Framing and Biased Information Search*

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Abstract
A long acknowledged by seldom addressed problem with political communication experiments concerns the use of captive participants. Study participants rarely have the opportunity to choose information themselves, instead receiving whatever information the experimenter provides. We relax this assumption in the context of an over-time framing experiment focused on opinions about health care policy. Our results dramatically deviate from extant understandings of over-time communication effects. Allowing individuals to choose information for themselves – a common situation on many political issues – leads to the preeminence of early frames and the rejection of later frames. Instead of opinion decay, we find dogmatic adherence to opinions formed in response to the first frame to which participants were exposed. The effects match those that occur when early frames are repeated multiple times. Our results have implications for experimental design, opinion formation, framing (as we also document novel downstream effects), and health care policy.

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Public opinion matters. It determines who wins elections, plays a significant role in shaping public policy, and influences the views of elected officials (e.g., Druckman and Jacobs 2009, Shapiro 2011). It is thus not surprising that politicians, interest groups, and other policy advocates put forth considerable effort to mold citizens' opinions. Political power comes with the ability to push opinions in one direction or another.

A primary means by which elites affect citizens' opinions is through framing – that is, offering alternative understandings of an issue (e.g., Schattschneider 1960, Lakoff 2004). For example, opponents of tax increases frame estate taxes as a case of double taxation, while proponents present them as a means for fair redistribution. Similarly, those in favor of universal healthcare push it as a form of egalitarianism, while opponents frame it as an unnecessarily costly measure steeped in government bureaucracy.

A generation of research shows that elites can use frames to affect public opinion. Much of this work is experimental; experiments constitute an ideal method to study elite influence because they allow investigators to know the messages to which individuals are exposed and they prevent people from self-selecting messages (Nelson et al. 2011). The typical study finds that when people are exposed to a given frame, their opinions move in the direction of the frame (e.g., when estate taxes are represented as double taxation, opposition to the tax increases) (for a review, see Chong and Druckman 2007c). This research has been remarkably influential (Iyengar 2010), but it also has been plagued by at least two factors.

First, policy debates and campaigns take place over time, yet the bulk of framing research (and elite influence work in general) focuses on a single point in time. Recent work addresses this limitation by investigating over-time communication effects – for example, Chong and Druckman (2010) expose experimental participants to competing frames over time (also see, e.g., Matthes 2008,

Albertson and Lawrence 2009). They find the over-time dynamics depend on the type of information processing, but overall they (2010: 677) conclude that "when people receive competing messages across different periods rather than concurrently, the accessibility of previous arguments tends to decay over time. Consequently, individuals typically give greater weight to the more immediate cues contained in the most recent message… [there is a] general tendency of framing effects to decay over time." This echoes other experimental research (e.g., Tewksbury et al. 2000, Druckman and Nelson 2003, de Vreese 2004, Mutz and Reeves 2005, Gerber et al. 2011), and some observational work (e.g., Achen and Bartels 2004, Hibbs 2008, Hill et al. 2008).[1] This message is that, all else constant, recency effects prevail and elites who dominate at the end, and not the beginning of policy debates, are advantaged.

The second problem with most extant work, including the experimental work just mentioned, is it ignores the reality that people operate in an information rich environment. Instead, experiments control the communications people receive and tend to focus on issues that receive scant attention outside of the experiment itself (e.g., de Vreese 2004, Chong and Druckman 2010). This is long recognized but seldom addressed critique about using captive audiences in experiments (e.g., Hovland 1959). While some recent work has begun to explore the implications of this approach (e.g., Gaines et al. 2007, Arceneaux and Johnson 2010, Gaines and Kuklinski 2011), none has done so in an over-time setting. The captive audience problem has increasing relevance given the 21st century profusion of media. Citizens, even when not directly looking, encounter policy information simply by turning on the television or opening the internet.

In this paper, we investigate how allowing individuals to choose information (including the choice of obtaining no relevant information) affects the impact of over-time competing elite frames.

[1] These studies contrast with macro-level public opinion research that finds stability in issue understandings (see Wood and Vedlitz 2007: 553).

We find that relaxing the captive audience assumption – and allowing information search – has dramatic implications for how over-time competition works. In fact, it completely reverses the conclusions from past work: messages do not decay and, instead, the first frame put forth dominates opinion. This suggests in environments where individuals have even minimal interest in obtaining information about an issue, elites who go first are advantaged and primacy prevails. We further show these primacy effects are substantively equal to what occurs if the side that goes first gets to repeat its message over time.

In the next section, we derive hypotheses about how information search and repetition affect the impact of frames over-time. We then present an experiment, focusing on opinions about health care reform. We conclude by discussing what our results reveal about framing, experimental design, and health care.

Framing, Repetition, and Information Search

A framing effect occurs when a communication changes people's attitudes toward an object (e.g., policy) by altering the relative weights they give to competing considerations about the object (Druckman 2001: 226-231). A classic example is an experiment in which participants are asked if they would allow a hate group to stage a public rally. Those participants randomly assigned to read an editorial arguing for allowing the rally on free speech grounds express more tolerance for the group than those who read an editorial arguing that the rally will endanger public safety (Nelson et al. 1997). Framing is effective in this instance because the communication plays on the audience's ambivalence between free speech and social order.

A frame's effect depends on various factors including its strength or persuasiveness (e.g., does it resonate with people's values?) (Chong 2000, Chong and Druckman 2007a,b),[2] attributes of the

[2] Chong and Druckman (2007b) show that, when all frames are received concurrently, stronger frames influence opinions to a greater extent than weaker frames, even when a weaker frame is repeated. A strong frame is typically identified via

frame's recipients (e.g., values or party identification can moderate the impact of a frame) (Cohen 2003, Berinsky 2007, Lenz 2009), and the political context. In competitive environments, where individuals are exposed concurrently to each side's strongest frame (e.g., free speech versus public safety), the frames tend to cancel out and exert no net effect (e.g., Sniderman and Theriault 2004, Chong and Druckman 2007b, Hansen 2007, Druckman et al. 2010).

Of course, in most instances, individuals do not receive competing frames at one point in time, but rather over-time. As mentioned, some recent work explores these dynamics. For instance, Chong and Druckman (2010) conducted two experiments (on the Patriot Act and limiting urban sprawl). The experiments looked at two points in time (t1 and t2).[3] At t1, participants randomly were assigned to receive either a Pro frame on the issue (e.g., limiting urban sprawl to preserve open space) or a Con frame (e.g., how limiting urban sprawl will increase housing costs). Then later, at t2, respondents received another frame, often the opposing one (e.g., those who received the Pro counter-terrorism frame later received the Con civil liberties frame). Chong and Druckman (2010) find that the modal effect is that the t1 frame decays and the t2 frame ends up dominating opinion. For example, those exposed the open space frame at t1 but the housing costs frame at t2 come to oppose limiting urban sprawl. *Recency effects tend to dominate*.

That said, Chong and Druckman (2010) also report some variations across issues (e.g., there were weaker recency effects on the Patriot Act) and, more importantly, differences based on individuals' processing style. Those who formed strong opinions when exposed to the initial t1 frame,[4] were affected largely by the t1 and not the t2 frame – that is, primacy effects prevailed for

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pre-tests that ask respondents to rate "effectiveness" of different frames. For example, strong frames for and against the hate group rally might invoke considerations of free speech and public safety while a weak opposition frame might be an argument that the rally will temporarily disrupt traffic.

[3] Chong and Druckman's (2010) experiments included various conditions that we do not mention here; we focus on those most relevant to our experiment.

[4] In one of their experiments, Chong and Druckman (2010) manipulate attitude strength (at the point of initial information exposure) by inducing either on-line processing (which tends to generate strong attitudes) or memory-based processing

those individuals. This occurred because strong opinions, by definition, are more stable and resistant to change (e.g., Visser et al. 2006), leading the opinions formed at t1 to endure.[5] Again, though, the modal finding is "when competing messages are separated by days or weeks, most individuals give disproportionate weight to the most recent communication because previous effects decay over time" (Chong and Druckman 2010: 663).

A limitation of virtually all work on over-time communication, including Chong and Druckman (2010) (also see, e.g., Tewksbury et al. 2000, Druckman and Nelson 2003, Druckman et al. 2010), is that it ignores events that occur between exposures (at t1 or t2). In fact, many studies make a point of showing that participants were exposed to minimal and non-consequential information other than that received in the experiment. This also explains why studies often focus upon low-salience issues that rarely appear in media coverage (e.g., regulation of hog farms, particular ballot propositions) (see, e.g., de Vreese 2004: 202). This is sensible in terms of ensuring clean causal inference from the experiment. Yet, it also, by design, ignores the reality that, in most campaigns and policy debates, information does not come to a temporary halt after the first frame is put forth (e.g., after the open space frame at t1).[6]

Information continues to appear in at least two ways. First, the competing sides promulgate messages; even if the opposing side takes some time to launch a counter-campaign, the initial side is likely to push its message repeatedly. We focus on this possibility here, in part because it provides a useful baseline of comparison for the other manner in which information is obtained (see Chong and Druckman 2011b on counter-framing). This second way is that individuals seek out information relevant to the issue; for example, once learning about a proposal to limit urban sprawl, an individual

(which tends to generate weak attitudes). In another experiment, they measure individuals' need-to-evaluate propensity which strongly correlates with attitude strength.

[5] Chong and Druckman (2010) suggest strong opinions generate primacy effects due to motivated reasoning, which we shortly discuss.

[6] Lechler and de Vreese (2010) recognize this and expose participants to different mixes of frames over time.

may obtain other relevant information. While this involves a conscious choice to choose and read such information, it does not require substantial motivation in an age of information profusion (e.g., on the internet, an individual may happen upon a relevant headline, without having looked, and then click the link). What it means experimentally is a relaxation of the captive audience assumption.[7]

Repetition Effects

We study what happens when the t1 frame is repeated multiple times, prior to individuals receiving the counter-frame (see Chong and Druckman 2011b for the situation where, instead, the counter-frame is repeated multiple times in response to the t1 frame). For example, those who received the open space frame at t1, then receive it a few more times, over-time, before receiving the competing economic costs frame. We focus on the case where the initial t1 frame influences, on average, opinions – in other words, cases where the frame is initially effective.[8]

In this situation, repetition likely increases the strength with which one holds the attitude. As mentioned, stronger attitudes are those that are more stable and resistant to change; there are a variety of overlapping but distinct strength related components of attitude such as extremity, accessibility, and importance (e.g., Miller and Peterson 2004, Visser et al. 2006). For us, the most relevant dimension of attitude strength is *certainty* – that is "the amount of confidence a person attaches to an attitude… measured by asking people how certain or how confident they are about their attitudes" (Visser et al. 2006: 3-4). Psychological research shows that repeated exposure to information increases perceptions of accuracy and familiarity (e.g., Cacioppo and Petty 1989, Moons et al. 2009), which in turn bolsters the confidence people have in their attitudes (e.g., Berger 1992, Druckman and Bolsen 2011). As Visser et al. (2006: 39) explain "increases in exposure to new information...increase

[7] We are, in essence, exploring distinct types of post-treatment exposure (see cell 4 in Chong and Druckman's (2010) Table 1).

[8] When the initial frame is not effective at first, it may be that repetition leads to a cumulative effect. The literature on message repetition – while largely focusing on one point in time – suggests that repetition increases the persuasive success of a message (as long as there is not too much repetition), particularly when elaboration is low (e.g., Moons et al. 2009).

attitude certainty."[9] In short, when hearing a persuasive frame multiple times, people come to be more certain of its veracity and become more confident; this strength increase, in turn, enhances stability and resistance to later frames (which are rejected as inconsistent with a strongly held belief; see Taber and Lodge 2006) (on prior opinions conditioning framing, see Brewer 2003, Druckman and Nelson 2003, Chong and Druckman 2007a,b,c).

