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Emphasis Framing and the Role of Perceived Knowledge: A Survey Experiment

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Abstract

The relationship between emphasis framing and public opinion has received considerable attention in political science, psychology, and mass communication studies. However, what moderating role perceived knowledge plays in influencing emphasis framing remains unsettled. We explore this relationship using a survey-experiment embedded within a large-N, nationally representative survey that allows us to test two specific hypotheses. First, we empirically test whether an emphasis frame influences policy support. Second, we test the moderating effect of perceived knowledge. We test the emphasis framing effects of the name given to a "hot-button" political issue, while controlling for other survey treatments. Furthermore, we evaluate the degree to which perceived knowledge of the issue moderates the relationship between the emphasis frame and support for hydraulic fracturing. We find support both for the role emphasis framing plays and for perceived knowledge as a moderator.

KEY WORDS: energy, environment, media, pollution

Introduction

What roles do emphasis framing effects play in influencing political support for different public policies? Are individuals with different levels of perceived knowledge more or less influenced by emphasis framing? Is it the case that individuals with less knowledge are more influenced by emphasis framing because of their lack of knowledge? Or is it the case that individuals with more knowledge are more likely to have that knowledge triggered by emphasis framing? These are questions that political scientists, psychologists, and mass communication scholars have been examining for quite some time, but they remain questions for which scholars do not have definitive answers (Borah, 2011; Chong & Druckman, 2007a; De Vreese, 2012).

Using data from a representative, national public opinion survey of adults in the United States, we are able to examine multiple facets of these questions. Scholars have repeatedly demonstrated how individual preferences are subject to emphasis framing effects. We examine the roles emphasis framing and perceived knowledge play in influencing political support for a "hot-button" political issue. We examine these relationships using multiple multivariate models and two different dependent variables and modeling strategies. The empirical results from these models provide evidence lending support to the influence of emphasis framing and the moderating effect of perceived knowledge.

In particular, we find evidence for the general influence of emphasis framing on political support for public policies. This evidence holds across nearly all

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specifications of the models; however, we find that this relationship is heavily moderated by the role of perceived knowledge. In every iteration of our models, we find that those with high levels of perceived knowledge are more influenced by the emphasis frame. Our models suggest that the "fracking" frame results in respondents being 7.6% less likely to support the policy in our probit model and 11% more likely to oppose the policy in our ordered probit model under conditions in which the respondent reported having high levels of perceived knowledge. These findings suggest that while individuals, on average, are likely to be influenced by emphasis frames, the emphasis frame is much more likely to be triggered when the individual believes they have a lot of knowledge concerning a topic. On the contrary, if individuals believe they have little to no knowledge of the policy topic, we find no evidence that they are influenced by the emphasis frame.

Hydraulic fracturing refers to the extraction of natural gas and petroleum from a process that injects high-pressure fluids into either natural or created deep-rock formations, thereby allowing the natural gas or petroleum to be released. Given the political debate over hydraulic fracturing, it makes for an interesting case study for developing an understanding of the role emphasis framing and perceived knowledge play in explaining who supports which types of policies in this contentious debate. In the next section, we discuss reasons for how emphasis framing and perceived prior knowledge may interact to influence political support for a contentious political issue, such as hydraulic fracturing.

Literature Review

Framing Effects

Framing effects in individual decision making were brought to prominence in the psychology field—work later to be associated with behavioral economics—through the work of Tversky and Kahneman (1981, 1986) and Kahneman and Tversky (1984). These authors, building upon their previous work in decision making, highlight the important role framing plays in influencing individuals' stated values and preferences. These types of frames are known as "logically equivalent" frames. The most commonly accepted framing definition defines framing as an effect that occurs when two "logically equivalent (but not *transparently* equivalent) statements of a problem lead decision makers to choose different options" (Rabin, 1998, p. 36, emphasis in original).

However, for the purposes of this paper we explore a slightly different area of framing. We are interested in what Nelson, Oxley, and Clawson (1997), Jacoby (2000), Druckman (2004), Sniderman and Theriault (2004), and many others call "issue framing." Issue framing can be defined as how "framing effects occur when different presentations of an issue generate different reactions among those who are exposed to the issue" (Jacoby, 2000, p. 751). The construct of issue framing has been used to explore the relationship between how a political issue is presented and how this presentation might influence public opinion.

Many scholars have examined a variety of political issues in which issue framing may play a role in influencing public opinion. Iyengar (1991) shows that different types of media frames encouraged viewers to place blame for social problems on either internal or external attributions. Additionally, Nelson and Kinder (1996) find that utilizing different frames for policy issues such as welfare, affirmative action, and AIDS influence predictors of public opinion toward these policy issues. Nelson and colleagues (1997) provide empirical evidence that framing is a distinct construct separate from mere persuasion. They also find an interesting relationship between sophistication of knowledge and framing effects. They find that *more informed* individuals are more likely to be influenced by the framing in their experiment. They believe that this suggests framing does not result in a belief change among less informed individuals, but rather the frame encourages well-informed respondents to lend greater weight to already held beliefs.

In a separate study, Jacoby (2000) examines how issue framing influences public opinion on government spending. In this article, Jacoby differentiates between general and specific issue frames. Jacoby defines a general issue frame as "an interpretation that focuses on the disputed governmental activity itself. Little attention is paid to the underlying causes or consequences of any policy initiatives that may result from the resolution of the issue" (p. 751). Furthermore, Jacoby defines a specific issue frame as a frame that "explicitly links governmental activities with targets in society" (p. 751). Jacoby finds that both general and specific frames strongly influence public opinion on government spending. Jacoby also suggests, from his analysis, that "framing effects can be generated simply by varying the presentation of an issue" (p. 763). This is a claim that we will examine further in the context of political support for hydraulic fracturing in one's own local community.

There remain several, important, unresolved issues in the discussion of the efficacy and power of issue framing in affecting citizen attitudes and behaviors that we are addressing in this manuscript. The first is the charge leveled by Chong and Druckman in the Table 1 matrix of their *American Political Science Review* article in 2007, that there are few, if any, empirical studies that examine the impact of multiple, competing frames (Chong & Druckman, 2007b). We address this major shortcoming directly in the 3 X 2 X 3 framing matrix experiment discussed later. In that experiment we lay out 3 sources of the frame, 2 names for the energy extraction technique, and 3 risk parameters. With this multiple frame design, we can help fill in this important gap and begin to address the explanatory power of competing, multiple frames.

