependent measures for curtailment behaviors. First, respondents were asked: “How likely are you to lower your thermostat setting in the winter and/or raise the setting in the summer to save energy?” on a 7-point fully labeled scale ranging from 1 = “extremely unlikely” to 7 = “extremely likely.” We also measured *information-seeking* curtailment behavior by asking respondents if they would like to receive more information “about Smart Energy Meters that save energy” in an email similar to the analogous investment information-seeking measure.¹⁰

Note that the survey included a number of other variables shown to affect energy attitudes, including questions about ethnicity, age, education, income, various types of values, dwelling place (i.e., house or apartment), region (i.e., regional climate), perceived influence over energy outcomes, political and demographic variables, and so on (e.g., Lubell, Zahran, and Vedlitz 2007; Lubell 2002; Finkel, Mueller, and Opp 1989). As our random assignment to conditions succeeded (i.e., we tested for covariate balance across conditions and ruled out potential confounding factors), not surprisingly, none of the control variables affected the impact of the experimental conditions on behavior. Thus, in reporting the results, we do not include these additional measures. Full results with the controls are discussed and reported in the Appendix (see Table A-2 and Table A-3).

Results

We present the results in a series of graphs that show the shift in the likelihood of taking investment and curtailment actions relative to the control group baseline with significant movements marked by asterisks. (The means and standard deviations for each dependent variable across conditions are reported in Table A-1 in the Appendix.) Instead of following the direct order of our hypotheses, we break our results down by first looking at investment behavior and then looking at curtailment behavior.

¹⁰ We also asked a variety of belief importance (and content) questions as is typical in some framing experiments and all the results cohere with our main results reported below. We do not explore mediation given doing so brings with it inferential problems (see Bullock and Ha 2011). Details on these questions are available from the authors.

Investment Behavior

The most striking aspect of Figures 1, 2, and 3 is the overall consistency of the impact of the experimental treatments across our three dependent investment behavior measures. Given this uniformity, we highlight the findings in the order of our hypotheses. Hypothesis 1 predicted that the individual responsibility attribution frame would increase the likelihood of investment behavior. We find either no support or only marginal support for this hypothesis. Although exposure to this frame does lead individuals to be significantly more willing to invest in insulation or weatherization (condition 2, Figure 1) with about a 3.49% increase, the results for the information-seeking (condition 2, Figure 2) and contingent valuation dependent measures (condition 2, Figure 3) are not significant. In short, telling individuals they are responsible for the energy situation does not have a huge effect on stimulating investment behavior.

[Insert Figures 1, 2, and 3 About Here]

In contrast, we find strong support for hypothesis 2 across dependent measures. When responsibility for taking care of energy issues is attributed to the government, individuals are less likely to invest in insulating/weathering their house (-5.33%, see Figure 1), less interested in receiving an email with information about how to insulate or weatherize one's home (-7.10%, see Figure 2) and less willing to pay for insulation to weatherize one's home or apartment (-9.72%, see Figure 3). In short, individuals are much less willing to engage in a collective action when the government is portrayed as responsible for collective outcomes.

We next evaluate the impact of communications that highlight either the economic consequences (personal costs or environmental consequences (collective benefit) of one's actions; these conditions did not contain any attribution frame. We find little to no support for hypothesis 3 (condition 7, Figures 1, 2, and 3) – i.e., there are no cases among our three dependent variables where emphasizing the environmental benefits of actions alone significantly increases the likelihood of taking action. In contrast, we find strong support for hypothesis 4 which predicted that highlighting the economic effects associated with capital investments would cause individuals to be less likely to take action (see condition 4, Figures

1, 2 and 3). When an economic consequences frame is emphasized individuals are less likely to invest in insulation/weatherization (- 5.33%, Figure 1), less likely to request an email seeking information about insulation/weatherization (-6.62%, Figure 2) and less willing to pay to insulate or weatherize one's home or apartment (-8.62, Figure 3). Highlighting the economic costs associated with capital investments on energy clearly reduces individuals' willingness to engage in a collective action - even if it helps the collectivity and, one could argue, saves money in the long run.

We next evaluate the hypotheses that involve conditions which include mixes of attribution and effect frames and in which the expected direction of the effect of the communication on behavior is consistent (conditions 6 and 8). We find strong support for hypothesis 5 (see condition 8, Figures 1, 2, and 3) and hypothesis 6 (see condition 6, Figure 1, 2, and 3). When an individual responsibility attribution frame is presented together with a frame highlighting the collective environmental benefits resulting from one's actions, individuals are significantly more likely to make investments to insulate / weatherize their home (6.38%, see Figure 1), more interested in receiving an email with information about insulation / weatherization (10.41%, see Figure 2), and willing to pay more to insulate / weatherize one's home (10.85%, see Figure 3). Recall that hypothesis 5 predicted an increased likelihood of making capital investments when both an individual attribution of responsibility frame and an environmental effect frame are emphasized. Thus, it appears that frames highlighting the environmental consequences of one's actions *only matter for behavior when individual attribution of responsibility frames are included*.