- *Hypothesis 1: When individuals repeatedly receive an initial influential frame (i.e., at t1), repeating that frame will increase the strength with which one holds the relevant attitude.*

- *Hypothesis 2: When individuals repeatedly receive an initial influential frame (i.e., at t1), individuals will increasingly resist the effect of a later counter-frame, leading to a primacy effect.[10] (This contrasts with the aforementioned baseline of decay and recency effects.)*

Search Behavior Effects

When provided with the opportunity to choose subsequent information (i.e., relaxation of the captive audience assumption), how individuals act depends on their motivation. If individuals are highly motivated to form "accurate" preferences, then they will likely seek out diverse information, including that which challenges their prior opinions (which, again, we are assuming were influenced by the initial frame). When it comes to most political issues, however, individuals are not so motivated and instead exhibit a directional orientation – where they seek out information that confirms prior opinions (what is called a confirmation bias) and they view evidence consistent with prior opinions as stronger (what is called a prior attitude effect). For example, those who oppose laws that limit urban sprawl will likely be drawn to articles that resonate with their beliefs, such as articles that frame limitations as having negative economic consequences or creating overly-dense environments.

[9] Also repeated exposure may prompt recollection which in turn increases strength (see Cook and Insko1968, Cacioppo and Petty 1989, Haugtvedt et al. 1994).

[10] It is implied that we expect strength to mediate the process by which the t1 attitude resists the effect of the later frame. We do not offer a formal prediction, however, because the nature of our design – in which we do not manipulate strength – means directly testing this type of mediational prediction is not possible (see Bullock and Ha 2011).

This type of search behavior is a case of motivated reasoning. Lodge and Taber (2008: 35-36) explain that motivated reasoning entails "systematic biasing of judgments in favor of one's immediately accessible beliefs and feelings . . . [It is] built into the basic architecture of information processing mechanisms of the brain." It occurs largely without conscious awareness, and seems to be common in politics; evidence to date shows that on political issues, even when encouraged to be accurate, individuals limit their searches to information that coheres with their prior opinions (e.g., Taber and Lodge 2006, Iyengar and Hahn 2009, Kim et al. 2010, Lawrence et al. 2010; also see Rahn 1993, Bartels 2002, Redlawsk 2002, Gerber and Huber 2009, 2010, Goren et al. 2009, Groenendyk 2009).[11] In a recent meta-analysis, Hart et al. (2009) find that political issues have the greatest amount of this selective exposure of any topic. Motivated reasoning also suggests individual downgrade arguments that run counter to their prior opinions (e.g., Druckman and Bolsen 2011).

- *Hypothesis 3: When individuals are influenced by an initial frame, they will seek out information consistent with their opinions, which reflect the impact of that initial frame). Individuals also will rate arguments counter to their prior opinions as significantly less effective than arguments not counter to their prior opinions.*

To the extent that individuals' behave as hypothesis 3 predicts, their initial attitudes will strengthen as they become more certain. This occurs not only because it serves as a form of repetition akin to that discussed above, but also because direct experiences – the act of obtaining consistent information – leads individuals to think more about their attitudes and thereby increases certainty (i.e., strength) (Krosnick and Smith 1994: 287; also see Borah 2011).[12] Consequently, individuals will reject later frames, leading again to primacy effects.

- *Hypothesis 4: When individuals receive an initial influential frame (i.e., at t1) and search out information consistent with that frame, it will increase the strength with which one holds the relevant attitude.*

[11] However, see Lavine et al. (2005). Also see Druckman (2011) for general discussion and Hart et al. (2009) for a meta-analysis of selective exposure research.
[12] Also personal communication with Jon Krosnick, August 10, 2010.

- *Hypothesis 5: When individuals receive an initial influential frame (i.e., at t1) and search out information consistent with that frame, individuals will increasingly resist the effect of a later counter-frame, leading to a primacy effect, all else constant.*[13] *(This contrasts with the aforementioned baseline of decay and recency effects.)*

In sum, we predict that repetition of the initial (t1) frame or allowing individuals to search for information after receiving the t1 frame will increase attitude certainty. This generates stable (perhaps even dogmatic) initial attitudes that resist the later counter-frame. The result is a primacy effect – the exact opposite of what occurs when no interim information appears. We next describe the experiment we designed to test our hypotheses.

Experiment

We recruited a total of 547 participants to participate in a study on news coverage. Participants included a mix of students and (older) non-students from the area (see Druckman and Kam 2011 on using student participants). Student participants took part to fulfill a course requirement (as part of a subject pool) while non-student participants received $20 in compensation. We found no differences in the causal dynamics between the two populations and thus we do not distinguish them in what follows.

We chose health care reform as the study's focus, particularly the continuing debate about whether health care should be universally provided by the government or left in private hands. We opted for health care for various reasons. First, we implemented our experiment between November, 2010, and February, 2011, on the heels of the Patient Protection and Affordable Care Act and the Health Care and Education Reconciliation Act, both of which were signed into law in March 2010 (for details, see Jacobs and Skocpol 2011).[14] It thus was a timely issue but also one for which extremely intense debate had passed. Second, health care reform has long generated conflict and

[13] We again avoid formal mediational predictions.

[14] In the midst of our study – specifically on December 14, 2010 – a federal judge ruled the health care mandate unconstitutional. We measured knowledge of the ruling after it occurred and found no evidence of its effect (either in terms of those who knew of the ruling versus those who did not, or in terms of participants before or after the ruling).

ambivalence – most Americans believe there are problems with the provision of health care but few express confidence about the best solution (Jacobs 1993, Hacker 2008). Third, the issue captures the multi-dimensionality of many policies in the U.S. by touching on economic and social considerations (see Lynch and Gollust 2010). Finally, while partisanship matters with health care opinions, many other factors matter including how the policy is framed (Barker 1998, Koch 1998, Jerit 2008, Winter 2008, Lynch and Gollust 2010).

[Table 1 About Here]

Our first task, then, was to select frames for the experiment. We did so by content analyzing all health care reform articles in the *New York Times* from February, 2009, through March, 2010 (totaling 387 articles; see Fein 2011). We isolated the major frames used and whether a given frame was used in opposition or support of universal government coverage (see Chong and Druckman 2011a for more details on the method). We found the most prevalent frame to be one that focuses on the costs of health care; the costs frame was sometimes used as an argument for universal coverage but more often as one against. All other frames were used in one direction or the other. In Table 1, we list the central frames on each side of the issue.

Using brief descriptions of each of these frames, we asked a group of pre-test respondents (including a mix of students and non-students; N = 54) to evaluate the extent to which they viewed the frame as opposed or in favor of universal health care and whether they viewed the frame as "effective" or "compelling." Both questions were on 7-point scales with higher scores indicating increased support and effectiveness; effectiveness is a way to gauge frame strength (see Chong and Druckman 2007 on this approach to pre-testing). The final two columns of Table 1 display the results. For our experiment, we used the Con costs frame, given its prevalence (as noted) and the fact that it is significantly viewed as more negative than any other Con frame (e.g., comparing the Con costs frame

against the government role frame, gives $t_{206} = 2.24$, $p \leq .05$, two-tailed test). On the pro-side, we opted for the inequality frame, which was significantly seen as supportive as any other frame, other than the Pro cost frame (and we avoided using the same frame on each side of the issue) (e.g. comparing the Pro inequality frame against the beneficiary-victim frame, gives $t_{106} = 1.42$, $p \leq .20$, two-tailed test). Inequality has increasingly relevance in debates about American politics (e.g., Jacobs and Skocpol 2007) and it offers an intriguing counterfactual given that in 2010, it was not among the most regularly used frames. Lynch and Gollust (2010: 26) argue for an "an experimental design that exposes study respondents randomly to either an inequalities frame or an economic frame (i.e., highlighting pocketbook concerns), or both…"

Table 1 also shows that the Pro inequality and Con costs frame do not significantly differ in terms of effectiveness ($t_{106} = .84$, $p \leq .40$, two-tailed test) and thus any differences due to exposure to these frames can be attributed to their direction and not effectiveness. Both frames also are high in terms of effectiveness and thus can be seen as strong frames. In what follows, we refer the costs frame as the *Con* frame and the inequality frame as the *Pro* frame.

Our experiment involved four distinct sessions, each one week apart.[15] We varied two factors: (1) the order of frame exposures at time 1 (t1) and time 4 (t4), and (2) what happened between those exposures (at times 3 and 4). The first element, frame exposure at t1 and t4, replicated the approach taken by Chong and Druckman (2010). We randomly assigned respondents to one of four scenarios: receive the Pro frame at t1 and the Con frame at t4, the Con frame at t1 and the Pro frame at t4, both frames at t1 and no frames at t4, or frames irrelevant to health care (i.e., focused on non-political topics) at both points in time. The dual frame condition with no t4 follow-up provides an interesting baseline since, if the passage of time is irrelevant, the exposure to the two frames over time should

[15] We opted for one-week intervals since that is at least some time but does not dramatically vary from Chong and Druckman's (2010) time between frame exposures.

result in the same effect as exposure at a single time. As is typical, we presented the frames in the context of news articles about healthcare reform. A few examples of the Con and Pro articles appear in Appendix A. We avoided invoking partisan cues in the articles so as to better gauge the pure effects of frames. This follows much other work on health care framing (e.g., Koch 1998).[16] At both t1 and t4, participants read two distinct articles, both of which used the same health care frames (for the given condition); each article was unique – no participant ever read the same article twice (even if some used the same frames). Overall, all of the articles we use in the experiment were unique, even when using the same frames, and all were assessed for realism (with a small set of pre-test respondents).

As part of the t1 session – which occurred online – participants completed a survey querying several demographics. The t4 session also took place online and included a survey that asked our key dependent variable measures, which we soon describe. At time 2 (t2) and time 3 (t3), participants came to the political science laboratory (which is formally called a survey center), were seated at a computer, told not to talk to other participants, and were informed that they were to read different articles that we collected from recent news stories.[17] (We had in fact created the articles ourselves and debriefed participants of this at the end of the study.) We then exposed participants to a website that contained a selection of articles. The second factor we varied in the experiment involved randomly assigning participants to one of three scenarios that affected the information available at t2 and t3.

One group, at both t2 and t3, received no relevant information, instead reading 8 articles on unrelated, non-political topics (e.g., debate about a college football playoff system, the problems with 3-D movies). Participants had to click through each article to continue in the study. This is akin to

[16] We also confirmed that while the partisanship of our participants affected overall opinion, it did not condition response to the frames.
[17] A small number of participants, for logistical reasons, completed t2 and t3 online. This has no impact on the outcome (i.e., the behavior of these participants echoes those of the others).

Chong and Druckman (2010) and all other experiments that treat subjects as captive to whatever information the experimenter provides. Another group read articles in the online environment at t2 and t3, but this time we provided 4 unrelated articles and 4 articles that were relevant and employed the same frame as the participant read at t1. This group also was captive but, unlike in Chong and Druckman, participants were exposed to a virtual onslaught of the t1 frame. This mimics campaigns where one side launches an intensive campaign before the other side can begin. We refer to this as *repetitive exposure*.