Second, we go beyond the current literature by focusing on the role that scientific and technical, not just political, knowledge may be playing in moderating and conditioning framing effects. The need for this greater knowledge precision was laid out clearly in Andrews, Clawson, Gramig, and Raymond (2016) when they note that "there is surprisingly little research on the effect of other forms of knowledge or expertise on the influence of frames." They go on to add that "research has paid scant attention to how this distinctive form of expertise might moderate framing effects" (Andrews et al., 2016, p. 3).

Third, we further expand on the role of specific knowledge by differentiating between perceived scientific and technical expertise and objectively measured indicators of this expertise in sorting out the effects of knowledge in evaluating the power of frames. A number of scholars have pointed out the important distinction between perceived and actual knowledge in evaluating citizen risk assessments and policy options (see, for example, Kellstedt, Zahran, & Vedlitz, 2008; Malka, Krosnick, & Langer, 2009; Stoutenborough & Vedlitz, 2014).

We hypothesize that our emphasis frame will influence respondents' views about their support for hydraulic fracturing in their community. Early on in the debate around hydraulic fracturing, the term "fracking" has been used by those who view the energy extraction technique negatively. Additionally, the term "fracking" is assumed to have a negative connotation when compared to the term hydraulic fracturing. Specifically, our first hypothesis is that we expect those who are given the word "fracking," as opposed to "hydraulic fracturing," to describe the energy extraction technique will be less likely to support the energy extraction technique in their community (H1).

We go beyond the current framing literature that focuses on the relationship between framing and political knowledge by considering the moderating effect that specific scientific and technical knowledge may play in influencing frames, either by strengthening or limiting, their influence.

The Important Role of Knowledge

In examining the factors that affect policy choices and levels of support researchers have consistently found that general and topic knowledge are important explanatory factors (see, for example, Hmelo-Silver, 2004). In addition, major theory builders of the policy process, like Sabatier and Weible (2007) make it clear that knowledge is a major influence. It is not surprising then that many researchers find knowledge levels as important predictors of policy choice (Lubell, Vedlitz, Zahran, & Alston, 2006; Lubell, Zahran, & Vedlitz, 2007; Stoutenborough, Sturgess, & Vedlitz, 2013). It is a reasonable expectation, then, that those who better understand a policy area, like energy, will likely have policy choices that differ from those with more domain-specific information. For us the key question under investigation is the role that knowledge and framing may be playing together in this citizen decision process.

Knowledge as a Moderator

Chong and Druckman (2007a), in a review of the current state of framing research, discuss the conflicting results from the examination of political knowledge as a moderator in the relationship between issue framing and individual opinions. Chong and Druckman highlight the role that political knowledge plays as a moderator is mixed. As mentioned above, Nelson and colleagues (1997) find that framing effects are stronger for individuals with more political knowledge. Slothuus (2008), Miller and Krosnick (2000), and Krosnick and Brannon (1993) find similar results. On the other hand, several studies (Haider-Markel & Joslyn, 2001; Kinder & Sanders, 1990; Schuck & de Vreese, 2006) find that framing effects are stronger for less politically knowledgeable individuals.

Several theoretical arguments have been suggested for why perceived knowledge of a policy issue might either strengthen or weaken the effect of the emphasis frame. Nelson and colleagues (1997) suggest that "framing effects derive not from the presentation of new information but from the activation of portions of recipients' existing knowledge structures, these effects should be as powerful among subjects who are familiar with (a political issue) arguments as among less informed subjects" (p. 233). Slothuus (2008), building directly on the work of Nelson and others, including Zaller (1992) and Zaller and Feldman (1992), discusses how the more aware an individual is the more likely they have thought about a political issue, and thus they have more issue frames on which to draw. While the preponderance of previous research supports the view that frames are more significant for those with greater knowledge, there are a few dissenting views. For example, Schuck and de Vreese (2006) find that those with *less* political knowledge are *more* influenced by their frame, but their frame essentially paints an issue as either a "risk" or an "opportunity."

Our second hypothesis is that if a specific frame is used to emphasize a certain characteristic of a policy, individuals with more technical knowledge concerning the particular policy topic area, not just the political aspects, will be more likely to be influenced by the emphasis frame (H2).

Framing Survey Experiment

Data

To test the effects of emphasis framing and moderating effects of perceived knowledge on policy support, we use a randomly assigned survey vignette that was embedded in a 2012 National Energy Policy Survey. The survey was in the field from May 11, 2012 through May 26, 2012. The sample was drawn from GfK's KnowledgePanel®, a probability-based web panel that is designed to be representative of the United States for adults age 18 and over. The survey was offered in English and targeted to adults over the age of 18. The survey had 1,525 respondents with a completion rate of 62%. The median completion time was about 29 minutes. The survey was designed to help researchers better understand how U.S. citizens view the risks and benefits of various energy sources and policy choices. The questionnaire for the survey can be found in the online supplemental materials.

As part of this survey, questions were asked about a wide array of citizen preferences including trustworthiness of information sources, general concern about a variety of energy sources, perceived knowledge of a variety of energy sources, political ideology, and a survey experiment designed to capture how a variety of factors influence an individual's support or opposition of hydraulic fracturing. We utilize several of these questions to help understand the relationship between framing and political support; however, the experiment serves as the primary source of information. The survey instrument can be found in the supporting information included with the online version of this article.

Experiment

Embedded within the National Energy Policy Survey is an experiment vignette designed to capture factors that influence support or opposition of hydraulic fracturing.[1] The experiment utilizes three randomly assigned factors: information source (your local newspaper, EPA officials, or industry officials), the name of the energy extraction technique (hydraulic fracturing vs. fracking), and the risk of negative outcomes in the form of odds (one in a hundred, one in a thousand, or one in a million) of releasing cancer-causing chemicals into your local water supply. Each factor was randomly assigned to each respondent. The vignette reads as follows:

> If (information source) reported that (name of energy extraction technique) may result in (risk of negative outcome) chance of releasing cancer-causing chemicals into your local water supply – would you support or oppose the use of (name of energy extraction technique) in your local community? (Support, Oppose, No Opinion).