We also find strong support for hypothesis 6, which predicted that exposure to an economic effect frame paired with a government attribution of responsibility frame (condition 9, Figures 1, 2, and 3) would lead individuals to be less likely to make capital investments that save energy. Indeed, the results indicate that receiving the combination of these frames significantly decreases one's likelihood of insulating / weatherizing his / her home to save energy (-4.80%, Figure 1), information-seeking requests about insulation / weatherization (- 5.12%, Figure 2), and willingness to pay for insulation / weatherization (-8.03%, Figure 3).

Although we did not offer explicit hypotheses for the conditions in which there were competing responsibility attribution and effect frames (conditions 5 and 9), we see in both instances that it is the *negative (anti-investment)* frame that is stronger. For all three dependent measures, the combination of the negative and positive frame decreases the likelihood of investment behaviors in the range of 5% to 10%. We suspect this effect is a manifestation of a negativity bias (e.g., Baumeister et al. 2001). Taken together, we see two novel and important lessons from our findings across nine experimental conditions and three dependent variables:

- Mobilization of investing in the collective good (when it comes to energy) is challenging because it requires *both* persuading people to attribute responsibility to themselves for collective outcomes *and* the addition of a positive benefit resulting from one's actions (e.g., environmental) to increase the likelihood of individuals' taking action.
- Demobilization of investing in the collective good (when it comes to energy) is relatively easy because it appears that emphasizing either the economic effects *or* attributing responsibility to the government (or doing both) decreases individuals' willingness to act.

We recognize these can be seen as somewhat discouraging results as they reveal that inducing individuals to take actions for the collective good via communications is difficult. However, we also identify one effective route for mobilizing action. We also should note that the percentage movements in our figures are quite sizable when one considers all the other factors that drive such decisions – e.g., deeply held values, one's financial situation, and so on. In short, *communication* is an effective means of affecting the likelihood of collective action, although it appears easier to demobilize than mobilize action with communication.

Curtailed Behavior

We again see consistency in the impact of the experimental treatments across our two key dependent curtailed behavior measures (compare the effects of the experimental conditions in Figure 4 and Figure 5). Recall that we measured curtailed behavior by asking respondents how likely they are to adjust the home thermostat to save energy and if they would like to receive an email about Smart Energy

Meters that save energy. Each of these actions is a step that can immediately save individuals money but may involve lifestyle sacrifices stemming from reduced consumption.

[Insert Figures 4 and 5 About Here]

We again see little support for hypothesis 1: emphasizing individual responsibility attributions alone does not induce individuals to take actions that could benefit the collective. However, we do see clear support for hypothesis 2 (see condition 2, Figures 4 and 5). Attributing responsibility to government for collective outcomes causes people to avoid actions that would help the collective good. Exposure to this frame reduces the likelihood of adjusting one's home thermostat to save energy (-4.45%, Figure 4) and decreases interest in receiving information about Smart Energy Meters (-11.10%, Figure 5). In sum, attributions of responsibility have a powerful effect on willingness to engage in a collective action in this domain.

We find little support for hypothesis 3 regarding exposure to a positive environmental effect frame on willingness to curtail energy use, as was the case with investment behaviors. People do not appear to be mobilized to act when only informed of the environmental benefits (or when only exposed to an individual attribution of responsibility frame, see above results for hypothesis 1 on curtailment behavior). In contrast, we again find strong support for hypothesis 4, which in this case predicted *increased* curtailment because of the emphasis on the economic consequences of conservation. Highlighting the economic consequences associated with energy curtailment behavior increases the likelihood of adjusting one's home thermostat to save energy (5.73%, Figure 4) and requests to receive an email with information about Smart Energy Meters (9.09%, Figure 5).

There is clear evidence supporting our prediction regarding the mix of the individual responsibility attribution frame and environmental effect frame on curtailment behavior (hypothesis 5; see condition 8, Figure 4 and Figure 5). Similar to the investment result, when both individual attributions *and* environmental effects are invoked people are more willing to adjust the home thermostat to save energy (4.35%, Figure 4) and request information about Smart Energy Meters (10.37%). Although we did not offer an explicit prediction for condition 6 - which included an economic effect frame paired with

a competing government responsibility attribution frame - the economic effect frame overpowers the government attribution and leads to an increase in the likelihood of adjusting the thermostat to save energy (4.13%, Figure 4) and an increase in requests for information about Smart Meters (8.53%, Figure 5). We find this particularly intriguing because it shows the myopia with which people likely think. When it comes to investments where the payoffs are not immediate, invoking economic consequences decreases the likelihood of taking action, but when it comes to a quick turnaround savings, such as lowering the thermostat (which can be seen on one's next bill), emphasizing economic consequences increases curtailment. This coheres with a long line of work on the myopia that voters use in evaluating incumbents performance on the economy (Achen and Bartels 2004; Alesina, Londregan, and Rosenthal 1993; Fair 1978; Healy and Lentz 2012; Kiewiet 1983; Kramer 1971; see also, Healy and Malhotra 2009). We see similar dynamics in condition 5 where we also offer no explicit prediction. The individual attribution of responsibility frame paired with an economic consequences cost frame significantly increases the likelihood of adjusting the home thermostat to save energy (4.57%, Figure 4) and requests for an email about Smart Meters (8.53%, Figure 5). However, in condition 9, the government attribution of responsibility overpowers the environmental benefit frame – decreasing the likelihood of adjusting the home thermostat (-5.15%, Figure 4) and requests for information about Smart Meters (-8.43%). Taken together, our results on curtailment behavior suggest the following:

