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The Informational Basis for Mass Polarization

Thomas J. Leeper*

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If nothing else, democratic politics requires compromise. Mass polarization, where citizens disagree strongly and those disagreements magnify over time, presents obvious threats to democratic well-being. The overwhelming presumption is that if polarization is occurring, a substantial portion of it is attributable to fragmentation attendant an increasingly choice-laden media environment where individuals expose themselves only to opinion-reinforcing information. Under what conditions does mass opinion polarization occur? Through two over-time, laboratory experiments involving information choice behavior, this paper considers, first, the effects of slant in one's information environment on over-time opinion dynamics and, second, the moderating role of attitude importance on those effects. The experiments reveal that, despite similar information search behavior, those with strong attitudes are dogmatic, resisting even substantial contrary evidence; those with weak attitudes by contrast hear opposing arguments and develop moderate opinions regardless of the prevalence of those arguments in their environment. Evaluations of information, rather than information search behavior per se, explain why individuals with strong attitudes polarize and those with weak attitudes do not. Polarization therefore seems to require more than media fragmentation and, in fact, a more important factor may be the strength of citizens' prior attitudes on particular issues.

If nothing else, democratic politics requires compromise. Mass polarization, where citizens disagree strongly and those disagreements magnify over time, therefore seems to present obvious threats to democratic well-being. Political science has demonstrated a modulating, though frequently uneasy, view of political polarization. This ambivalence reflects the apparent divisiveness of polarized politics (Sunstein 2009) against the apparent benefits that polarization might have for citizen decision-making (Levendusky 2010). Contemporary debate surrounding polarization has deep roots. The concluding line item of the 1950 American Political Science Association report on political parties offered a cautious desire for

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party contrast without mass polarization.¹ Just a decade later, McClosky, Hoffmann, and O’Hara (1960) demonstrated that the two-party system offered clear differences between parties without undesirable polarization.² In more recent times, McClosky, Hoffmann, and O’Hara’s assessment of American politics seems to resonate much more with the conclusion drawn by Fiorina and Abrams (2008) that “the American public as a whole is no more polarized today than it was a generation ago” (584) than with the contemporary observation by Hetherington (2001) that “Greater ideological polarization in Congress has clarified public perceptions of party ideology, which has produced a more partisan electorate” (629), but the polarization literature is still growing (see, for example, Levendusky 2009, 2010, 2011; Stroud 2011; Carmines and Ensley 2004).

The overwhelming presumption is that if polarization is occurring, a substantial portion of that polarization is attributable to the fragmentation attendant an increasingly choice-laden media environment where individuals can easily expose themselves only to opinion-reinforcing information (see, especially, Sunstein 2002; Stroud 2011; Bennett and Iyengar 2008). Yet the literature says surprisingly little about *when* the micro foundations for mass polarization — over-time increases in individuals’ opinion extremity³ — actually occur (but see Taber and Lodge 2006; Feldman 2011; Levendusky 2011). Despite media choice being mentioned as a cause of polarization, that effect has withstood insufficient empirical scrutiny. Indeed, much of the polarization literature focuses on trends in macro opinion (as opposed to individual-level opinion changes over time). That research necessarily struggles to demonstrate the causes of polarization because of a lack of individual-level panel data, which is necessary to avoid faulty ecological inferences about opinion dynamics (Druckman

¹“If the two parties do not develop alternative programs that can be executed, the voter’s frustration and the mounting ambiguities of national policy might set in motion more extreme tendencies to the political left and the political right [...] Orientation of the American two-party system along the lines of meaningful national programs is a significant step toward avoiding the development of such a cleavage” (*APSA Report* 1950, 14).

²“Whereas the leaders of the two parties diverge strongly, their followers differ only moderately in their attitudes toward issues” (426).