For the final t2-t3 group, we relaxed the captivity norm by allowing participants to search in an environment containing 35 articles.[18] They had 15 minutes to search (which was not sufficient time to read 35 articles) and had the option of reading nothing (but had no alternative activity available to them during that time). Of the 35 articles from which participants could choose, *four used the same health care frame as the t1 exposure, four used the opposite fame* (e.g., the Con frame for participants who received the Pro frame at t2), six dealt with health but used different frames (as described in Table 1), 14 dealt with other issues (e.g., immigration, education, gay marriage, national security, environment) and employed either an inequality or cost frame on the given issue, and 7 dealt with non-political topics. The topic and frame used by each article was made clear in the titles on which participants clicked to access a given article.[19] Participants could choose to read as few or many articles as they preferred, in the given time period. We presented the articles in an order originally chosen at random.[20] An example of the search environment appears in Appendix B; all articles and details on the arrangement of information (i.e., order of articles) in the non-search and

[18] The articles offered at each time period were all unique (i.e., articles were not reused at any point the study; we created a total of 80 unique articles).

[19] We opted for a static as opposed to dynamic information environment (c.f., Lau and Redlawsk 2006) because our focus is on specific information on a single issue at a given point in time (e.g., the experience of opening a web browser on a given day) and not the overall day-to-day flow of different types of campaign information. Of course, we encourage future work to extend our approach to dynamic environments.

[20] We used the same order for all participants, however, to avoid possible confounding effects – the impact of order is an issue for future research.

search conditions are available from the authors. For all conditions, we tracked which articles participants chose to read (which was always all articles in the non-search conditions) and how long they spent reading each.

As mentioned, our key dependent measure appeared on a questionnaire after the t4 treatment. Our health care question, following prior work (i.e., resembling an item that has appeared on the American National Election Studies), asked: "Some people feel there should be a universal government insurance plan that would cover medical and hospital expenses for all citizens. Others feel that medical and hospital expenses should be paid by individuals and through private insurance plans. Where would you place yourself on this scale…" The scale included 7 possible responses and we scaled it so that the lowest scores indicated support for private plans covering all expenses and the highest score indicated full universal coverage. We followed this item by asking respondents "How certain are you about your opinion about Health Care Insurance?," on a 5-point scale with higher scores indicating increased certainty (i.e., attitude strength). Additionally, we asked respondents to evaluate the "effectiveness" of the t4 article in terms of "providing information and/or presenting an argument about the health care." Respondents answered on a 7-point with higher scores indicating increased effectiveness. This item allows us to explore motivated reasoning.

We also asked whether the individual would provide his/her e-mail address so that we could send more information about health plans. We use this measure to capture the extent to which the treatments generated a desire for information seeking. Finally, we measured opinions on other issues, and for reasons we later explain, expected possible effects on two of them: whether immigration should be reduced or increased (on a 7-point scale ranging from "greatly reduced" to "greatly increased") and whether taxes should be increased to cover government services (on a 7-point scale from "greatly reduced" to "greatly increased").

[Table 2 About Here]

In Table 2, we provide an overview of the conditions. We expect the "no interim information" conditions to generate results that echo Chong and Druckman's (2010): when frames are received at different points in time (conditions 1 and 4), strong recency effects will occur, and when the dual frames are offered (condition 7), opinions should match the control group (10). In the repetition conditions, where the there is frame exposure at t1 and t4 (conditions 3 and 6), we should see increased attitude strength and primacy effects. The dual frame condition with repetition (condition 9) should not generate an effect since it resembles balanced exposure throughout. Finally, for the search conditions, we expect individuals in the over-time conditions (2 and 5) to choose articles consistent with the t1 frames (at t2 and t3), which will then generate increased attitude strength and a primacy effect. In short, repetition and information search should lead to the exact opposite patterns as those observed by Chong and Druckman. This would accentuate the dramatic limitations of keeping participants captive.

Results

We begin by presenting the average health care reform support scores across conditions; we confirmed successful random assignment across conditions and thus do not include control variables in reporting our results (doing so would not change what we present).[21] We display the mean scores at t1 and t4 in Figures 1, 2, and 3, which respectively include the conditions with no interim information, repetition, and information search.[22] We included the control condition (10) results in all graphs as a baseline. Appendix C provides the standard deviations and Ns.

[Figures 1, 2, 3 About Here]

[21] We measured a host of controls shown by prior work to shape health care opinions (e.g., Lynch and Gollust 2010). We find these variables largely match what prior work reports.

[22] We also measured belief importance – that is, the importance that respondents attribute to equality and costs when it comes to thinking about health care. If we used those as dependent variables, our results largely match what we report with the overall health care measure.

Although not formally noted in the graphs, the t1 framing effects are exactly as one would expect (i.e., a conventional framing effect). That is, relative to the no-frame control condition (10), we find exposure to the Pro inequality frame significantly increased support for universal government coverage (conditions 1, 2, 3) while the Con cost frame significantly decreased support (conditions 4, 5, 6). Furthermore, those who received the Pro-Con dual frame at t1 (conditions 7, 8, 9) or no frame at t1 (condition 11) exhibited no significant opinion shift relative to the control group.

In the no information conditions, displayed in Figure 1, the control condition (condition 10) and the t1 dual frame condition (condition 7) did not change over time (recall neither condition included a t4 frame).[23] In contrast, those who received a single frame at t1 and then the opposite frame at t4 exhibited a dramatic flip in opinion (conditions 1 and 4). In condition 1, participants who received the Pro inequality frame at t1 report an average score of 5.43, but then upon receiving the Con costs frame at t4, their opinions drop to 4.47. Analogously, respondents in condition 4 show a flip from being very opposed to universal coverage (3.75) to being the most supportive group (5.35). For both conditions 1 and 4, framing effects, relative to the control, are significant at t4, just as they were at t1, but the direction of the effects flipped.

Notice that individuals in all but the control group, received the same two Pro and Con frames. When received simultaneously, as in condition 7, the frames cancel out, but when received over-time they substantially move opinions, with ultimate opinion reflecting the most *recently* received frame. These results replicate Chong and Druckman (2010: 669).[24]

Figure 2 presents the repetition results, where individuals received the t1 frame two more times at t3 and t4 before being exposed to the counter-frame at t4. We find that dual frames, even when repeated, do not move opinions, over time (condition 9). More importantly, when the t1 frame

[23] We use one-tailed tests since we have directional predictions (Blalock 1979: 163; also see Chong and Druckman 2010).
[24] Our comparison focuses on the conditions in which Chong and Druckman (2010) did not manipulate processing mode.

is repeated, the results completely reverse, relative to the no information conditions. Instead of decay and recency effects, we find the t1 framing effect sustains to t4 – individuals reject the counter t4 frame, leading to *primacy effects*. For example, in condition 3, upon receiving the t1 Pro inequality frame, participants are supportive on average (5.63). This support endures to t4 (5.40), even in the face of the opposing Con costs frame at t4. The same dynamic occurred for the t1 Con-t4 Pro condition 6. For both conditions 3 and 6, the t4 framing effects, relative to control, are significant, as they were at t1. The results support hypothesis 2: investing resources in early repetition can inoculate individuals against later opposition.

Figure 3 shows that the information search conditions exhibit near identical dynamics as repetition.[25] As hypothesis 5 predicts, allowing individuals to seek out information at t2 and t3 prevents decay and ensures the t1 framing effect persists, while the t4 counter-frame fails. Exposure to both frames at t1 (condition 8) or no frames at t1 (condition 11), followed by subsequent search, does little to influence opinions. These results imply that the captive audience constraint present in nearly all extant experiments has potentially generated a misleading, or at least incomplete, portrait of framing effects. In our case, relaxation of this assumption, shifted the over-time influence from decay to stability and recency to *primacy effects*. This suggests that using captive subjects does not necessarily lead to an overstatement of experimental effects – rather it just changes the nature of those effects.

Attitude Certainty

We posited that exposure to repeated messages and engaging in information search will increase attitude strength, as measured by certainty. Recall that we measured the certainty with which individuals hold their overall attitude toward health care reform at t1 and t4 on a 7-point scale with

[25] The one exception is the t4 framing effect for condition 2 falls short of significance (i.e., 5.19 does not significantly exceed 4.95), and thus the t1 framing effect does not maintain. However, the decline from t1 to t4 is not significant.

higher scores indicating increased certainty. In Figures 4, 5, 6 we report certainty scores by condition with graphs similar to the ones used above. (We again include the control condition in all Figures, for comparison purposes.) Appendix D reports the standard deviations and Ns.

[Figures 4, 5, 6 About Here]

Figure 4 shows no significant change in certainty among the conditions without interim information; this is sensible insofar as nothing occurred that would stimulate increased certainty. In contrast, we see that in *every* repetition and information search condition, individuals, on average, increased the certainty with which they hold their attitudes, after having received repeated messages or sought out information (note Figures 4 and 6 include the control with no interim information and that condition did not see significant changes in certainty). As expected, this occurred even in cases where frames themselves did not move opinions – for example, in conditions 8 and 9 where individuals received dual frames at t1 and no frame at t4, opinions did not change over-time. Yet, as predicted by hypotheses 1 and 4, repeated exposure and information search still worked to increase certainty.[26] It was the interim experiences and not persuasion per se that drove certainty.[27]

Our theory implies that information search and repetition generate primacy effects because individuals come to view the t4 opposing frames as ineffective (e.g., they engage in motivated reasoning, dismissing arguments counter to their strongly held prior opinions). We test this with the aforementioned t4 item that asked individuals to evaluate the "effectiveness" of the two t4 articles (on a 7-point scale with higher scores indicating increased effectiveness). In Table 3, we present a regression of t4 effectiveness on a dummy variable for each experimental condition, excluding the

[26] Our hypotheses focus on over-time change; however, we also compared certainty scores for each condition with the control group (condition 10) at t1 and t4. At t1, no conditions exhibit significantly distinct certainty scores relative to condition 10. At t4, all the repetition and information search conditions, except condition 11, significantly differ from the t4 control.

[27] As explained in a prior note, our experimental design prevents us from formally testing the implied hypothesis that the impact of repetition and information search on overall opinion is mediated by attitude certainty (see Bullock and Ha 2011). Nonetheless, when we engage in what are often taken as conventional mediation tests (Baron and Kenny 1986) the evidence supports mediation.

control group. The results show that in every case where individuals received a single directional t1 frame and were in a repetition or information search condition, they evaluated the t4 frame as significantly less effective (than the control group). This did not occur for conditions without interim information or in conditions that provided dual frames (which is sensible, given opinions did not move in response to dual frames). In short, access to interim information not only increases attitude certainty but it also leads individuals to downgrade the persuasiveness of later contrary arguments. This supports a part of hypothesis 3.

[Table 3 About Here]

Information Search

A key component of our argument is that, when given the opportunity, individuals engage in biased information search by seeking out information consistent with their extant opinions (which were shaped by the initial (t1) frame). We test for this by exploring which articles respondents chose to read in the search conditions.

Given that participants chose from among 35 articles, with many being irrelevant to health care, they could have opted for few, if any articles, or none of the eight articles that employed either the inequality or costs health care frame.[28] We found neither of these scenarios to be the case: participants in the search conditions viewed an average of 8.27 (standard deviation = 3.55; N = 187) articles at t2 and 8.59 (4.30; 187) at t3. They also read, on average, respectively, 1.05 and 1.32 articles that employed an inequality or costs health care frame.[29]

We evaluate the pro-con direction of participants' choices by computing a scale that ranges from -4 to 4, where -4 indicates read all 4 Con health care (cost) articles and no Pro health care

[28] Participants could have chosen other health care articles that used alternative frames (e.g., morality, government's role). In what follows, we focus exclusively on the articles that used the two frames on which we focus; however, all results are robust if we instead include all health care related articles.

[29] These results suggest that the t1 frames, if nothing else, prompted participants to focus on the relevant health care framed articles to a much greater extent than any other type of article.

(inequality) articles and 4 indicates read all 4 Pro articles and no Con articles (see Taber and Lodge 2006 for a similar approach). We present the number of Pro-Con articles read for t2 and t3, by search condition, in Figure 7. The relevant point of comparison would be 0 which means participants read the same number of Pro and Con articles (or none).