- Mobilization of curtailment activities in the interest of the collective good (when it comes to energy) is substantially less challenging than it is with respect to investment activities. Individuals can be persuaded to curtail energy use by referencing the economic consequences of these behaviors, *or*, as with investment, when there are frames both persuading people to attribute the responsibility to themselves for collective outcomes *and* the addition of a positive consequence resulting from one's action (e.g., environmental effects).
- Demobilization of curtailment activities (when it comes to energy) is more difficult than demobilizing investment actions. In the case of curtailment behaviors, it requires

communications highlighting government responsibility attributions and no reference to the economic effects.

Conclusion

We have shown that communications matter for collective action. Moreover, we have identified how these communications affect the likelihood of engaging in a collective action. Taken together, we view the central lessons as being:

- Communications are a critical part of inducing and/or demobilizing collective action. This is an area that has been almost entirely ignored in political science. But direct communication and the content of frames – i.e., attributions of responsibility and frames highlighting effects stemming from an action – can influence the likelihood of individuals engaging in a collective action. This has important consequences not only for understanding such actions but also efforts to mobilize collective action to conserve energy.
- When it comes to energy behaviors, it is critical to distinguish investment from curtailment. Mobilizing investment behaviors is challenging because it requires both an individual responsibility attribution frame *and* a frame highlighting a positive environmental result. Demobilization of investment simply requires a reference to short term costs or government responsibility attributions. On the other hand, mobilizing curtailment is much easier given the immediate cost saving. This reveals a myopic outlook on costs – immediate savings matter but long term investments that may save money do not (see Healy and Lenz 2012). Nonetheless, demobilization of energy curtailment simply requires the presence of a government responsibility attribution frame.

These results are particularly relevant because the frames we identified and used are prominently associated with energy conservation in published news stories. Indeed, we content analyzed articles related to U.S. energy conservation appearing in the *New York Times* and *USA Today* between 2001 and 2011 (n = 301). In terms of generating mobilization, the results are discouraging insofar as the government is the entity by far most attributed responsible for addressing the nation's energy policy (39%

of the articles in our sample compared to only 10.5% of the articles in our sample that explicitly mentioned individuals' responsibility for collective outcomes).

We also analyzed news stories for any discussion of the effects (positive and/or negative) resulting from an individual's actions in the domain of energy. The most prominent frames regarding the effects linked to energy conservation focus on the environmental benefits and economic consequences for consumers. We found that the environment as an effect frame is included in 55% of news articles, but consumer costs are included 51% of the time. Given the power of the costs frame, it suggests mobilization for investment may be unlikely. On the other hand, the results suggest that curtailment may occur much more frequently.

Our results show that frames in a communication can make a difference to the energy-related behaviors of citizens if the messages are carefully crafted to emphasize individual responsibility for the greater good and the positive collective consequences that will result from taking action. We believe the results are useful to practitioners seeking to mobilize voluntary efforts to reduce energy consumption. The success of these programs depends on the choices consumers make. Currently, people fail to adopt relatively straightforward actions such as using better insulation in homes that would significantly impact the nation's overall energy demand (Allcott and Mullainathan 2010). But perhaps most importantly, we show that communications and the content within have a causal impact on the willingness of individuals to engage in collective action behaviors – this is a research agenda in need of much further exploration.

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Table 1. Experimental Design

	No Consequences	Cost Consequences	Envir. Consequences
No Attribution	1 N = 179	4 N = 178	7 N = 177
Individual Attribution	2 N = 178	5 N = 176	8 N = 177
Government Attribution	3 N = 177	6 N = 178	9 N = 180