Multivariate Evidence for Emphasis Framing

Methods

Multivariate analysis of the support or opposition of hydraulic fracturing provides a test for the independent effects of the three factors in the vignette (name of energy extraction technique, source of information, and risk of negative outcomes). Given the randomized nature of the vignette, you could simply conduct a series of *t* tests of political support by options within each factor, but this becomes a bit unwieldy when the factors have more than two options. So, given that we have three treatment options for both source of information and risk of negative outcomes, we elect to use multivariate approaches. We use two multivariate estimation techniques: probit maximum likelihood estimator and ordered probit maximum likelihood estimator to estimate a total of eight models. For each estimation technique we estimate a "base model" in which we include our set of independent variables, controls, and include perceived knowledge as an independent variable, and then, we estimate our model on three separate subsamples: individuals with low perceived knowledge, individuals with medium perceived knowledge, and individuals with high perceived knowledge.

Dependent Variables

We use these two estimation techniques to explore two slightly different dependent variables. For both estimation techniques, we construct our dependent variable from the following question that immediately follows the experiment from the survey: "would you support or oppose the use of (name of energy extraction technique) in your local community? (Support, Oppose, No Opinion)." The first dependent variable we construct is a dichotomous variable, which we call "Support," for which respondents that gave the answer of "support" are assigned a value of 1 and those that gave a response of "oppose" are given a value of 0 for this variable. This approach allows for a direct comparison of those who support the policy to those who oppose the policy. Unfortunately, this approach does not include those who reported "no opinion."

In order to account for respondents who selected "no opinion," we construct a second dependent variable that we call "Ordered Support." For this measure, we assume that individuals have a continuum that is their broad level of support for this policy. Those with the lowest levels of support for the policy will respond that they oppose this policy. Those that have middling levels of support for the policy will respond that they have no opinion. Finally, those that have higher levels of support for this policy will respond that they support this policy. Thus, you can think of the responses of oppose, no opinion, and support as being various responses to a continuum of overall support for the policy. In this instance, individuals who respond with “oppose” are given a value of 1 on this variable; those individuals who respond with “no opinion” are given a value of 2 of this variable; and those individuals who respond with “support” are given a value of 3 for this variable. This approach allows us to estimate an ordered probit model and examine the relationship between emphasis framing, knowledge as a moderator, and increasing levels of support for the policy.

Independent Variables

In both sets of models (probit and ordered probit) we create sets of dichotomous variables for each of the possible options within each experiment factor. For the “name of energy extraction technique” emphasis frame, if the respondent received the “Hydraulic Fracturing” treatment they were given a 1 for the hydraulic fracturing variable and a 0 for the fracking variable. The opposite would be true for the respondent who received the “Fracking” treatment. Furthermore, for the “information source” we construct three dichotomous variables: Local newspaper, EPA official, and industry official. Each of these variables is given a value of 1 for the respondents who received the treatment that corresponds with the name of the variable. For example, if in the vignette the respondent was told that the information came from an “EPA Official” then the respondent would be given a 1 on the EPA official variable and a 0 on the newspaper and industry official variables. Again, this same process is utilized for the odds variables.

For our perceived knowledge variable, we use the following survey item:

> How much if anything, have you heard about a process called [“hydraulic fracturing”/“fracking”] that is used to extract natural gas from underground rock formations? Have you heard….
>
> A lot
>
> A little
>
> Nothing at all

We assign a value of 1 to those respondents who have heard “nothing at all” about hydraulic fracturing, a value of 2 to those who have heard “a little” about hydraulic fracturing, and finally, a value of 3 to those who have heard “a lot” about hydraulic fracturing. Our other independent variables include measures of political ideology, general concern about the environment, gender, education, and age. We use these variables to control for other factors that may influence the respondent’s preferences concerning support or opposition of hydraulic fracturing. Political ideology is measured on a seven-point scale in which higher values represent individuals who report being more conservative. The respondent’s general concern for environment is measured on an eleven-point scale in which higher values

Table 1. Variable Means and Standard Deviations

	Mean	Sd.	Min.	Max.
Support	0.236	0.425	0	1
Ordered support	1.617	0.761	1	3
Frame: Fracking	0.515	0.500	0	1
Frame: Hydraulic fracturing	0.485	0.500	0	1
Source: Local newspaper	0.349	0.477	0	1
Source: EPA official	0.322	0.467	0	1
Source: Industry official	0.329	0.470	0	1
Odds: 1 in a million	0.346	0.476	0	1
Odds: 1 in a thousand	0.325	0.469	0	1
Odds: 1 in a hundred	0.329	0.470	0	1
Political ideology	4.278	1.549	1	7
Perceived knowledge	2.142	0.741	1	3
General concern	4.952	3.200	0	10
Male	0.489	0.500	0	1
Education	10.29	1.987	1	14
Age	48.85	17.13	18	94
Observations	1525			

correspond to higher levels of concern. The education variable is measured using fourteen categories of education, where higher levels of education correspond to categories with larger numbers. In Table 1, we report the summary statistics for both our dependent variables and independent variables.

Results for Probit Models

Table 2 displays the results from our four probit models with the support variable as our dependent variable. As Table 2 displays, for the base support model, we find a statistically significant effect for our emphasis frame at the .05 level. Respondents are 4.4 % less likely to support the energy extraction technique when “fracking” is the name used for the technique, as opposed to using the term hydraulic fracturing. We also find that if the odds are one in a million chances that hydraulic fracturing releases cancer-causing chemicals in the local water supply, respondents are 19% more likely to support hydraulic fracturing in their local community than if the odds are one in a hundred.

Political ideology, perceived knowledge, general concern, gender, and age are all also predictors of support for the energy extraction technique. The more conservative individuals report being, the more likely they are to support the energy extraction technique in their local community (.01 level). The more perceived knowledge respondents have, the less likely they are to support the energy extraction technique in their community (.01 level). The more concerned individuals are about the energy extraction technique, the less likely they are to support it (.01 level). Males are 9% more likely to support the energy extraction technique (.01 level). And, finally, as age increases, individuals are more likely to support the energy extraction technique (.10 level).