[Figure 7 About Here]

The figure shows that when exposed to both frames (condition 8) or no frame (condition 11), participants engaged in evenhanded information searches, with averages near 0.[30] In contrast, exposure to a single directional frame significantly drove subsequent article choice. Participants who received the Pro inequality frame at t1 (condition 2) accessed approximately 1 more Pro than Con article in each period. The reverse occurred when the t1 frame was the Con costs frame (condition 5). This supports hypothesis 3 and suggests exposure to the first frame on an issue can subsequently drive information acquisition.[31]

We next explore whether the primacy effects we found in the search conditions were in fact shaped, in part, by the articles individuals chose to read (as hypotheses 5 suggests). We do this with a series of regressions in Table 4; since these analyses exclusively focus on the search conditions, we use the no t1 and no t4 frame condition (11) as the control.[32]

In first column, we regress t4 support for universal care opinion on the experimental search conditions. As shown above, we find the single frame conditions significantly shaped t4 opinions in

[30] In these conditions, participants did in fact access relevant health care articles with the respective t2 and t3 means being .57 and .88 articles; while these are less than in the single frame conditions, it still indicates participants were significantly motivated to look at health care articles.

[31] As mentioned, we recorded the amount of time participants spent reading each article. When we look at time instead of simple article counts, the results are virtually identical to those presented here. In the repetition condition, participants did not choose which articles to read but could choose how much time to spend reading each article. We recorded this time and we find a biased information acquisition process for repetition conditions; those exposed to the t1 Pro frame spent more time reading Pro articles while those exposed to the t1 Con frame spent more time on Con articles. This runs somewhat contrary to the findings of Ditto et al. (1998), which suggest individuals expend greater cognitive effort processing preference-incongruent information.

[32] Our analyses here are less vulnerable to the aforementioned mediation critiques since, in this case, our data were collected at different points in time.

the direction *consistent with the t1 frame*. In the second column, we add t1 opinion, finding that it renders the condition dummies insignificant – in short, the impact of the condition dummies on t4 opinions works entirely through t1 opinion.

[Table 4 About Here]

The next two columns regress the t2 and t3 search counts on the condition dummies and time 1 opinion. The results show that search behavior did in fact depend on prior opinion and experimental condition. The fifth column replicates the t3 search regression but adds t2 search behavior to the regression. Interestingly, here we see that t3 search behavior is largely determined by t2 search behavior.

The final column regresses t4 overall opinion on the conditions, time 1 opinion, and search behavior. As we expected, the conditions fall to insignificance, with their effects being absorbed by t1 opinion and t3 search behavior. t2 search behavior is not significant, with its effect apparently working indirectly insofar as it influenced t3 search behavior. In sum, as hypotheses 5 suggests, the t1 frames affect t1 opinion which in turn influences search behavior and then combines with search behavior to determine t4 opinion.

Downstream Effects

Downstream effects refer to "knowledge acquired when one examines the indirect effects of a randomized experimental intervention" (Green and Gerber 2002: 394; also see Sondheimer 2011). With our experiment, we anticipated two possible downstream effects. First, those in conditions that generated greater attitude certainty – the repetition and information search conditions – should have less incentive to acquire more information. These individuals will be less likely to worry about maintaining a mistaken or misinformed attitude (see, e.g., Murray 1991: 10). We test this with a t4

item that offered respondents an opportunity to provide their e-mail address so as to receive more information about health care reform.[33]

In Table 5, the first column regresses whether the responded provided his/her e-mail on the experimental conditions. The results show, indeed, that repetition and information search significantly decrease interest in receiving subsequent information. (This holds across all conditions, except the information search, no frame condition 11). In the second column, we add the t4 certainty measure which is highly significant, revealing that increased certainty generates less interest in information. (Some of the experimental condition dummies become insignificant.)

[Table 5 About Here]

Another downstream effect we explore is spillover to other issue attitudes. Lacy and Lewis (2011) argue that opinions on health care strongly relate to immigration and tax attitudes (i.e., people maintain non-separable preferences over them). Indeed, expanding immigration pits equality of opportunity against the costs absorbed by citizens and support for increased taxes and government services relates to egalitarianism and costs. As explained, we measured support for expanding immigration and for increasing taxes/government services, at t1 and t4, on 7-point scales. We expect the Pro inequality frame will increase support and the Con costs frames decrease support for each. We report the results, for t1 and t4, in the last four columns in Table 4. The results mimic those we found for health care – at t1, for both issues, the t1 frames significantly moves opinions with the dual frames largely canceling out. At t4, we also see nearly identical overtime dynamics to that found on health care. The frames used on one issue and the opinions on that issue appear to carryover to related issues

[33] We also asked respondents to self-report how interested they were in receiving more information; we did not find significant effects on this variable. We presume this is to do social desirability measurement bias and thus it accentuates the importance of using more behavior oriented measures.

(see Schnell and Callaghan 2005). There are important secondary downstream effects to issue frames both in terms of how people seek information and opinions on alternative issues.

Conclusion

Our results accentuate the consequences of treating experimental participants as captive. Prior work consistently suggests that most over-time communication effects quickly decay leading to recency effects (e.g., Tewksbury et al. 2000, Druckman and Nelson 2003, Achen and Bartels 2004, de Vreese 2004, Mutz and Reeves 2005, Hibbs 2008, Hill et al. 2008, Gerber et al. 2011). Most of these studies involve participants who were restricted from or at least not provided the opportunity to obtain relevant information over-time, or who had scant incentives to do so (e.g., because of the focus on minor issues or campaigns). We recognize that on many issues individuals will not engage in information search – but on other issues that affect their lives more directly (e.g., health care, social security, war, major elections), acquiring information is likely to occur. This is particularly true in recent years where one need only open an internet browser to be exposed (intentionally or unintentionally) to possible information about the issues of the day. We find that allowing participants to acquire information – after exposure to an initial message – is akin to providing that message repetitively. The consequence is strong primacy rather than recency effects. The main point is that, going forward, experimental work on communication effects needs to carefully consider the consequences of the long-standing but often debated norm of treating participants as captive. This echoes recent work by Arceneaux and Johnson (2010) and Gaines and Kuklinski (2011) that focuses on comparisons between those who seek information and those who opt out (also see Levendusky 2011).

In terms of public opinion formation, our results are not particularly encouraging. They resonate with other recent findings that suggest citizens (individually and/or in aggregate) waver

between being quite malleable or highly dogmatic (e.g., Chong and Druckman 2010, Druckman and Leeper 2011). In cases where information is scant, they are quite easily moved by the most recent information. But when given the opportunity to search for information, they cling to their initial opinions, seek out consistent information, and reject later information. From a normative perspective, this suggests that the most salubrious approach to encouraging "desirable" opinion formation processes is to induce citizens to be motivated to form "accurate" opinions, in which case they often avoid motivated reasoning processes (see Druckman 2011).

Our results also add to the framing literature by revealing downstream effects. The frames employed on one issue can carry over to other issues and affect one's interest in obtaining further information. Finally, the findings suggest that those in favor of health care reform missed an opportunity in 2010. The inequality frame was not widely used in the most recent health care debate, and our results suggest it could have been powerful. It may have been a more effective strategy and prevented the over-time loss of proponents of reform (see Fein 2011, Hopkins 2011). Framing can be a powerful rhetorical weapon and one whose dynamic complexities, we are just beginning to understand.

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Appendix A Two Example Pro Inequality Articles and Two Example Con Cost Articles

Disparities in Americans' Health on the Rise; Income, Race, Insurance Major Factors in Differences

Even as health care costs continue to escalate, many Americans - especially minorities and the poor - still do not receive high-quality care, according to federal reports published by the National Institutes of Health. The quality of health care is improving slowly and some racial disparities are narrowing, the reports found, but gaps persist and Hispanics appear to be falling even further behind. Officials called the reports, mandated by Congress to study the quality and distribution of health care, the most comprehensive assessments of their kind.

“We can do better,” Former Health and Human Services Secretary Mike Leavitt said at a Washington conference on racial and ethnic disparities in health care. “Disparities and inequities still exist. Outcomes vary. Treatments are not received equally.”

One study of 13,000 New Jersey heart patients found that far fewer African American patients received catheterization to clear the arteries, despite exhibiting the same symptoms. Another study involving 13,600 nursing home residents found that blacks “had a 63 percent greater probability of being untreated for pain relative to whites.”

In the National Healthcare Disparities Report, researchers found more measures on which the quality gap between whites and racial minorities was shrinking than widening. But the report found that major disparities remained for all groups and that the gap had widened for Hispanics.

Forty-six disparities were discussed in the report. Of those experienced by blacks, 58 percent were narrowing and 42 percent were widening, the researchers found. For Hispanics, 41 percent of disparities were narrowing, whereas 59 percent were becoming larger.

Embedded in the American urban landscape, you'd see poor, black people inhaling lethal amounts of exhaust and nicotine. Their hearts would be heavy with fat and artery-clogging plaque, while their brains would be awash in alcohol and drugs. Some might see such a condition as terminal, set up a triage and hope it works itself out. But a good doctor might recognize the regenerative powers of the body politic and come up with a comprehensive treatment plan that also attacks root causes - including the twin cancers of racism and poverty.

Take, for example, that the average life span for black men in the nation's capital is about 57 years, a year more than that of Native Americans on the Pine Ridge Reservation in South Dakota but about 23 years lower than that of white men in the District. That kind of racial and economic disparity in well-being reflects fundamental problems in America's health care and health insurance systems. There is doubt that all reform proposals under consideration in Congress will fully correct these inequalities. But one thing is certain: The current health care system does much to perpetuate them.

Rich Americans' Health Coverage Better than that of Working Class and Middle Class

Real barriers here are the costs facing low-income people without insurance or with skimpy coverage. But even Americans with above-average incomes find it more difficult than their counterparts abroad to get care on nights or weekends without going to an emergency room, and many report having to wait six days or more for an appointment with their own doctors.

The United States has a great disparity in the quality of care given to richer and poorer citizens. Americans with below-average incomes are much less likely to see a doctor when sick, to fill prescriptions or to get needed tests and follow-up care.

Mississippi and Arkansas, two of the nation's poorest states, also have the highest death rates from cervical cancer - a result of poor access to basic screenings and health care for a large number of women, says Peter Bach of New York's Memorial Sloan-Kettering Cancer Center.

Yet in Mississippi, where a cervical cancer vaccine could save a great number of lives, only 16% of teen girls in 2008 received the shot, called Gardasil, according to Bach's paper in Saturday's *The Lancet*. About 22% of Arkansas girls ages 13 to 17 got the vaccine, which costs $390 for three shots.

In the wealthier state of Rhode Island, where cervical cancer mortality is half as high as in Mississippi and Arkansas, 55% of girls received Gardasil, the paper says. Though there's nothing wrong with wealthier girls getting the vaccine, Bach says, the low vaccination rates in poor states are "a failure."

Under current reform discussions, disparities in health are only going to be exacerbated by pushing the cost of reform onto working class families that are already falling behind in the bad economy. In an era of rising wealth inequality and stagnant middle-class wages, failure to equitably finance reform may only make things worse for families with poor health or no health care coverage.

Instead of increasing the burden on working men and women by labeling their medical insurance "gold-plated," why not finance health care reform by looking at those who really have gold-plated plans?

Or, why not place a small surtax on the wealthy, whose taxes were cut so significantly under President George W. Bush? Why not apply the Medicare tax to unearned income that the very wealthy collect in interest and dividends on their investments? Why not limit deductions for itemized expenses or eliminate the subsidies we give to the insurance industry in order to equalize health benefits for everyone, while fairly distributing the burden of paying for the reforms?