Figure 1. Likelihood of Investing in Insulation / Weatherization

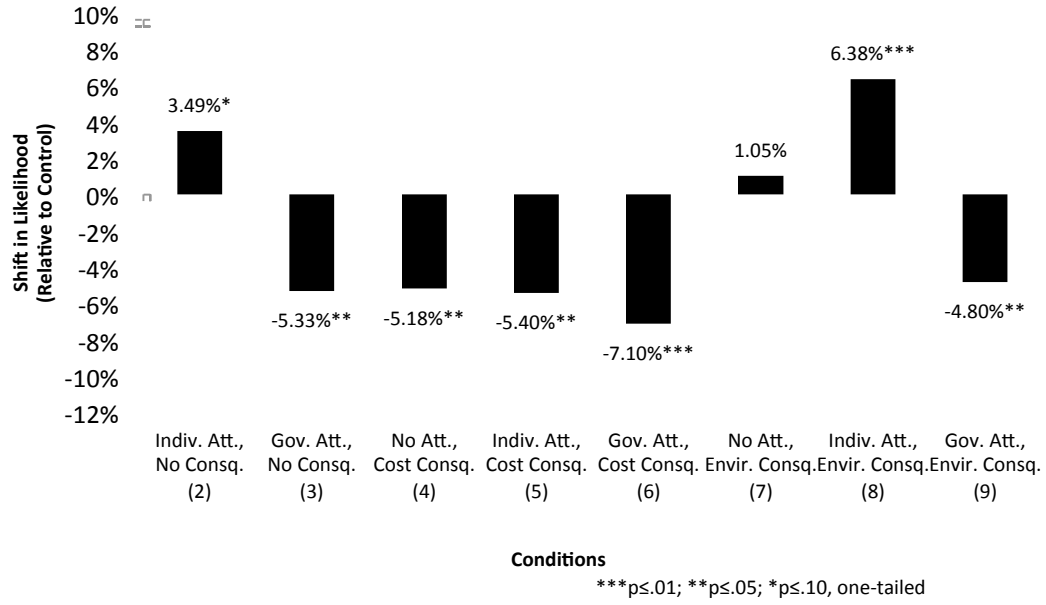


Figure 2. Percent Providing E-mail to Obtain More Information About Insulation / Weatherization

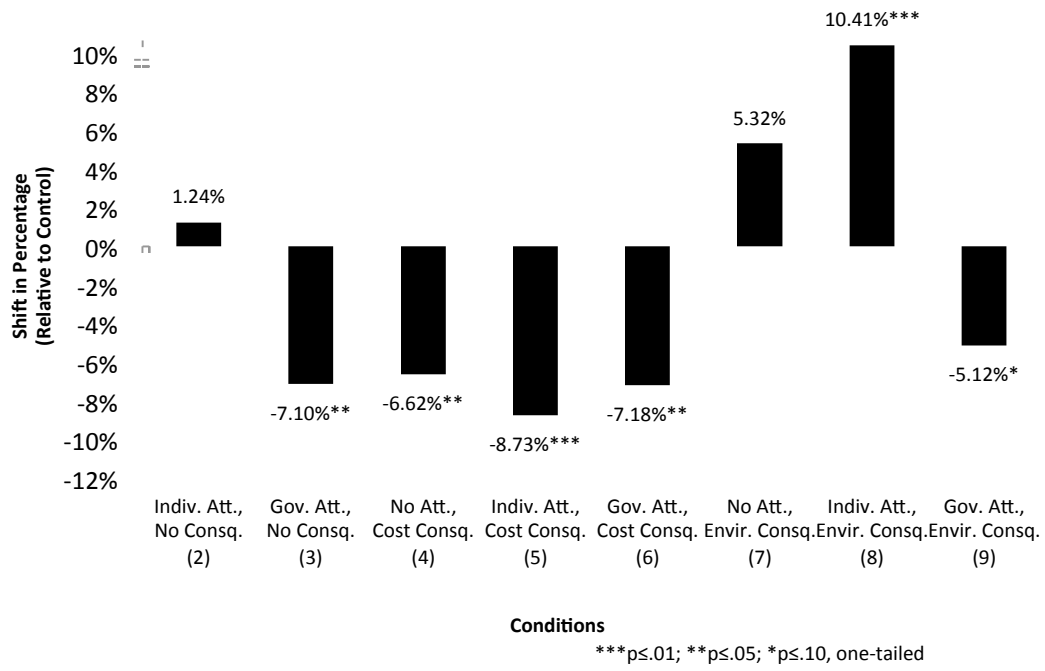


Figure 3. Maximum Pay for Insulation / Weatherization (\$0 to \$500)