The low knowledge and medium knowledge model results are similar to the base model with a couple of notable exceptions. First, our main variable of interest, the emphasis frame, is no longer significant. So, for those who report low (nothing at all) or medium (a little) knowledge, the emphasis frame is not statistically significant. Second, age is no longer a significant predictor in either of these models. The one in a

Table 2. Marginal Effects of Support Models

	Support ME/SD	Support-Knowledge Low ME/SD	Support-Knowledge Med ME/SD	Support-Knowledge High ME/sd
Frame: Fracking	−0.044**	0.043	−0.045	−0.076**
	(0.0225)	(.0420)	(.0363)	(.0360)
Frame: Hydraulic fracturing	—	—	—	—
Source: Local newspaper	0.033	0.12**	0.037	−0.0086
	(.0273)	(.0509)	(.0428)	(.0430)
Source: EPA official	0.020	0.065	−0.019	0.059
	(.0277)	(.0506)	(.0432)	(.0434)
Source: Industry official	—	—	—	—
Odds: 1 in a million	0.19***	0.14***	0.20***	0.17***
	(.0260)	(.0481)	(.0405)	(.0466)
Odds: 1 in a thousand	0.047	−0.040	0.055	0.085
	(.0293)	(.0538)	(.0445)	(.0521)
Odds: 1 in a hundred	—	—	—	—
Political ideology	0.043***	0.025**	0.062***	0.0034
	(.0072)	(.0126)	(.0121)	(.0118)
Perceived knowledge	−0.11***	—	—	—
	(.0158)			
General concern	−0.034***	−0.058***	−0.034***	−0.0014
	(.0033)	(.0040)	(.0059)	(.0058)
Male	0.090***	0.071*	0.086**	0.075**
	(.0226)	(.0427)	(.0349)	(.0358)
Education	−0.0028	0.0079	−0.00052	−0.016
	(.0058)	(.0124)	(.0087)	(.0099)
Age	0.0013*	0.00089	0.0016	−0.00089
	(.0007)	(.0012)	(.0011)	(.0011)
Pseudo R^2	0.25	0.45	0.24	0.12
Number of observations	1057	273	454	330

Note: Probit estimation. Low, Med, and High reference levels of reported perceived knowledge.
Significance levels $*p<.10$, $**p<.05$, $***p<.01$.

million odds, political ideology, general concern, and gender variables, however, are all still statistically significant and in the same direction as the base model.

Our high (a lot) knowledge model looks a bit different from the low and medium models. First, our emphasis frame variable is significant at the .05 level. This suggests that among those who report high knowledge of the extraction technique, those who received the “fracking” frame are 7.6% less likely to support the use of the extraction technique in their community. This suggests that those who are most influenced by the emphasis frame are those individuals who report having the most knowledge about the energy extraction technique. Furthermore, in the high knowledge model, both the political ideology and general concern variables lose statistical significance. Males remain more likely to support the use of the energy extraction technique; males are 7.5% more likely to support the energy extraction technique than females. The one in a million variable also remains positive and significant. Those respondents who received the one in a million odds prompt are 17% more likely to support the energy extraction technique in their community than those who received the one in a hundred prompt.

Results for Ordered Probit Models

For our second set of models, we use an ordered probit to estimate the predictors of our ordered support variable. Again, we use this additional estimator and dependent variable to account for those individuals who chose no opinion in response to the question of whether or not they supported the energy extraction technique in their community. In Table 3, we report the average marginal effect for each independent and control variable for each level of the ordered support variable (oppose, no opinion, and support). Substantively, overall, the ordered probit results resemble the results from the probit models. In our base ordered probit model, the emphasis frame is statistically significant. When the "fracking" frame is used, respondents are 5% more likely to report that they oppose the energy extraction technique and 3.3% less likely to report that they support the energy extraction technique. This result is significant at the .05 level. Additionally, the odds variables, one in a million and one in a thousand, are both significant at the .01 level. Those respondents who received the one in a million odds prompt are 13% more likely to support the energy extraction technique while those who received the one in a thousand odds prompt were 5.2% more likely to support the energy extraction technique, both when compared to one in a hundred odds.

The findings for the additional variables in the base ordered probit model also closely mirror the base probit model. Individuals who report being more conservative are more likely to support the energy extraction technique (.01 level). Those with higher levels of perceived knowledge are less likely to support the energy extraction technique (.01 level). Those who are more concerned about the energy extraction technique are less likely to support it in their community (.01 level). Males are more likely to support the energy extraction technique. Males are 5.4% more likely than females to respond that they support the energy extraction technique in their community. Finally, unlike the probit base model, education is significant and age is not, in the ordered probit base model. Individuals with higher levels of education are less likely to support the energy extraction technique.

The low and medium knowledge ordered probit models also closely mirror the substantive results from the low and medium knowledge probit models. The emphasis frame is not significant in either of these models. The one in a million odds variable is significant and positive in both models, and the one in a thousand model is positive and significant in the medium knowledge model. Political ideology is a significant predictor in both the low and medium knowledge models at the .05 and .01 levels, respectively. Again, here, the more conservative respondents report being, the more likely they are to support the energy extraction technique. General concern is a significant predictor at the .01 level across both the low and medium knowledge models, while gender is only significant in the medium knowledge model.

Finally, our high knowledge ordered probit model also closely resembles the substantive findings from the high knowledge probit model. The emphasis frame, for the high knowledge model, is significant at the .01 level. Individuals who received the "fracking" frame were 11% more likely to oppose the energy extraction technique and 4.3% less likely to support it than were the individuals who received the "fracking" frame. The one in a million and one in a thousand variables also remain statistically significant at the .01 and .05 levels, respectively. Political ideology and general concern, however, are no longer significant predictors. On the other hand, age, gender, and education are all significant at the .10, .05, and .01 levels, respectively. Males who report high levels of knowledge are 3.4% more