The wealthiest nation in the world should be able to provide high quality, affordable health care for all without adding to the burden on working families or making their quality of life worse.

Real Sources of Health Care Costs Growing Out of Control

America's overall health care budget has soared to about $2.25 trillion, about 17 percent of GDP. Waste and vast overhead costs, overuse of medical services, insufficient competition, and lack of information about most cost-effective practices are among the culprits.

Premiums rose 6.1 percent last year, more than twice the rate of inflation and significantly outstripping the 3.7 percent increase in workers' earnings, according to the Kaiser Family Foundation's 2007 Employer Health Benefits Survey. Since 2001, health care costs have increased 78 percent, according to Kaiser. Meanwhile, high health care costs make it increasingly difficult for businesses to compete against companies overseas that typically don't offer health benefits. Since 2000, the portion of firms offering health insurance has shrunk from 69 percent to 60 percent.

With business and working families bearing the greatest burden of rising health care costs, more attention needs to be paid to the real sources of rising costs. Rather than fund health insurance with higher premiums and taxes on those already paying too much, targeting the source of high health care costs would save real money, making health care more affordable for everyone. Reducing the $32 billion that the health care industry spends each year on marketing and figuring out the premium for each individual or group customer in each state would lead to major savings.

And one source of cost the American Medical Association hopes no one will notice is that American doctors make a lot more money than doctors elsewhere - roughly twice as much. The average incomes of $274,000 for specialists and $173,000 for general practitioners are, respectively, 6.6 and 4.2 times those of the average patient. The rate in the other countries is 4 and 3.2.

While higher volume is the story behind higher physician costs in the United States, the culprit for spending on hospitals and drugs is higher prices. While Americans spend fewer days in the hospital than people elsewhere, that efficiency is more than offset by a higher average cost per day - $1,666, four times the industrial-country average. There are multiple causes for this $224 billion in annual overspending on hospital services - everything from more serious illnesses to more nurses per bed to extraordinary overhead and capital costs.

The cost of medical malpractice adds another $55.6 billion to annual health care spending, an amount that has been increasing by about 10% per year since 1975. About 10 cents of every dollar paid for health care goes to malpractice insurance premiums that doctors must pay in order to protect themselves in case patients sue them. While trial lawyers rack up millions in fees from malpractice cases, doctors pass the high costs of insurance on to patients.

Of course, any effort to reduce these excess costs faces determined opposition from well-financed lobbies, which is why many reformers prefer to focus on the goal of extending coverage to the 47 million Americans who don't have health insurance. But doing the one without the other would be economic folly. According to the McKinsey Global Institute, the research arm of a global management consulting firm, offering universal coverage without reining in costs would add another $77 billion each year in unnecessary and unproductive health spending.

Insurance-market reform could eliminate much of that expense. And by focusing on covering the uninsured, advocates of some reform proposals fail to address both administrative inefficiency and excess costs, which are the factors holding back long-term cost control.

States Struggle to Bear Costs of Health Care

National health insurance advocates propose that turning the nation's insurance companies into government-regulated utilities will lower insurance premiums. In Massachusetts, a universal health care mandate has brought both higher premiums and more medical spending. The Massachusetts plan has come in for a lot of criticism and its costs are running much higher than expected, mainly because it turns out that there were more people without insurance than anyone realized. Other states are watching Massachusetts carefully to understand the potential costs of nationwide reform.

In fact, the nation's governors are emerging as a formidable lobbying force on health care, especially as states overburdened by the recession brace for the daunting prospect providing for millions of uninsured residents. The wake-up call for the nonpartisan National Governors Association (NGA) came early in the summer, when Sens. Baucus and Grassley announced hearings on the nation's rising spending on public health insurance programs.

California Gov. Arnold Schwarzenegger, for one, estimated that expanding Medicaid coverage could cost his state $8 billion a year. Sen. Dianne Feinstein, also of California, underscored those concerns with her own pledge: “I could not support any reform that pushes additional costs on California state government or its counties.”

Recession victims already are flocking to Medicaid, and enrollment is expected to rise through fiscal 2010, according to the Kaiser Family Foundation's Commission on Medicaid and the Uninsured. The pace of increase is expected to ease after fiscal 2010, but the long-term outlook is rising costs for states to provide ever-more expensive care.

“States are already at a breaking point,” Sen. Grassley told colleagues during the panel's two-week-long debate on reform. But he also expressed concern that any broader reform proposals might not seriously reduce costs. On Thursday, the Democratic Governors Association delivered a letter to the panel. “We recognize that health reform is a shared responsibility and everyone, including state governments, needs to partner to reform our broken health care system,” the letter noted.

Part of the problem in calculating the costs of reform, is lack of data on how many people lack insurance and what different proposals would cost to provide them with public or private insurance. If public programs expand, governors can't say for certain how many people will show up to claim the new benefits. Because low-income people are harder to track - they tend to move more frequently, and they often don't file tax returns - state officials don't know precisely how many will be eligible. Massachusetts showed that drawing accurate estimates is challenging, and the costs of reform can be much higher than expected.

Another mystery is how many people who qualify for Medicaid under current rules - a sizable portion of the uninsured population - will decide to finally sign up. This is the “woodwork effect” that unnerves state officials around the country because it could lead to much higher costs.

“That's part of the problem we're having, is getting hard numbers,” says a researcher at the NGA. “We just don't know.” Such uncertainty is troubling for policymakers because the difference between estimates in the number of uninsured translates into hundreds of millions of dollars in potential new spending.

Appendix B Example of Search Environment

Sampling of Recent News Stories

Health Care for all Isn't Socialism; it is Social Responsibility	Gay Marriage Increasingly Seen as a Civil Rights Issue	New Ozone Rules Could Cost Industry Billions
In Hospital Decision, Obama Finds Safe Ground on Gay Rights, But Further Action Necessary	Governor Proposes Rise In Income Tax For Illinois	The Coffee-House Effect
Who's the Teacher? (Mr. Danza)	A Dozen States Pledge to Fight Government's Expanded Role in Health Care	Members of Congress Address Geographic Disparities in Medicare Spending
Community-Garden Rules Receive a Mixed Reaction	Spammers Use the Human Touch to Avoid CAPTCHA	National Plan Not Essential to Effective Health Care Market Reform
Deficiencies in U.S. Health Care System Spur Increase in the Number of the Uninsured	Gender Differences in Education Need Innovative Solutions	How to Fix the Health Care System? Slash High Salaries for Doctors
Immigrants Face Unfair Penalties in Criminal Cases	Pay for Teachers Rises by 7.1%	The Practices of Monopolistic Insurers have Damaging Consequences for Many Americans
Minority and Low-Income Students are Less Likely to Graduate and Attend College	National Health Insurance Plans Simply Pile on New Mandates, Taxes, and Subsidies	Years-long Battle Ended; Greater Fuel Efficiency Expected to Offset Cost
Soaring Costs Jeopardize Missile Defense Systems	Barnes & Noble Turns the Page	Without Coverage, Health and Political Voice of Uninsured Falling Behind that of Other Americans
Swiss Health Care Model Effective At Low Cost Without National Insurance Plan	Obsessions With Minutiae Thrive as Databases	Health Insurance out of Reach for Many Working Families Caught Between Poverty Line and Affordable Coverage
Bush Tax Cuts Near Expiration	High Systemic Costs Keep Insurance and Health Care Out of Reach	Present Insurance System Means Health Care Distributed Unequally Across Urban, Rural Areas
Noise Pollution from SunChips Bags Prompts Change in Packaging	Fears and Misperceptions about Immigrants Prompt Unjust Legislation	Painting a Rosy Picture of a Costly Fighter Jet
Choice Matters: Public Cares About Public Option(s) In National Health Care	Repealing the Estate Tax Would Benefit Only Wealthy Americans	

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Appendix C Health Care Opinions at Time 1 and Time 4

Condition	Time 1 Opinion	Time 4 Opinion
(1) t1 Pro-t4 Con No interim information	5.43 (std. dev.=1.32, N=53)	4.47 (1.61, 53)
(2) t1 Pro-t4 Con Information choice	5.56 (1.35, 43)	5.19 (2.04, 43)
(3) t1 Pro-t4 Con Repetition	5.63 (1.32, 49)	5.40 (1.75, 48)
(4) t1 Con-t4 Pro No interim information	3.75 (1.62, 52)	5.35 (1.63, 51)
(5) t1 Con-t4 Pro Information choice	3.74 (1.69, 43)	3.95 (1.86, 42)
(6) t1 Con-t4 Pro Repetition	3.50 (2.18, 38)	3.82 (2.15, 38)
(7) t1 Both-t4 None No interim information	4.88 (1.72, 48)	4.98 (1.48, 47)
(8) t1 Both-t4 None Information choice	4.67 (2.12, 43)	4.52 (1.99, 42)
(9) t1 Both-t4 None Repetition	4.85 (1.76, 61)	4.71 (1.58, 62)
(10) No frames No interim information	4.90 (1.76, 61)	4.95 (1.59, 59)
(11) No frames Information choice	4.70 (1.97, 56)	4.71 (1.89, 56)
Overall	4.73(1.84, 547)	4.76 (1.81, 541)

Appendix D Certainty of Health Care Opinions at Time 1 and Time 4

Condition	Time 1 Certainty	Time 4 Certainty
(1) t1 Pro-t4 Con No interim information	3.25 (std. dev.=1.07, N=53)	3.40 (0.99, 53)
(2) t1 Pro-t4 Con Information choice	3.34 (1.1, 44)	4.44 (1.47, 43)
(3) t1 Pro-t4 Con Repetition	3.42 (1.23, 48)	4.33 (1.65, 48)
(4) t1 Con-t4 Pro No interim information	3.50 (1.11, 52)	3.55 (1.12, 51)
(5) t1 Con-t4 Pro Information choice	3.30 (1.12, 43)	4.15 (1.67, 41)
(6) t1 Con-t4 Pro Repetition	3.50 (1.03, 38)	4.24 (1.53, 38)
(7) t1 Both-t4 None No interim information	3.46 (0.85, 48)	3.64 (1.21, 47)
(8) t1 Both-t4 None Information choice	3.42 (0.88, 43)	4.10 (1.41, 42)
(9) t1 Both-t4 None Repetition	3.42 (1.02, 62)	4.23 (1.52, 61)
(10) No frames No interim information	3.40 (0.92, 60)	3.58 (1.07, 59)
(11) No frames Information choice	3.36 (1.15, 56)	3.50 (1.08, 56)
Overall	3.40 (1.04, 547)	3.89 (1.38, 539)

Table 1: Pretest Results

Frame	Opposed-Supportive	Effectiveness
Costs (e.g., gov't control of costs)	6.73 (1.48)	3.58 (2.06)
Beneficiary-Victim	6.56 (1.43)	5.93 (1.21)
Morality	6.24 (1.82)	5.39 (1.47)
Inequalities	*6.19* *(1.28)*	*5.82* *(1.04)*
Limit Insurance Companies	6.13 (2.13)	4.98 (1.73)
Political Process	2.94 (1.83)	3.65 (1.78)
Free Market	2.83 (1.99)	3.41 (2.01)
Choice	2.34 (2.11)	5.11 (1.87)
Government Role	2.01 (1.76)	4.53 (1.31)
Costs (e.g., gov't taxes)	1.32 (1.43)	6.07 (1.92)

Note: N=54, Cell entries are means with standard deviations in parentheses.