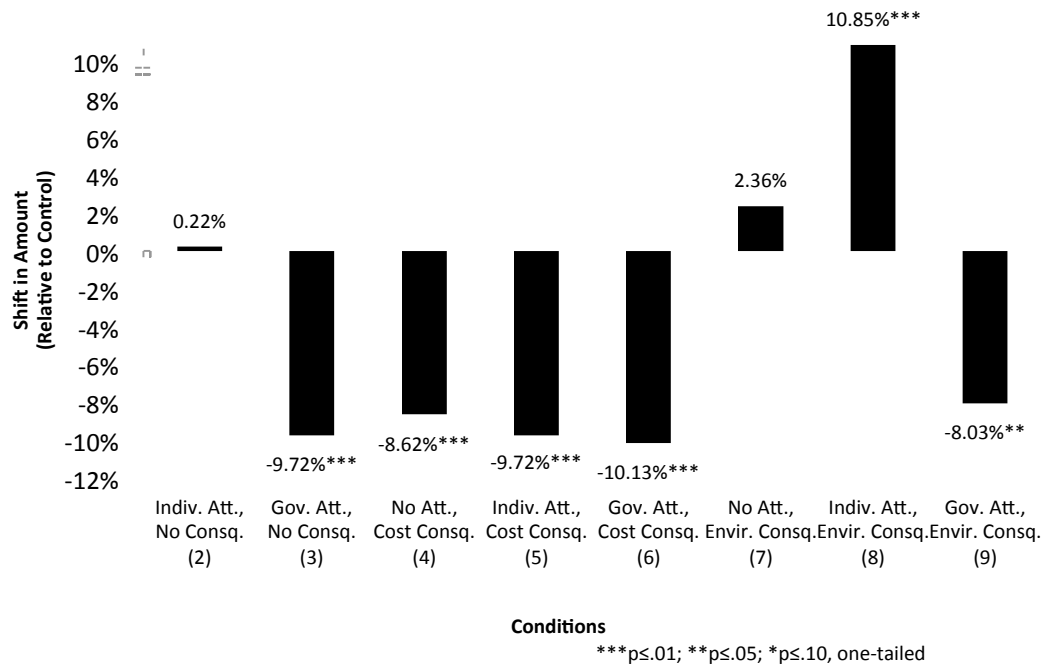


Figure 4. Likelihood of Adjusting Thermostat

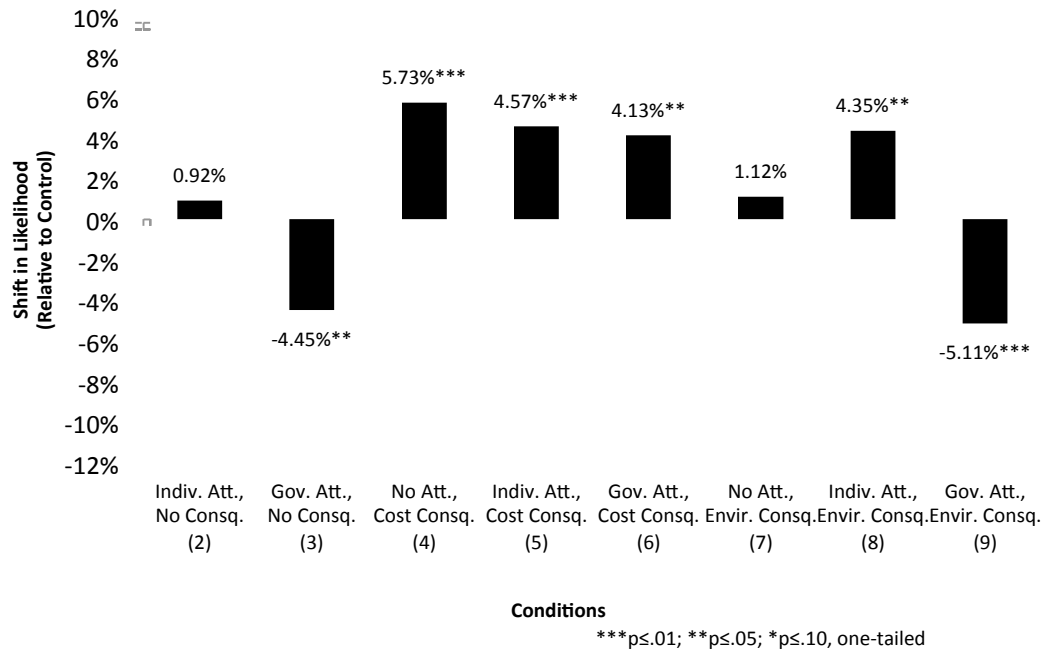
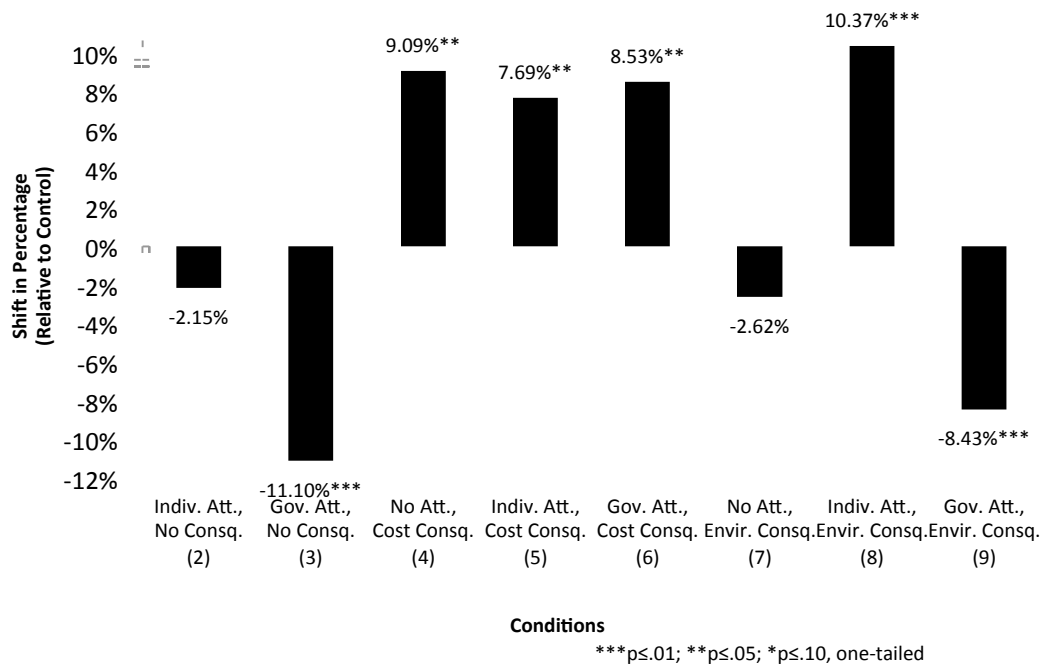