Table 3. Marginal Effects of Ordered Support Models

	(1) OSupport Marginal Effect	(2) OSupport-Low Marginal Effect	(3) OSupport-Med Marginal Effect	(4) OSupport-High Marginal Effect
Frame: Fracking				
Oppose	0.05017**	−0.04769	0.04771	0.1082***
	(0.02183)	(0.03959)	(0.03302)	(0.03933)
No opinion	−0.01751**	0.005927	−0.01575	−0.06512***
	(0.007681)	(0.004930)	(0.01101)	(0.02381)
Support	−0.03266**	0.04176	−0.03195	−0.04306***
	(0.01425)	(0.03478)	(0.02216)	(0.01657)
Frame: Hydraulic fracturing				
Frame: Local newspaper				
Oppose	−0.03564	−0.1091**	−0.04262	−0.0001720
	(0.02654)	(0.04814)	(0.03993)	(0.04764)
No opinion	0.01244	0.01356**	0.01407	0.0001036
	(0.009279)	(0.006153)	(0.01324)	(0.02868)
Support	0.02321	0.09555**	0.02854	0.00006848
	(0.01730)	(0.04250)	(0.02679)	(0.01896)
Frame: EPA official				
Oppose	−0.03160	−0.03179	−0.01047	−0.08364*
	(0.02703)	(0.04898)	(0.04027)	(0.04965)
No opinion	0.01103	0.003950	0.003458	0.05035*
	(0.009447)	(0.006086)	(0.01331)	(0.02998)
Support	0.02057	0.02783	0.007014	0.03329*
	(0.01762)	(0.04293)	(0.02697)	(0.02017)
Frame: Industry official				
Odds: 1 in a million				
Oppose	−0.2051***	−0.1933***	−0.2302***	−0.1854***
	(0.02564)	(0.04641)	(0.03792)	(0.04789)
No opinion	0.07159***	0.02402***	0.07603***	0.1116***
	(0.009647)	(0.006678)	(0.01396)	(0.02920)
Support	0.1336***	0.1692***	0.1542***	0.07381***
	(0.01750)	(0.04132)	(0.02688)	(0.02117)
Odds: 1 in a thousand				
Oppose	−0.07922***	−0.01375	−0.1016**	−0.1207**
	(0.02745)	(0.05001)	(0.04052)	(0.05121)
No opinion	0.02765***	0.001709	0.03354**	0.07263**
	(0.009635)	(0.006192)	(0.01353)	(0.03092)
Support	0.05157***	0.01204	0.06802**	0.04803**
	(0.01803)	(0.04383)	(0.02754)	(0.02130)
Odds: 1 in a hundred				
Political ideology				
Oppose	−0.04822***	−0.02701**	−0.06665***	−0.006085
	(0.007296)	(0.01268)	(0.01132)	(0.01390)
No Opinion	0.01683***	0.003357**	0.02201***	0.003663
	(0.002674)	(0.001608)	(0.004077)	(0.008367)
Support	0.03139***	0.02366**	0.04464***	0.002422
	(0.004917)	(0.01119)	(0.008066)	(0.005538)
Perceived knowledge				
Oppose	0.08701***	0	0	0
	(0.01615)	(.)	(.)	(.)
No opinion	−0.03036***	0	0	0
	(0.005908)	(.)	(.)	(.)
Support	−0.05664***	0	0	0
	(0.01067)	(.)	(.)	(.)
General concern				
Oppose	0.03902***	0.06181***	0.03776***	0.009899
	(0.003320)	(0.004298)	(0.005625)	(0.006442)
No opinion	−0.01362***	−0.007682***	−0.01247***	−0.005959
	(0.001362)	(0.001425)	(0.002134)	(0.003887)
Support	−0.02540***	−0.05413***	−0.02529***	−0.003940
	(0.002364)	(0.003965)	(0.004015)	(0.002610)

Table 3: *Continued*

	(1) OSupport Marginal Effect	(2) OSupport-Low Marginal Effect	(3) OSupport-Med Marginal Effect	(4) OSupport-High Marginal Effect
Male				
Oppose	−0.08337***	−0.05859	−0.06930**	−0.08542**
	(0.02198)	(0.04023)	(0.03274)	(0.04101)
No opinion	0.02909***	0.007282	0.02289**	0.05142**
	(0.007802)	(0.005034)	(0.01100)	(0.02482)
Support	0.05427***	0.05131	0.04641**	0.03400**
	(0.01448)	(0.03537)	(0.02206)	(0.01683)
Education				
Oppose	0.01318**	−0.008659	0.003687	0.03830***
	(0.005716)	(0.01163)	(0.008351)	(0.01031)
No opinion	−0.004599**	0.001076	−0.001218	−0.02305***
	(0.002013)	(0.001432)	(0.002760)	(0.006305)
Support	−0.008579**	0.007583	−0.002469	−0.01524***
	(0.003731)	(0.01021)	(0.005594)	(0.004500)
Age				
Oppose	−0.0006786	−0.0003786	−0.001026	0.002124*
	(0.0006677)	(0.001232)	(0.001007)	(0.001210)
No opinion	0.0002368	0.00004706	0.0003389	−0.001278*
	(0.0002334)	(0.0001537)	(0.0003342)	(0.0007311)
Support	0.0004418	0.0003316	0.0006873	−0.0008452*
	(0.0004349)	(0.001079)	(0.0006755)	(0.0004926)
Pseudo R^2	0.11	0.28	0.12	0.06
Number of observations	1443	319	628	496

Note: Ordered probit estimation. Low, Med, and High reference levels of reported perceived knowledge. Significance levels $*p < .10$, $**p < .05$, $***p < .01$.

likely to support the energy extraction technique than are the females who report the same level of knowledge.

For robustness and additional information, we have included two appendices with additional models. Appendix A includes 16 additional models. The first set of models display the coefficients for our support models discussed above. The second set of models are estimated with population weights. The third set of models are estimated without controls or sampling weights; these models only include the variables from the experiment. Appendix B also includes 16 additional models that include the same sets of models but estimated using our ordered support dependent variable and ordered probit estimation. In general, our main findings hold across all of these additional estimations.

Discussion

Our results provide mixed evidence to support both hypotheses. There appears to be a general relationship between our emphasis “fracking” frame and level of political support for hydraulic fracturing in one’s local community (H1). In both our support probit model and our ordered support ordered probit model, we find statistically significant evidence that using the “fracking” emphasis frame in our survey experiment is related to less support for hydraulic fracturing in one’s own community. This finding suggests that emphasis or issue frames that are used to garner political support for or against a particular policy by way of giving a derogatory name to a policy may be effective.

However, it seems that this frame is not a clear and direct determinant of policy preferences (H2). Rather, we see that the level of perceived knowledge plays a moderating role in the relationship between the emphasis frame and a respondent's support or lack thereof for the policy in their community. We consistently find across both of our sets of models that for those who report either no knowledge or only a little knowledge about hydraulic fracturing that the relationship between the emphasis frame and political support loses its statistical significance. Conversely, we consistently find statistical support suggesting those who report having a lot of knowledge or awareness about hydraulic fracturing are influenced by the naming emphasis frame (H2).

Finally, we discussed earlier that there were several gaps in the growing framing literature. The first gap relates to the failure of previous studies to address multiple, competing frames (Chong & Druckman, 2007b). Addressing that gap is the explicit purpose of our 3 X 2 X 3 framing matrix experiment where the joint impacts of language, information source, and risk level are simultaneously examined for their role in predicting support or opposition to fracking/hydraulic fracturing in their community. We find that, when testing all three frames together, terminology and level of risk are both significant while source of information is not. The results of this multiple frames experiment shows, empirically, that some multiple framing is occurring, and that competition between frames is likely.