Table 2: Experimental Conditions, with Article/Frame Exposure at Each Time

	No Interim Information	Information Choice	Repetition of T1
t1 Pro-t4 Con	(1) t1: 2 Pro t2: 8 Non-political t3: 8 Non-political t4: 2 Con	(2) t1: 2 Pro t2: Search t3: Search t4: 2 Con	(3) t1: 2 Pro t2: 4 Pro, 4 Non-political t3: 4 Pro, 4 Non-political t4: 2 Con
t1 Con-t4 Pro	(4) t1: 2 Con t2: 8 Non-political t3: 8 Non-political t4: 2 Pro	(5) t1: 2 Con t2: Search t3: Search t4: 2 Pro	(6) t1: 2 Con t2: 4 Con, 4 Non-political t3: 4 Con, 4 Non-political t4: 2 Pro
t1 Both-t4 None	(7) t1: 1 Pro, 1 Con t2: 8 Non-political t3: 8 Non-political t4: 2 Non-political	(8) t1: 1 Pro, 1 Con t2: Search t3: Search t4: 2 Non-political	(9) t1: 1 Pro, 1 Con t2: 2 Pro, 2 Con, 4 Non-political t3: 2 Pro, 2 Con, 4 Non-political t4: 2 Non-political
No frames	(10) t1: 2 Non-political t2: 8 Non-political t3: 8 Non-political t4: 2 Non-political	(11) t1: 2 Non-political t2: Search t3: Search t4: 2 Non-political	n/a*

Note: All participants in repetition groups read articles in the same order, but could choose how long they spent on each article. All participants in search conditions were presented with an identical search environment.
*If no frames were presented at t1, no frames are available for repetition, and thus this treatment group is unnecessary.

Table 3: Effectiveness of t4 Frame By Experimental Condition

Dependent Variable:	Effectiveness of t4 frame
(1) t1 Pro-t4 Con	0.01
No interim information	(0.18)
(2) t1 Pro-t4 Con	-0.50***
Information choice	(0.22)
(3) t1 Pro-t4 Con	-0.35**
Repetition	(0.21)
(4) t1 Con-t4 Pro	0.01
No interim information	(0.19)
(5) t1 Con-t4 Pro	-0.63***
Information choice	(0.22)
(6) t1 Con-t4 Pro	-0.45**
Repetition	(0.25)
(7) t1 Both-t4 None	-0.11
No interim information	(0.18)
(8) t1 Both-t4 None	-0.04
Information choice	(0.19)
(9) t1 Both-t4 None	0.09
Repetition	(0.16)
(11) No frames	-0.20
Information choice	(0.16)
$\tau_{1 \text{ through } 6}$	See below
Log likelihood	-927.40
N	541

Note: Entries are ordered probit coefficients with standard errors in parentheses. ***$p \leq .01$; **$p \leq .05$; *$p \leq .10$ for one-tailed tests. The coefficients and standard errors for $\tau_{1 \text{ through } 6}$ are: -1.63 (0.13), -0.83 (0.12), -0.38 (0.12), -0.1 (0.12), 0.91 (0.13), 2.02 (0.18).

Table 4: Search Behaviors

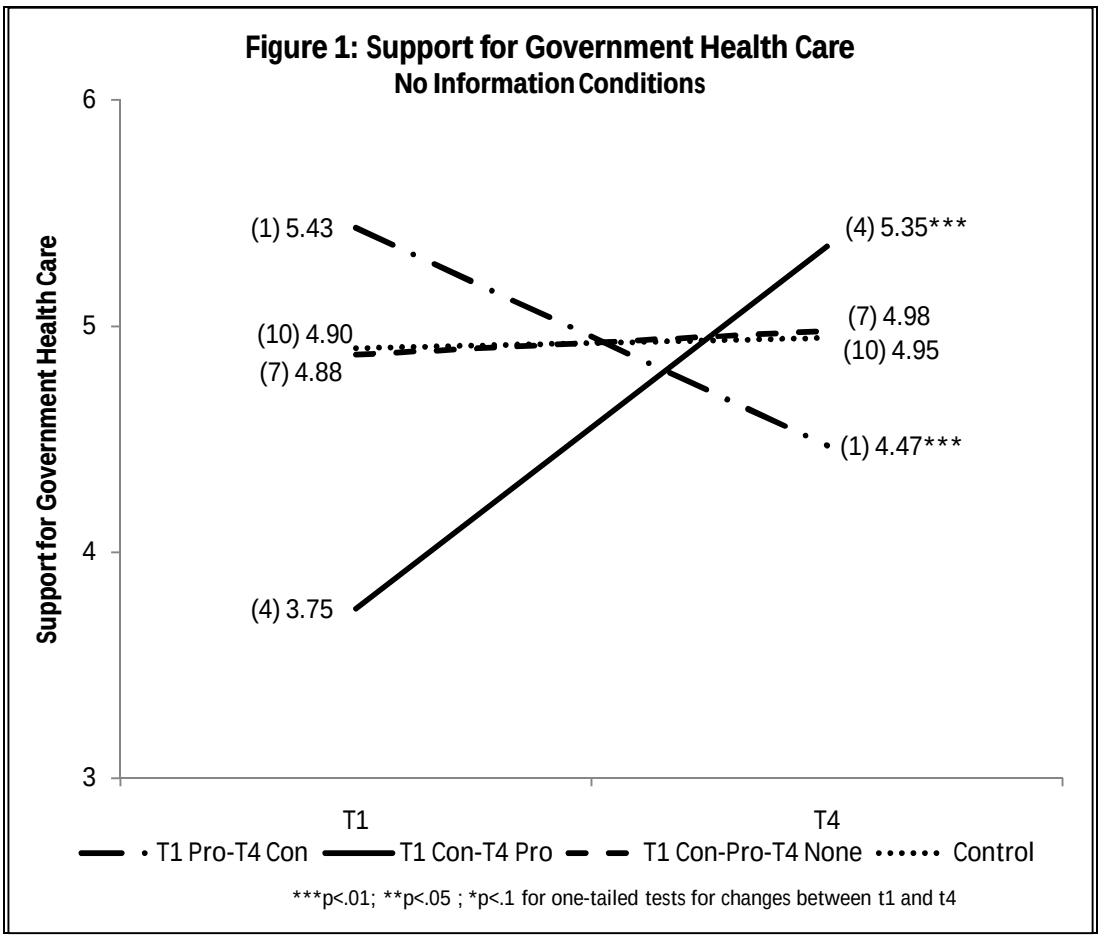
Dependent Variable:	t4 Health opinion	t4 Health opinion	t2 Search	t2 Search	t3 Search	t4 Health opinion
(2) t1 Pro-t4 Con Information choice	0.28** (0.17)	0.05 (0.18)	0.93*** (0.23)	0.88*** (0.23)	0.49** (0.24)	0.01 (0.18)
(5) t1 Con-t4 Pro Information choice	-0.48*** (0.17)	-0.18 (0.17)	-0.57*** (0.23)	-0.42** (0.22)	-0.21 (0.23)	-0.13 (0.17)
(8) t1 Both-t4 None Information choice	-0.17 (0.17)	-0.18 (0.17)	-0.03 (0.22)	0.06 (0.22)	0.06 (0.22)	-0.18 (0.17)
t1 Health Opinion		0.41*** (0.03)	0.15*** (0.05)	0.07* (0.04)	0.02 (0.05)	0.40*** (0.03)
t2 Search Behavior					0.47 (0.08)	-0.01 (0.07)
t3 Search Behavior						-0.09* (0.06)
$\tau_{1 \text{ through } 6}$ (or τ_8)	See below	See below	See below	See below	See below	See below
Log likelihood	-982.27	-864.42	-242.64	-272.20	-254.98	-859.26
N	541	538	185	185	185	537

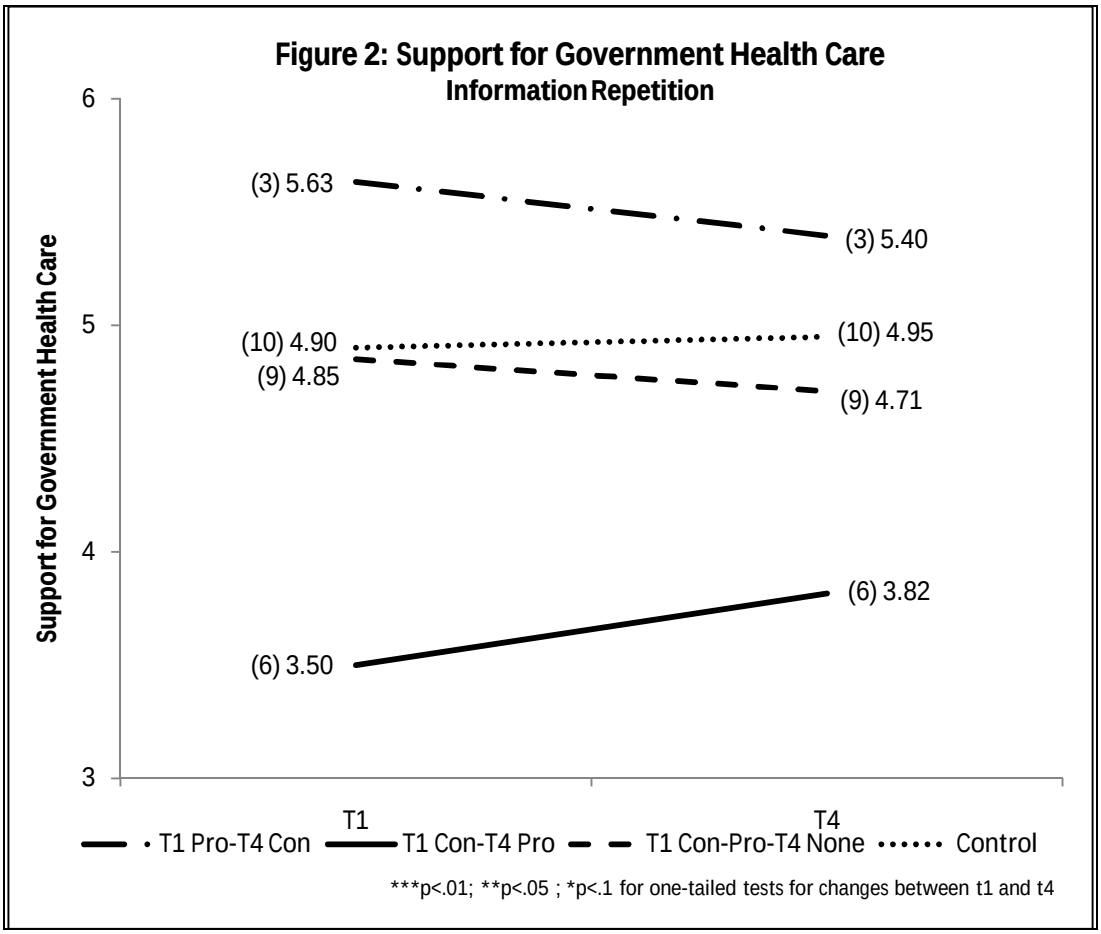
Note: Entries are ordered probit coefficients with standard errors in parentheses. ***$p \leq .01$; **$p \leq .05$; *$p \leq .10$ for one-tailed tests. The coefficients and standard errors for $\tau_{1 \text{ through } 6}$ (or τ_8), for each respective model, are: -1.83 (0.11), -1.05 (0.07), -0.58 (0.06), -0.28 (0.06), 0.06 (0.06), 0.88 (0.07); -0.42 (0.16), 0.63 (0.14), 1.22 (0.14), 1.62 (0.14), 2.07 (0.15), 3.06 (0.17); -2.00 (0.39), -0.76 (0.27), -0.06 (0.26), 1.6 (0.28), 2.17 (0.30), 2.71 (0.33); -1.81 (0.33), -1.17 (0.28), -0.87 (0.27), -0.42 (0.26), 1.08 (0.26), 1.79 (0.28); -2.26 (0.35), -1.61 (0.30), -1.28 (0.28), -0.79 (0.27), 0.81 (0.27), 1.64 (0.29), 2.66 (0.36), 3.35 (0.46); -0.51 (0.16), 0.56 (0.14), 1.15 (0.14), 1.56 (0.15), 2.01 (0.15), 3.00 (0.17).