Figure 5. Percent Providing E-mail to Obtain More Information About Smart Energy Meters



Appendix

Table A-1: Means across Conditions for Dependent Measures

	<i>Likelihood of investing in insulation / weatherization (1 – 7 scale)</i>	<i>Email request for information on insulation / weatherization (0 / 1)</i>	<i>Maximum WTP for insulation / weatherization (\$0 - \$500)</i>	<i>Likelihood of adjusting home thermostat (1 – 7 scale)</i>	<i>Email request for information about Smart Energy Meters (0 / 1)</i>
Condition 1	4.49 (1.87)	.21 (.41)	232.00 (189.07)	5.44 (1.48)	.18 (.38)
Condition 2	4.74 (1.50)	.22 (.41)	233.08 (183.64)	5.50 (1.49)	.16 (.36)
Condition 3	4.12 (1.50)	.14 (.34)	183.41 (174.49)	5.12 (1.45)	.07 (.25)
Condition 4	4.13 (1.58)	.14 (.35)	188.90 (179.26)	5.84 (1.42)	.27 (.44)
Condition 5	4.11 (1.55)	.12 (.33)	183.39 (163.69)	5.76 (1.24)	.26 (.43)
Condition 6	4.00 (1.72)	.14 (.34)	181.35 (173.67)	5.73 (1.33)	.26 (.44)
Condition 7	4.57 (1.79)	.26 (.44)	243.81 (192.95)	5.51 (1.58)	.15 (.36)
Condition 8	4.94 (1.62)	.31 (.46)	286.24 (192.63)	5.74 (1.37)	.28 (.45)
Condition 9	4.16 (1.51)	.16 (.36)	191.87 (159.78)	5.08 (1.52)	.09 (.29)
Overall Mean	4.37 (1.66)	.19 (.39)	213.77(182.03)	5.53 (1.46)	.19 (.39)

Table A-2. Control Measures, Demographic, and Political Profile of Sample

Variable	Scale (Overall Distribution)	Average (std. dev.)
<i>Beliefs</i>		
Belief Importance (Environment)	Response to “When it comes deciding whether to insulate your home and/or lower your thermostat, how important to you is the effects of your decision on sustaining the environment?” (1= extremely unimportant (2%); 2 = very unimportant (2%); 3 = somewhat unimportant (3%); 4 = neither unimportant nor important (7%); 5 = somewhat important (18%); 6 = very important (29%); 7 = extremely important (39%)).	5.80 (1.39)
Personal Influence	Agreement with “taking actions that reduce my own personal consumption have an impact on the nation’s energy situation.” (1= strongly disagree (2%); 2= moderately disagree (3%); 3= slightly disagree (5%); 4= neither disagree nor agree (13%); 5= slightly agree (29%); 6= moderately agree (26%); 7= strongly agree (23%)).	5.34 (1.37)
Group Success	Agreement with “taking actions that reduce my own personal consumption have an impact on the nation’s energy situation.” (1= strongly disagree (3%); 2= moderately disagree (4%); 3= slightly disagree (6%); 4= neither disagree nor agree (19%); 5= slightly agree (29%); 6= moderately agree (22%); 7= strongly agree (17%)).	5.01 (1.46)
Belief Importance (Costs)	Response to “When it comes to deciding whether to insulate your home and/or lower your thermostat, how important to you is the cost involved?” (1= extremely unimportant (1%); 2= very unimportant (2%); 3= somewhat unimportant (4%); 4= neither unimportant nor important (10%); 5 = somewhat important (25%); 6= very important (32); 7= extremely important (25%)).	5.52 (1.32)
<i>Values</i>		
Post-Materialist Values	More important to “protect the environment” or “maintain prosperous economy”? (1= definitely protect environment (8%); 2= very likely protect environment (9%); 3= probably protect environment (10%); 4= equally important (43%); 5= probably maintain prosperous economy (13%); 6= very likely maintain prosperous economy (10%); 7= definitely maintain prosperous economy (7%)).	4.03 (1.55)
Heirarchicalism /Egalitarianism	Agreement with “We have gone too far in pushing equal rights in this country.” (1= strongly disagree (21%); 2= moderately disagree (9%); 3= slightly disagree (9%); 4= neither disagree nor agree (19%); 5= slightly agree (16%); 6= moderately agree (11%); 7= strongly agree (16%)).	3.95 (2.07)
Individualism/ Communitarianism	Agreement with “If the government spent less time trying to fix everyone’s problem, we’d all be a lot better off.” (1= strongly disagree (6%); 2= moderately disagree (6%); 3= slightly disagree (7%); 4= neither disagree nor agree (19%); 5= slightly agree (17%); 6= moderately agree (16%); 7= strongly agree (28%)).	4.96 (1.82)
<i>Demographics</i>		
Talk about politics	How many days a week, on average, do you talk about politics with your family and/ or friends? (0= never (17%); 1= 1 day/week (26%); 2= 2 days/week (17%); 3= 3 days/week (13%); 4= 4 days/week (7%); 5= 5 days/week (8%); 6= 6 days/week (3%); 7= every day (10%)).	3.53 (2.16)