The second gap involves the role of knowledge, other than political knowledge, in influencing support or opposition to fracking/hydraulic fracturing. Again, we find new and unique aspects of the importance of this more specific, technical knowledge indicator. We find a clear distinction in the impact of perceived science and technology knowledge in this issue domain, with higher perceived knowledge leading to less support for fracking/hydraulic fracturing in the respondent's community.

Conclusion

Using a survey experiment and two (probit and ordered probit) multivariate maximum likelihood estimators, we have explored the relationship between issue or emphasis framing and political support for hydraulic fracturing. Furthermore, we have examined how this relationship is moderated by perceived prior knowledge of hydraulic fracturing. Using these techniques, we find that the effect of emphasis framing on support or opposition to a policy issue is clearly moderated by perceived knowledge. Respondents who reported having a lot of knowledge are more likely to be influenced by the frame. In the case of hydraulic fracturing, these high knowledge respondents were less likely to support hydraulic fracturing in their community when the extraction process was given the name "fracking." This finding suggests that individuals with more knowledge of a policy issue are more likely to be influenced by this emphasis frame.

The findings illustrate, in part, why political elites may give biased names to certain policies and legislation to influence those with knowledge of an issue. This study suggests that when a frame is specific and requires some knowledge of the policy issue, those with more knowledge are likely to be influenced by the frame while those with little to no knowledge are not likely to be influenced. Given this, it may be the case that elites strategically choose some emphasis frames to rally supporters who are informed (emphasis frames that are specific and require some knowledge of the policy issue) and may choose other emphasis frames in an attempt to influence those with little to no knowledge (emphasis frames that may be general or specific but which use terms that are more commonly known to the public and do not require knowledge of the policy issue).

While we have focused exclusively on the case of hydraulic fracturing and frames, our research may also be of particular relevance to two other policy arenas, that rely on highly technical scientific information: biotechnology and climate change. For example, Durant, Bauer, and Gaskell (1998) have found that European perceptions of biotechnology to be explained in large part by trust in regulatory bodies and knowledge. Specifically, they found that "in many countries better-informed respondents were more likely to possess definite opinions about biotechnology, both positive and negative" (p. 224). This highlights the potential moderating role knowledge may play in identifying with emphasis frames. If levels of knowledge lead to both positive and negative perceptions of biotechnology and associated policies, it may be the case that these perceptions are influenced by emphasis frames that those with knowledge have been exposed to. In this case, it would be useful to explore the various frames used by elites to communicate biotechnology perceptions and the role knowledge may play in that relationship.

Similar instances can be found in the literature on climate change perceptions and knowledge. For example, Krosnick, Holbrook, Lowe, and Visser (2006) find that individuals' "attitudes towards global warming are a function of particular perceived consequences of global warming, and that certainty about these attitudes and beliefs is a function of knowledge and prior thought" (p .1). Here we see evidence for the role of knowledge as an explanatory variable for individuals' perceptions of global warming. It may also be the case here that knowledge plays a moderating role for the frames elites use to communicate the effects of climate change.

As scientists and policy experts work to inform citizens on the technical aspects of hydraulic fracturing (and potentially biotechnology, climate change, and other scientifically technical issues) it is of particular importance to generate better understandings of the relationship between emphasis framing and public support for different policy actions. Furthermore, it is also important to understand the moderating role domain specific knowledge plays in these relationships.

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Note

1 As with all research methods, vignette experiments are not without their limitations or drawbacks, Rhidian Hughes and co-author Meg Huby have examined this issue in detail and suggest that while vignette experiments have their drawbacks they can be quite useful when the vignette is provided in a situated context as an interpretation of the real world and is being used to elicit individuals' perceptions, beliefs, and attitudes (Hughes, 1998; Hughes & Huby, 2002, 2004). Given that this is what we are attempting to accomplish with our research design, we contend that vignette experiments are quite useful in this context.

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References

Andrews, A. C., Clawson, R. A., Gramig, B. M., & Raymond, L. (2016). Finding the right value: Framing effects on domain experts. *Political Psychology*, doi:10.1111/pops.12339.

Borah, P. (2011). Conceptual issues in framing theory: A systematic examination of a decade's literature. *Journal of Communication*, *61*, 246–263.

Chong, D., & Druckman, J. N. (2007a). Framing theory. *Annual Review of Political Science*, *10*, 103–126.

Chong, D., & Druckman, J. N. (2007b). Framing public opinion in competitive democracies. *American Political Science Review*, *101*(4), 637–655.

De Vreese, C. H. (2012). New avenues for framing research. *American Behavioral Scientist*, *56*, 365–375.

Druckman, J. N. (2004). Political preference formation: Competition, deliberation, and the (ir)relevance of framing effects. *American Political Science Review*, *98*, 671–686.

Durant, J., Bauer, M. W., & Gaskell, G. (1998). *Biotechnology in the public sphere, A European source book*. London: Science Museum.

Haider-Markel, D. P., & Joslyn, M. R. (2001). Gun policy, opinion, tragedy, and blame attribution: The conditional influence of issue frames. *The Journal of Politics*, *63*, 520–543.

Hmelo-Silver, C. E. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review*, *16*(3), 235–266.

Hughes, R. (1998). Considering the vignette technique and its application to a study of drug injecting and HIV risk and safer behavior. *Sociology of Health & Illness*, *20*(3), 381–400.

Hughes, R., & Huby, M. (2002). The application of vignettes in social and nursing research. *Journal of Advanced Nursing*, *37*(4), 382–386.

Hughes, R., & Huby, M. (2004). The construction and interpretation of vignettes in social research. *Social Work & Social Sciences Review*, *11*(1), 36–50.

Iyengar, S. (1991). *Is anyone responsible?: How television frames political issues*. Chicago: University of Chicago Press.

Jacoby, W. G. (2000). Issue framing and public opinion on government spending. *American Journal of Political Science*, *44*, 750–767.

Kahneman, D., & Tversky, A. (1984). Choices, values, and frames. *American Psychologist*, *39*, 341.

Kellstedt, P. M., Zahran, S., & Vedlitz, A. (2008). Personal efficacy, the information environment, and attitudes toward global warming and climate change in the United States. *Risk Analysis*, *29*(1), 113–126.

Kinder, D. R., & Sanders, L. M. (1990). Mimicking political debate with survey questions: The case of white opinion on affirmative action for blacks. *Social Cognition*, *8*, 73–103.