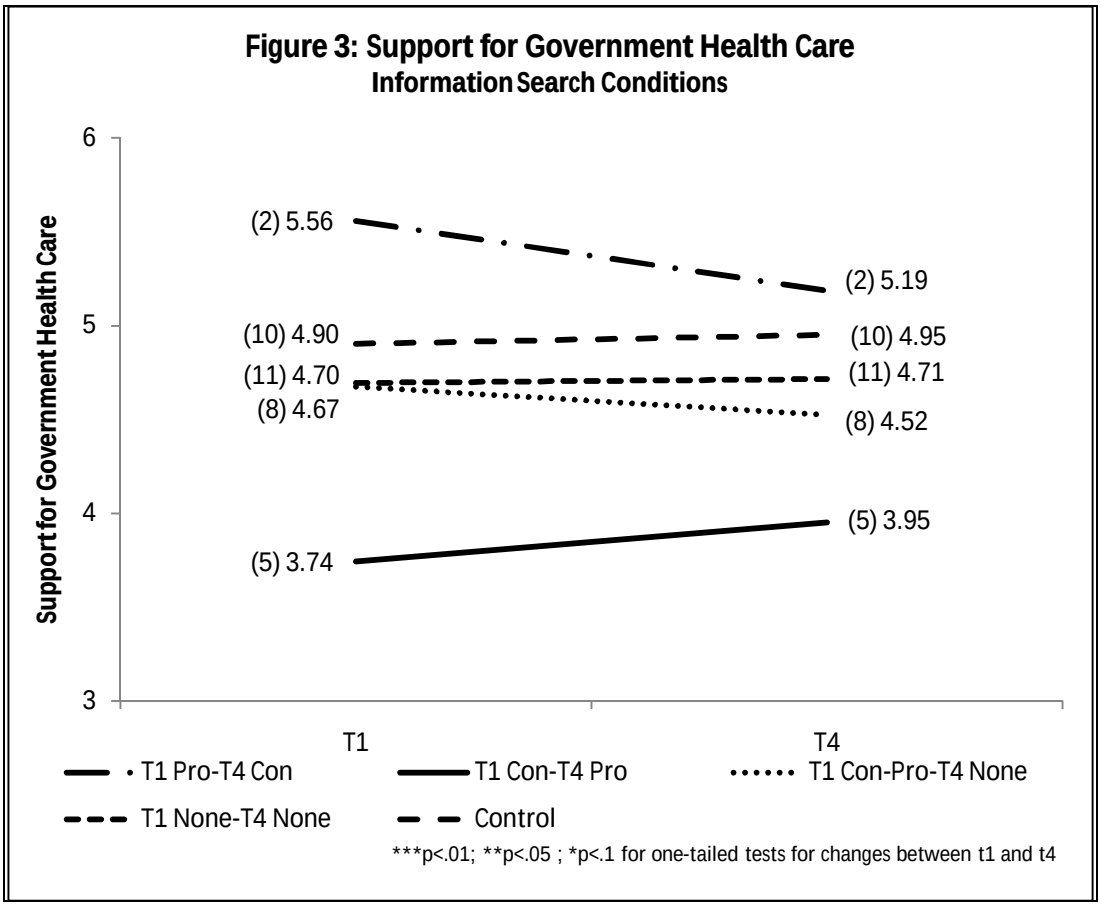
Table 5: Acquiring Additional Information

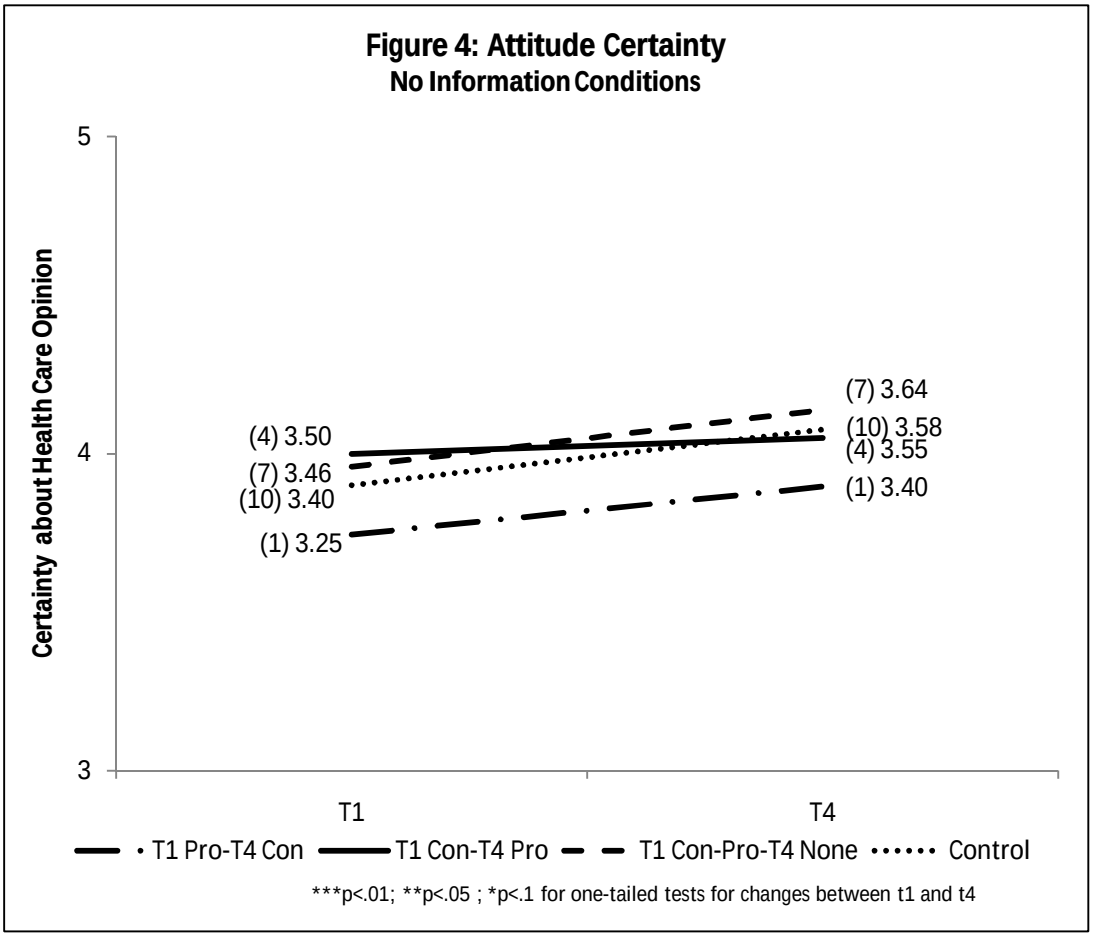
Dependent Variable:	Email for Information		Immigration		Taxes	
	(1)	(2)	t1	t4	t1	t4
(1) t1 Pro-t4 Con						
No interim	0.12	0.09	0.33**	-0.25*	0.40**	-0.26*
information	(0.25)	(0.25)	(0.17)	(0.19)	(0.19)	(0.18)
(2) t1 Pro-t4 Con	-0.43*	-0.27	0.33*	0.34**	0.32**	0.27*
Information choice	(0.28)	(0.28)	(0.19)	(0.20)	(0.17)	(0.18)
(3) t1 Pro-t4 Con	-0.35*	-0.23	0.48***	0.34**	0.30**	0.41**
Repetition	(0.27)	(0.27)	(0.21)	(0.20)	(0.18)	(0.21)
(4) t1 Con-t4 Pro						
No interim	0.08	0.07	-0.35**	0.35**	-0.18	0.31*
information	(0.25)	(0.25)	(0.19)	(0.20)	(0.2)	(0.20)
(5) t1 Con-t4 Pro	-0.51**	-0.43*	-0.52***	-0.45**	-0.38**	-0.37*
Information choice	(0.29)	(0.29)	(0.21)	(0.20)	(0.22)	(0.23)
(6) t1 Con-t4 Pro	-0.54**	-0.45*	-0.38**	-0.35*	-0.47***	-0.41**
Repetition	(0.3)	(0.3)	(0.21)	(0.24)	(0.20)	(0.21)
(7) t1 Both-t4 None						
No interim	-0.41*	-0.41*	0.22	0.21	0.18	0.09
information	(0.27)	(0.28)	(0.22)	(0.20)	(0.18)	(0.21)
(8) t1 Both-t4 None	-0.41*	-0.33	-0.28*	0.02	0.02	-0.11
Information choice	(0.28)	(0.29)	(0.20)	(0.22)	(0.19)	(0.20)
(9) t1 Both-t4 None	-0.44**	-0.31	0.11	-0.04	0.11	-0.08
Repetition	(0.25)	(0.27)	(0.19)	(0.18)	(0.18)	(0.19)
(11) No frames	0.05	0.04	0.00	-0.08	-0.01	-0.01
Information choice	(0.24)	(0.25)	(0.18)	(0.2)	(0.17)	(0.18)
Certainty T1		-0.26***				
		(0.05)				
Constant	-0.46***	0.46**				
	(0.17)	(0.24)				
$\tau_{1 \text{ through } 6}$			See below	See below	See below	See below
Log likelihood	-292.90	-278.31	-881.74	-818.22	-964.71	-920.94
N	538	536	545	540	549	540