Political Knowledge	Know majority required to over-ride veto (56% correct) Know which party has majority in U.S. House = (72% correct) Know whose responsibility it is to declare law unconstitutional = (76% correct) Know current U.S. Sec. of State = (67% correct)	.68 (.33)
Energy Knowledge	Know the world's largest exporter of oil = (63% correct) Know renewable energy sources = (63% correct) Know most U.S. oil not imported from ME = (24%)	.50 (.30)
Income	Estimate of family income (before taxes) < \$30,000 (24%); \$30,000 – \$69,999 (42%); \$70,000 – \$99,999 (19%); \$100,000 - \$200,000 (13%); > 200,000 (2%)	N/A
Education	What is the highest level of education you have completed? (1 = Less than high school (1%); 2 = High school (16%); 3 = Some college (39%); 4 = Four year college degree (31%); 5 = Advanced degree (13%).	N/A
Age	What is your age?	44.75 (16.43)
Female	Are you male (50%) or female (50%)	N/A
Minority	Which of the following do you consider to be your primary racial or ethnic group? (White = 73%; Minority = 27%).	N/A
TrustGov	How much of the time do you think you can trust the government in Washington to do what is right? (4 = just about always (2%); 3 = most of the time (18%); 2 = only some of the time (61%); 1 = never (20%))	2.02 (0.67)
Media	How often do you obtain energy information from... newspapers, TV, online (0-1 scale, alpha = .54)	.51 (.27)
Party Identification	Generally speaking, do you consider yourself a Democrat, Independent, or Republican? (1= strong Democrat (16%); 2= weak Democrat (9%); 3= lean Democrat (14%); 4= Independent (33%); 5= lean Republican (12%); 6= weak Republican (6%); 7= strong Republican(12%).	N/A
Pays Own Utilities	Do you pay directly for the utilities in your home (e.g., gas and/or electric bill), or is this paid for by someone else (e.g., a landlord)? Pay directly = 90%; Do NOT pay directly = 10%	N/A
House or Apt.	Do you live in a house (73%) or apartment (27%)?	N/A
Government Responsibility	Listed below are different sources people tend to see as responsible for addressing (or fixing) the energy situation. Rate how responsible you think each source is for dealing with the U.S.'s energy problems.	5.35 (1.46)
Consumer (effectiveness) ApphConsum	Response to "Do you think the success of energy policy depends on whether individual citizens take actions that reduce energy demand?" (1= not at all (2%); 2 = not much (3%); 3 = a little (7%); 4 = somewhat (14%); 5 = a good amount (29%); 6 = a great deal (29%); 7 = completely depends (17%))	5.18 (1.38)
Climate warm	How would you describe the climate in which you live (relative to other parts of the U.S. (1= extremely cold (2%); 2 = relatively cold (10%); 3 = moderate (42%); 4= relatively warm (21%); 5 = extremely warm (25%).	N/A

Table A-3. Determinants of Support for Action

	Likely to Insulate ^a	Max WTP Weatherize ^b	Email on Insulation ^c	Likely to Curtail ^a	Email on Smart Mtr. ^c
Experimental Conditions					
No Consequences + Individual Attribution (Condition 2)	.01 (.11)	3.90 (17.21)	.08 (.16)	.08 (.11)	-.13 (.16)
No Consequences + Government Attribution (Condition 3)	-.30*** (.11)	-42.82*** (17.26)	-.28* (.17)	-.24** (.11)	-.64*** (.19)
Cost Consequences + No Attribution (Condition 4)	-.32*** (.11)	-42.8*** (17.21)	-.25 (.16)	.37*** (.12)	.29* (.15)
Cost Consequences + Individual Attribution (Condition 5)	-.26** (.11)	-34.57** (17.32)	-.33* (.17)	.37*** (.12)	.28* (.16)
Cost Consequences + Government Attribution (Condition 6)	-.36*** (.11)	-49.99*** (17.21)	-.23 (.16)	.27** (.12)	.31** (.15)
Envir. Consequences + No Attribution (Condition 7)	.07 (.11)	18.43 (17.22)	.20 (.15)	.16 (.11)	-.14 (.16)
Envir. Consequences + Individual Attribution (Condition 8)	.33*** (.11)	63.51*** (17.27)	.42*** (.15)	.31*** (.11)	.37** (.15)
Envir. Consequences + Government Attribution (Condition 9)	-.30*** (.11)	-43.65*** (17.16)	-.17** (.16)	-.27** (.11)	-.45*** (.18)
Beliefs					
Importance of Environment	.05* (.02)	7.24* (3.79)	-.03 (.04)	.03 (.03)	.01 (.04)
Beliefs cont.					
Importance of Costs	.03 (.02)	.303 (3.57)	.03 (.03)	.03 (.02)	.03 (.03)
Collective Efficacy	.12*** (.03)	14.83*** (3.96)	.14*** (.04)	.13*** (.03)	.08** (.04)
Group Success	.09*** (.02)	10.14*** (3.66)	.01 (.03)	.10*** (.02)	.07** (.04)
Government Responsible	.04** (.02)	.839 (3.11)	.04 (.03)	.05** (.02)	.02 (.03)
Consumers Responsible	.01 (.02)	10.50*** (3.47)	.01 (.03)	.01 (.02)	-.02 (.03)
Effectiveness of	.03	.61	.11***	.06**	.04