Krosnick, J. A., & Brannon, L. A. (1993). The impact of the Gulf War on the ingredients of presidential evaluations: Multidimensional effects of political involvement. *American Political Science Review*, *87*, 963–975.

Krosnick, J. A., Holbrook, A. L., Lowe, L., & Visser, P. S. (2006). The origins and consequences of democratic citizens' policy agendas: A study of popular concern about global warming. *Climatic Change*, *77*, 7–43.

Lubell, M., Vedlitz, A., Zahran, S., & Alston, L. T. (2006). Collective action, environmental activism, and air quality policy. *Political Research Quarterly*, *59*(1), 149–160.

Lubell, M., Zahran, S., & Vedlitz, A. (2007). Collective action and citizen responses to global warming. *Political Behavior*, *29*(3), 391–413.

Malka, A., Krosnick, J. A., & Langer, G. (2009). The association of knowledge with concern about global warming: Trusted information sources shape public thinking. *Risk Analysis*, *29*(5), 633–647.

Miller, J. M., & Krosnick, J. A. (2000). News media impact on the ingredients of presidential evaluations: Politically knowledgeable citizens are guided by a trusted source. *American Journal of Political Science*, *44*, 301–315.

Nelson, T. E., & Kinder, D. R. (1996). Issue frames and group-centrism in American public opinion. *The Journal of Politics*, *58*, 1055–1078.

Nelson, T. E., Oxley, Z. M., & Clawson, R. A. (1997). Toward a psychology of framing effects. *Political Behavior*, *19*, 221–246.

Rabin, M. (1998). Psychology and economics. *Journal of Economic Literature*, *36*, 11–46.

Sabatier, P. A., & Weible, C. M. (2007). The advocacy coalition framework: Innovations and clarifications. In Paul A. Sabatier (Eds.), *Theories of the policy process* (2nd ed., pp. 187–217). Boulder, CO: Westview Press.

Schuck, A. R. T., & de Vreese, C. H. (2006). Framing the EU enlargement: News media content and effects. *European Journal of Communication*, *21*, 5–32.

Slothuus, R. (2008). More than weighting cognitive importance: A dual-process model of issue framing effects. *Political Psychology*, *29*, 1–28.

Sniderman, P. M., & Theriault, S. M. (2004). The structure of political argument and the logic of issue framing. In W. E. Saris & P. M. Sniderman (Eds.), *Studies in public opinion: Attitudes, non attitudes, measurement error, and change* (pp. 133–165). Princeton, NJ: Princeton University Press.

Stoutenborough, J. W., Sturgess, S. G., & Vedlitz, A. (2013). Knowledge, risk, and policy support: Public perceptions of nuclear power. *Energy Policy*, *62*(11), 176–184.

Stoutenborough, J. W., & Vedlitz, A. (2014). The effect of perceived and assessed knowledge of climate change on public policy concerns: An empirical comparison. *Environmental Science and Policy*, *37*, 23–33.

Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, *211*, 453–458.

Tversky, A., & Kahneman, D. (1986). Rational choice and the framing of decisions. *Journal of Business*, *59*, S251–S278.

Zaller, J., & Feldman, S. (1992). A simple theory of the survey response: Answering questions versus revealing preferences. *American Journal of Political Science*, *36*, 579–616.

Zaller, J. R. (1992). *The nature and origins of mass opinion*. New York: Cambridge University Press.

Appendix A. Additional Support Models

	Coefficients, preferred				Coefficients, with survey weights				Coefficients, no controls or weights			
	(1) Probit b/se	(2) Probit-Low b/se	(3) Probit-Med b/se	(4) Probit-High b/se	(1) Probit b/se	(2) Probit-Low b/se	(3) Probit-Med b/se	(4) Probit-High b/se	(1) Probit b/se	(2) Probit-Low b/se	(3) Probit-Med b/se	(4) Probit-High b/se
Frame: Fracking	−0.1905*	0.2184	−0.1871	−0.4129**	−0.2580**	−0.008448	−0.2337	−0.3884*	−0.08927	0.08991	−0.1262	−0.3870**
	(0.09761)	(0.2135)	(0.1508)	(0.1973)	(0.1188)	(0.2364)	(0.1744)	(0.2311)	(0.08579)	(0.1612)	(0.1315)	(0.1885)
Frame: Hydraulic fracturing	0	0	0	0	0	0	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Frame: Local newspaper	0.1434	0.5861**	0.1523	−0.04660	0.1495	0.6201**	0.1524	0.05700	0.01628	0.1277	−0.004615	−0.06390
	(0.1176)	(0.2616)	(0.1779)	(0.2333)	(0.1455)	(0.3014)	(0.2201)	(0.2510)	(0.1040)	(0.1941)	(0.1601)	(0.2223)
Frame: EPA official	0.08788	0.3280	−0.07923	0.3223	0.1302	0.3454	−0.1651	0.5071*	0.03798	0.06613	−0.09908	0.2139
	(0.1192)	(0.2566)	(0.1792)	(0.2372)	(0.1490)	(0.3098)	(0.2168)	(0.2732)	(0.1058)	(0.1937)	(0.1609)	(0.2266)
Frame: Industry official	0	0	0	0	0	0	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Odds: 1 in a million	0.8245***	0.6975***	0.8444***	0.9051***	0.8520***	0.6580**	0.8239***	1.1213***	0.6896***	0.5088***	0.8421***	0.9530***
	(0.1193)	(0.2495)	(0.1795)	(0.2571)	(0.1357)	(0.2818)	(0.2130)	(0.2974)	(0.1036)	(0.1898)	(0.1602)	(0.2491)
Odds: 1 in a thousand	0.2029	−0.2000	0.2266	0.4627	0.4049***	−0.1172	0.3595	0.8211**	0.2032*	−0.06518	0.2963*	0.5154*
	(0.1267)	(0.2729)	(0.1854)	(0.2831)	(0.1545)	(0.3356)	(0.2264)	(0.3276)	(0.1116)	(0.2032)	(0.1658)	(0.2732)
Odds: 1 in a hundred	0	0	0	0	0	0	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Political ideology	0.1853***	0.1281**	0.2556***	0.01823	0.1604***	0.1329	0.2675***	−0.05537				
	(0.03210)	(0.06431)	(0.05385)	(0.06386)	(0.04762)	(0.08986)	(0.07962)	(0.07818)				
Perceived knowledge	−0.4659***	0	0	0	−0.5393***	0	0	0				
	(0.07174)	(.)	(.)	(.)	(0.08125)	(.)	(.)	(.)				
General concern	−0.1476***	−0.2919***	−0.1429***	−0.007394	−0.1447***	−0.2946***	−0.1192***	−0.03608				
	(0.01610)	(0.03546)	(0.02663)	(0.03159)	(0.02019)	(0.03640)	(0.03296)	(0.03270)				
Male	0.3878***	0.3582	0.3567**	0.4065**	0.2507**	0.1698	0.2515	0.4008*				
	(0.09904)	(0.2178)	(0.1472)	(0.1953)	(0.1247)	(0.2549)	(0.1760)	(0.2394)				
Education	−0.01210	0.03976	−0.002171	−0.08739	−0.03459	0.08308	−0.007466	−0.1527**				
	(0.02520)	(0.06251)	(0.03618)	(0.05364)	(0.03825)	(0.07575)	(0.04377)	(0.07198)				
Age	0.005709*	0.004480	0.006563	−0.004808	0.007407*	0.006173	0.006105	0.00002188				
	(0.002993)	(0.006267)	(0.004701)	(0.005765)	(0.003931)	(0.007776)	(0.006811)	(0.006003)				
Constant	−0.6158	−0.8279	−1.9790***	−0.7442	−0.1810	−1.1272	−1.8960***	−0.3471	−1.0204***	−0.6677***	−0.9668***	−1.6169***
	(0.4526)	(0.9739)	(0.5736)	(0.7369)	(0.5841)	(1.3540)	(0.6586)	(0.9216)	(0.1094)	(0.1947)	(0.1665)	(0.2648)
					16.46	9.69	6.36	3.43				
Number of observations	1057	273	454	330	1057	273	454	330	1081	275	460	342