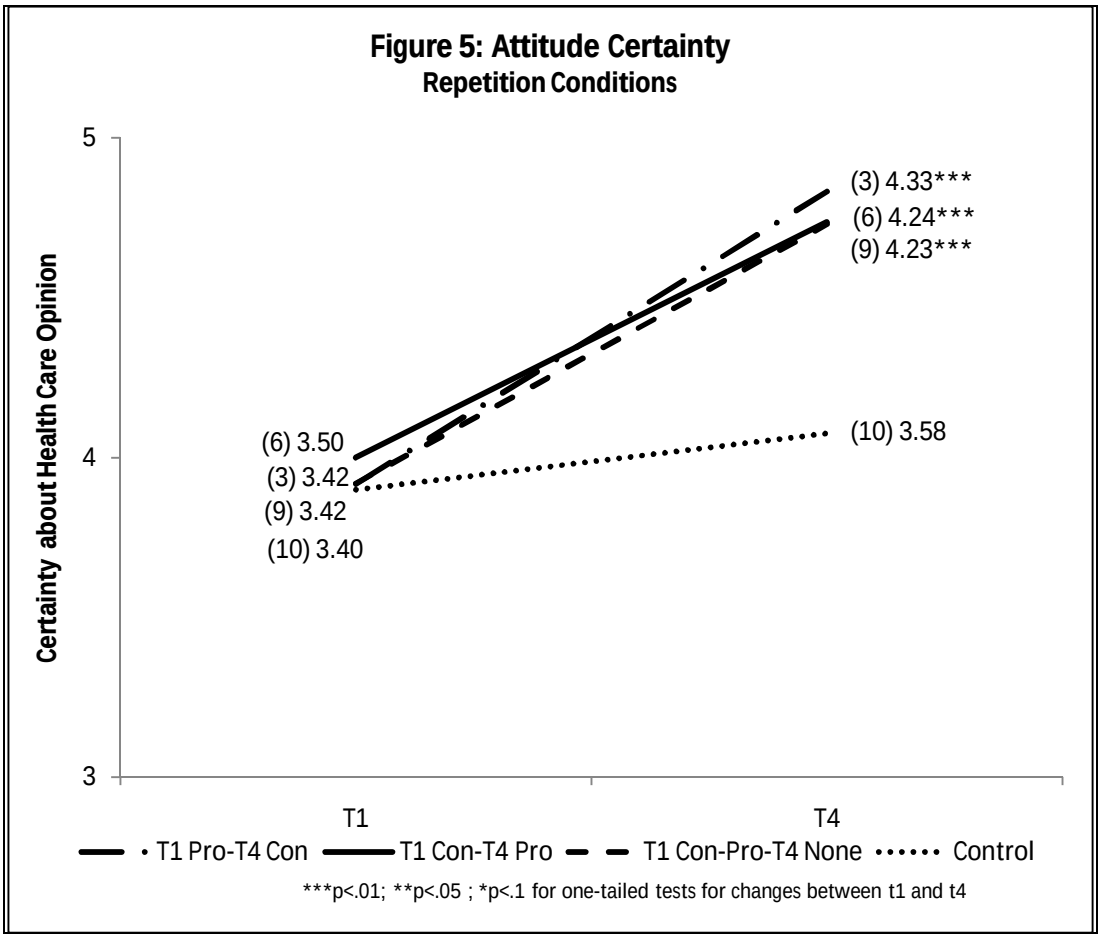
Note: Entries are probit coefficients for e-mail regressions and ordered probit coefficients for immigration and taxes regressions. Standard errors in parentheses. ***$p \leq .01$; **$p \leq .05$; *$p \leq .10$ for one-tailed tests. The coefficients and standard errors for $\tau_{1 \text{ through } 6,}$ for t1 and t4 immigration opinions and t1 and t4 taxes opinions, respectively, are:
-1.95 (0.16), -1.21 (0.14), -0.59 (0.13), 0.46 (0.13), 1.07 (0.14), 1.98 (0.15); -2.24 (0.18), -1.58 (0.15), -0.91 (0.14), 0.30 (0.14), 0.96 (0.14), 1.98 (0.17); -1.52 (0.13), -1.01 (0.12), -0.52 (0.12), 0.03 (0.12), 0.72 (0.12), 1.91 (0.14); -1.83 (0.16), -1.24 (0.14), -0.72 (0.14), -0.08 (0.14), 0.79 (0.14), 1.73 (0.15).


Figure 1: Support for Government Health Care
No Information Conditions
Support for Government Health Care
6
5
4
3
(1) 5.43
(4) 5.35***
(10) 4.90
(7) 4.88
(7) 4.98
(10) 4.95
(1) 4.47***
(4) 3.75
T1
T4
T1 Pro-T4 Con
T1 Con-T4 Pro
T1 Con-Pro-T4 None
Control
***p<.01; **p<.05 ; *p<.1 for one-tailed tests for changes between t1 and t4


Figure 2: Support for Government Health Care
Information Repetition
Support for Government Health Care
6
5
4
3
(3) 5.63
(3) 5.40
(10) 4.90
(10) 4.95
(9) 4.85
(9) 4.71
(6) 3.82
(6) 3.50
T1
T4
T1 Pro-T4 Con
T1 Con-T4 Pro
T1 Con-Pro-T4 None
Control
***p<.01; **p<.05 ; *p<.1 for one-tailed tests for changes between t1 and t4


Figure 3: Support for Government Health Care
Information Search Conditions
Support for Government Health Care
6
5
4
3
(2) 5.56
(2) 5.19
(10) 4.90
(10) 4.95
(11) 4.70
(11) 4.71
(8) 4.67
(8) 4.52
(5) 3.74
(5) 3.95
T1
T4
T1 Pro-T4 Con
T1 Con-T4 Pro
T1 Con-Pro-T4 None
T1 None-T4 None
Control
***p<.01; **p<.05 ; *p<.1 for one-tailed tests for changes between t1 and t4


Figure 4: Attitude Certainty
No Information Conditions
Certainty about Health Care Opinion
5
4
3
(4) 3.50
(7) 3.46
(10) 3.40
(1) 3.25
(7) 3.64
(10) 3.58
(4) 3.55
(1) 3.40
T1
T4
T1 Pro-T4 Con
T1 Con-T4 Pro
T1 Con-Pro-T4 None
Control
***p<.01; **p<.05 ; *p<.1 for one-tailed tests for changes between t1 and t4


Figure 5: Attitude Certainty
Repetition Conditions
Certainty about Health Care Opinion
5
4
3
(3) 4.33***
(6) 4.24***
(9) 4.23***
(10) 3.58
(6) 3.50
(3) 3.42
(9) 3.42
(10) 3.40
T1
T4
T1 Pro-T4 Con
T1 Con-T4 Pro
T1 Con-Pro-T4 None
Control
***p<.01; **p<.05 ; *p<.1 for one-tailed tests for changes between t1 and t4

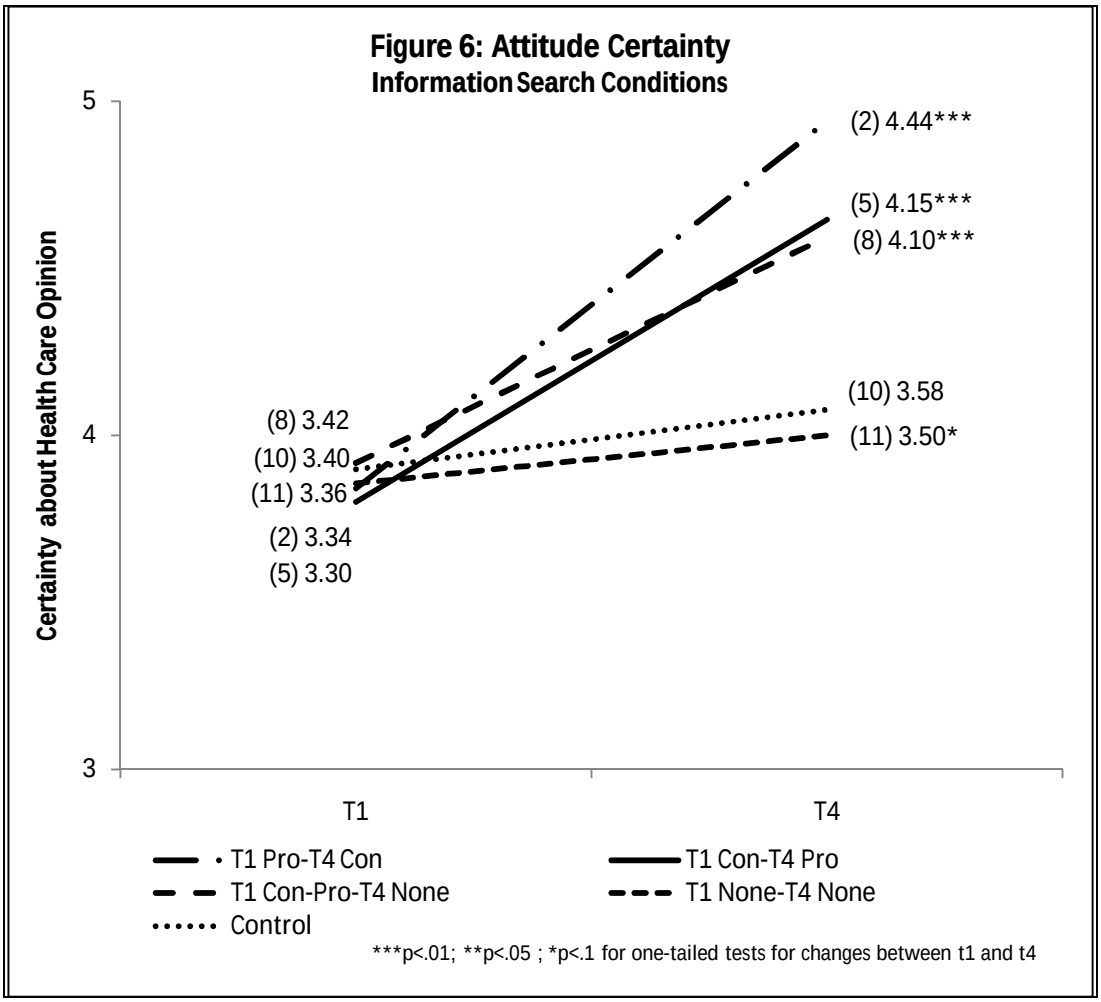
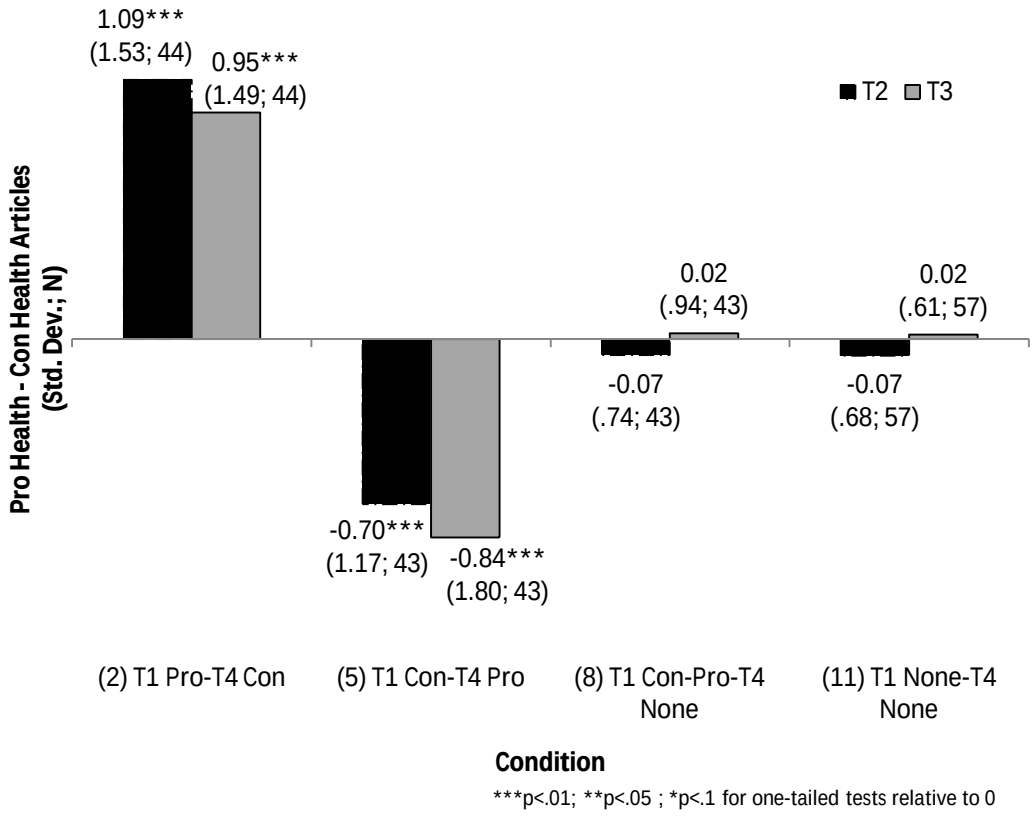

Figure 6: Attitude Certainty
Information Search Conditions
Certainty about Health Care Opinion
5
4
3
(2) 4.44***
(5) 4.15***
(8) 4.10***
(10) 3.58
(11) 3.50*
(8) 3.42
(10) 3.40
(11) 3.36
(2) 3.34
(5) 3.30
T1
T4
T1 Pro-T4 Con
T1 Con-T4 Pro
T1 Con-Pro-T4 None
T1 None-T4 None
Control
***p<.01; **p<.05 ; *p<.1 for one-tailed tests for changes between t1 and t4

Figure 7: Information Search Behavior
Number of Articles Read Pro-Con (SD; N)



***p<.01; **p<.05 ; *p<.1 for one-tailed tests relative to 0