Consumer Approaches	(.02)	(3.68)	(.04)	(.02)	(.04)
Values					
Post-materialism / materialism	-.04* (.02)	-10.79*** (3.08)	-.05* (.03)	-.02 (.02)	-.03 (.03)
Hierarchialism / Egalitarianism	.01 (.02)	-2.23 (2.40)	-.01 (.02)	-.00 (.02)	.01 (.02)
Individualism / Communitarianism	.03* (.02)	.03 (2.82)	-.00 (.03)	.03* (.02)	.02 (.03)
Demographics					
Income	.00 (.03)	15.55*** (4.46)	-.00 (.04)	-.04 (.03)	.05 (.04)
Education	.03 (.03)	11.21** (4.84)	.02 (.05)	.10*** (.03)	-.01 (.05)
Age	-.01*** (.00)	.00 (.28)	.00 (.00)	-.00 (.00)	.00 (.00)
Female	-.01 (.06)	-27.13*** (8.62)	-.05 (.08)	.14** (.06)	-.14* (.08)
Minority	.07 (.06)	-17.78* (10.01)	.07 (.09)	-.03 (.07)	.10 (.09)
	Likely to Insulate ^a	Max WTP Weatherize ^b	Email on Insulation ^c	Likely to Curtail ^a	Email on Smart Mtr. ^c
Demographics cont.					
Pay own utility	-.20 (.09)	-9.99 (14.34)	-.29 (.15)	-.33*** (.09)	-.10 (.14)
House (1) or Apartment (2)	-.52** (.06)	-84.15*** (9.67)	-.15 (.09)	-.20*** (.06)	-.19** (.09)
Knowledge & Political Characteristics					
Trust Government	.05 (.04)	-3.49 (6.65)	.08 (.06)	-.03 (.04)	.15** (.06)
Media use	-.11 (.13)	2.39 (20.02)	-.05 (.19)	.02 (.13)	.20 (.19)
Party Identification (Dem)	.02 (.02)	-.504 (3.19)	-.02 (.03)	.01 (.02)	.02 (.03)
Talk about politics	.05*** (.02)	2.96 (2.33)	.00 (.02)	.00 (.02)	.01 (.02)
Political Knowledge	.19* (.10)	47.56*** (15.49)	-.15 (.15)	.33*** (.10)	-.05 (.14)
Energy Knowledge	.22** (.10)	26.36* (16.21)	.21 (.15)	.06 (.11)	-.13 (.15)
Ideology	-.02 (.02)	-1.56 (3.72)	-.03 (.03)	-.02 (.02)	-.05* (.03)

Constant	-----	51.28 (49.56)	-2.04 (0.48)	-----	-2.18 (0.47)
Log-likelihood / R ²	-2771.32	.23	-710.12	-2390.11	-712.65
Number of observations	1600	1600	1600	1600	1600

^aEntries are ordered probit coefficients with standard errors in parentheses; ^b Entries are ordinary least squares (OLS) coefficients with standard errors in parentheses; ^c Entries are probit regression coefficients with standard errors in parentheses. *** $p < .01$; ** $p < .05$; * $p < .01$ (one-tailed tests).

Note: In assessing the impact of the additional covariates included in Table A-3, we highlight a number of interesting and sensible results. First, there is a highly significant and large impact across models in the belief that one's actions affect the national energy situation (see *collective efficacy*, Table A-2). Also supporting the CI model (Finkel and Muller 1998; Lubell, Zahran, and Vedlitz 2007), we find that perceptions about *group success* shape behavioral intentions, willingness to pay, and information-seeking behavior across models. Interestingly, the impact of many of the other control variables is spotty and in some cases these variables have no effect. *Post-materialist* values increase willingness to make capital investments; however, they have no effect on curtailment behaviors. Political and energy knowledge tend to increase willingness to take action across models, which is consistent with extant work on knowledge lowering the costs associated with taking a collective action (e.g., see Lubell, Zahran, and Vedlitz 2007). There are several other variables that are significant in one or two models only; however, the impact of the remainder of the control variables is not overwhelming. It is notable that across both types of behavior party identification and ideology largely are insignificant predictor variables - although liberals are marginally more likely than conservatives to request information about Smart Energy Meters.