³Fiorina and Abrams (2008) write that “Movement away from the center toward the extremes would seem to be a noncontroversial definition of polarizing” (567).

and Leeper 2012). Contemporary mass polarization — if it exists — has almost universally been blamed on the nature of the mass media environment (Bennett and Iyengar 2008; Iyengar and Hahn 2009; Sunstein 2002, 2009; Stroud 2011; Arceneaux and Johnson 2012). While it is plausible that the political information environment contributes to polarization, the mechanisms by which this might occur are not well understood.

What political conditions and what individual predispositions push people to extremes? Through two over-time, laboratory experiments involving information choice behavior, this paper considers, first, the effects of slant in one’s information environment (like that thought to cause polarization) on over-time opinion dynamics and, second, the moderating role of attitude importance on those effects. I first describe my expectations, which are rooted in the psychology of attitude strength, then report the design and results of each experiment in turn, and conclude with a discussion of how information choices are made and the effects of those choices on opinion dynamics. Experiment 1 shows how slanted environments may influence information exposure and opinion changes, but Experiment 2 shows these effects to be substantially moderated by the strength of individuals’ attitudes. The results suggest that while information choices facilitate polarization for those with the strongest opinions, slanted information environments alone are insufficient to polarize the electorate.

Information and Polarization

Recent commentary on political communication has pointed to the political information environment — the set of information available to a given individual at a given point in time — as a central mechanism in the construction, perpetuation, and implications of polarizing politics (see especially Sunstein 2002; Bennett and Iyengar 2008; Iyengar and Hahn 2009; Levendusky 2010). Some have been quick to infer from increasing media choice that media fragmentation causes average citizens to selectively expose themselves only to ideologically congruent political information and avoid cross-cutting exposure (Bennett and Iyengar 2008;

Iyengar and Hahn 2009).⁴ During the mid-century period where Schattschneider and fellow committeemen saw parties as insufficiently differentiated, news media offered little diversity in political information; from the perspective of political communication, this correspondence is likely meaningful.⁵ This historical association bolsters arguments that media play a powerful role in polarization. But does information choice alone produce polarization?

Information Choice

Research has noted that political debate is frequently competitive — posing arguments supportive of and opposed to particular policies against one another — and that captive exposure to competing messages seems unlikely to polarize opinions (Petty and Cacioppo 1986; Chong and Druckman 2007*b*). It is less clear how information choice behaviors might enable individual-level opinion dynamics that aggregate to polarization. Despite considerable evidence for how people choose (political) information (Redlawsk 2004; Lau and Redlawsk 2006; Fischer et al. 2005, 2011; Sundström 1987; Jonas et al. 2001; Verplanken, Hazenberg, and Palenewen 1992; Huang 2000; Valentino et al. 2008), little research has examined how people choose from within different information environments or how those choices affect attitudes downstream. This seems to be, in part, due to research on political information acquisition (see, most prominently, Lau and Redlawsk 2006) adopting and responding to methods originated in consumer behavior research, which emphasize choice as an outcome (Jacoby, Szybillo, and Busato-Schach 1977; Jacoby, Chestnut, and Fisher 1978), rather than experimental designs aimed at understanding political phenomena.⁶

⁴Fiorina and Abrams (2008) find little opinion polarization during this period, but there is a good chance this is due to the nature of the opinions considered in their assessment of opinion stability and change. As Druckman and Leeper (2012) argue, “macro” opinion studies, like Fiorina and Abrams’s, rely fundamentally upon less volatile, more general attitudes than those considered in most studies of opinion change and are thus ill-suited for examining the extent to which media polarize the electorate.

⁵In 1980s and 1990s scholarship, “the nightly news programs of ABC, CBS and NBC were widely criticized for being largely the same broadcasts covering the same narrow range of issues from the very same angles” (Mutz and Young 2011, 1021; see also Bennett and Iyengar 2008; Williams and Delli Carpini 2011).

⁶Importantly, psychologists have also offered considerable insight into information choice behaviors (Fischer, Schulz-Hardt, and Frey 2008; Fischer et al. 2011; Greifeneder, Scheibehenne, and Kleber 2010; Scheibehenne, Greifeneder, and Todd 2010; Malhotra 1982).