Note: Significance levels: *$p < .10$, **$p < .05$, ***$p < .01$.

Appendix B. Additional Ordered Support Models

	Coefficients, preferred				Coefficients, with survey weights				Coefficients, no controls or weights			
	(1) OProbit b/se	(2) OProbit-Low b/se	(3) OProbit-Med b/se	(4) OProbit-High b/se	(1) OProbit b/se	(2) OProbit-Low b/se	(3) OProbit-Med b/se	(4) OProbit-High b/se	(1) OProbit b/se	(2) OProbit-Low b/se	(3) OProbit-Med b/se	(4) OProbit-High b/se
Frame: Fracking	−0.1475**	0.1871	−0.1423	−0.2976***	−0.1615**	0.02499	−0.1490	−0.2902**	−0.07533	0.1043	−0.08331	−0.2493**
	(0.06442)	(0.1564)	(0.09884)	(0.1104)	(0.07941)	(0.1895)	(0.1163)	(0.1435)	(0.06111)	(0.1364)	(0.09368)	(0.1054)
Frame: Hydraulic fracturing	0	0	0	0	0	0	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Frame: Local newspaper	0.1048	0.4281**	0.1272	0.0004734	0.08422	0.4629*	0.08636	−0.03420	0.008035	0.09362	−0.01142	−0.04864
	(0.07812)	(0.1919)	(0.1194)	(0.1311)	(0.09776)	(0.2390)	(0.1457)	(0.1661)	(0.07426)	(0.1656)	(0.1139)	(0.1256)
Frame: EPA official	0.09289	0.1247	0.03124	0.2301*	0.1152	0.1696	−0.01341	0.2775	0.02744	0.03541	−0.06607	0.1322
	(0.07955)	(0.1922)	(0.1202)	(0.1376)	(0.09813)	(0.2329)	(0.1466)	(0.1706)	(0.07555)	(0.1658)	(0.1148)	(0.1305)
Frame: Industry official	0	0	0	0	0	0	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Odds: 1 in a million	0.6031***	0.7583***	0.6869***	0.5102***	0.6461***	0.6873***	0.6898***	0.6579***	0.5385***	0.4549***	0.6640***	0.5163***
	(0.07915)	(0.1908)	(0.1206)	(0.1369)	(0.09416)	(0.2331)	(0.1406)	(0.1657)	(0.07492)	(0.1645)	(0.1146)	(0.1309)
Odds: 1 in a thousand	0.2329***	0.05393	0.3030**	0.3320**	0.3816***	0.02316	0.4073***	0.5290***	0.2271***	0.01874	0.2610**	0.3860***
	(0.08128)	(0.1963)	(0.1225)	(0.1430)	(0.09851)	(0.2526)	(0.1482)	(0.1712)	(0.07701)	(0.1693)	(0.1164)	(0.1354)
Odds: 1 in a hundred	0	0	0	0	0	0	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Political ideology	0.1418***	0.1060**	0.1989***	0.01674	0.1134***	0.1015	0.1852***	−0.04501				
	(0.02221)	(0.05046)	(0.03598)	(0.03825)	(0.03206)	(0.06942)	(0.05190)	(0.05446)				
Perceived knowledge	−0.2558***	0	0	0	−0.3089***	0	0	0				
	(0.04839)	(.)	(.)	(.)	(0.05819)	(.)	(.)	(.)				
General concern	−0.1147***	−0.2425***	−0.1127***	−0.02724	−0.1153***	−0.2476***	−0.1042***	−0.03739*				
	(0.01077)	(0.02600)	(0.01810)	(0.01783)	(0.01380)	(0.03012)	(0.02306)	(0.02196)				
Male	0.2451***	0.2299	0.2068**	0.2350**	0.1274	0.07017	0.1155	0.1370				
	(0.06538)	(0.1587)	(0.09844)	(0.1141)	(0.08093)	(0.1908)	(0.1202)	(0.1464)				
Education	−0.03874**	0.03397	−0.01100	−0.1054***	−0.05787***	0.06474	−0.02198	−0.1459***				
	(0.01688)	(0.04568)	(0.02493)	(0.02932)	(0.02242)	(0.05236)	(0.03094)	(0.03877)				
Age	0.001995	0.001485	0.003062	−0.005843*	0.002124	0.002420	0.002682	−0.005743				
	(0.001964)	(0.004834)	(0.003010)	(0.003355)	(0.002563)	(0.006219)	(0.004139)	(0.004160)				
					18.94	10.49	9.63	4.40				
Number of observations	1443	319	628	496	1443	319	628	496	1489	322	639	523

Note: Significance levels: *$p < .10$, **$p < .05$, ***$p < .01$.

SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article.