Choice is a critical part of the media effects, but from a political science perspective it is probably best understood as a mechanism rather than outcome in and of itself. There is limited extant research that considers information choice in this fashion. Arceneaux and Johnson (2012), for example, suggest that choice undermines the polarizing effects of partisan media. Whereas captive exposure to Fox and MSNBC lead people to hold quite different opinions toward issues, choice allows individuals to choose ideologically congruent information exposure or opt out of political information altogether. Levendusky (2012), however, finds that exposure to chosen messages magnifies the effects of partisan media observed under captive exposure. In other research, Redlawsk, Civettini, and Emmerson (2010) show that in the face of increasingly counter-attitudinal information about one’s preferred political candidate, campaign search behavior and affect toward that candidate eventually “tip” toward the slant of the environment. Beyond these few experiments, however, we know little about the opinion-dynamic effects of information choice, and the mixed results from Arceneaux and Johnson (2012) and Levendusky (2012) suggest the effects of choice on polarization are largely unresolved.⁷

This discussion leads to a first set of hypotheses associated with the premise that because the information environment shapes the choices that people *can* make, the information environment causes the choices the people *do* make (and to some extent directly affects their opinions). Just as in the real world, the information environment itself may influence attitudes aside from any effects of the particular information that people choose to read. While people make choices from the environment they are presented with, they often have little choice over the environment itself (which is set by editorial decisions and political agendas; Boczkowski 2010; McCombs and Shaw 1972; Baumgartner and Jones 1993). Individuals are often incidentally exposed to the information that they choose to avoid (Lee 2009; Tewksbury, Weaver, and Maddex 2001; Zukin and Snyder 1984). Operating within an environment that disproportionately favors or disproportionately opposes your predispositions would therefore

⁷The present research expands on this extant work by examining the effects of information choices outside the scope of cable news and the campaign simulations introduced by Lau and Redlawsk (2006).

seem to have divergent effects on choice behavior and opinions.

Hypothesis 1: Pro-slanted environments will lead to greater numbers of Pro articles being chosen, Con-slanted environments will lead to greater numbers of Con articles being chosen, and mixed environments will tend to lead people to choose an even number of Pro and Con argument.

By constraining choices and by exposing individuals to a mix of Pro and Con headlines (and further information contained within chosen articles), information environments also change peoples' opinions in the direction of the environment's slant. As a result of exposure to the environment and exposure to the information contained in articles therein, individuals should react to that information by evaluating it and moving their opinions in the direction of the slant of the environment, as if they were they exposed to information in a captive fashion (Chong and Druckman 2007*a*; Druckman, Fein, and Leeper 2012).

Hypothesis 2: Pro-slanted environments will lead to more favorable opinions on an issue, Con-slanted environments will lead to less favorable opinions, and mixed environments will tend to lead to moderate opinions (comparable to those of the control group).

Polarization for Some

If information environments sway opinions, then there is little reason to believe that polarization would happen at all. Polarization requires that individuals move to opposite extremes, not reach the same conclusion. When is this likely to occur? When individuals select information from their environment and evaluate that information in an attitude-reinforcing fashion (Kunda 1990; Taber and Lodge 2006), they may be much less likely to respond to the informational contents of their environment even if that environment is stacked against their predispositions (Sheagley 2012; Redlawsk, Civettini, and Emmerson 2010). Developing more extreme viewpoints — the foundation of polarization — would be much more likely. Indeed, Taber and Lodge (2006), suggest that exposure to any information increases attitude extremity, but they consider only a balanced information environment. As Leeper (2012)

has argued, however, attitude-defensive motivation is not always widespread; only individuals with strong, personally important attitudes are likely to engage in attitude-defensive reasoning.

This view is broadly consistent with considerable evidence that attitude importance is a distinct psychological construct from other attitude attributes, such as accessibility (Krosnick 1989; Bizer and Krosnick 2001; Visser, Bizer, and Krosnick 2006) or certainty (Visser, Krosnick, and Simmons 2003), and that attitudes become important when one's interests are at stake (Boninger, Krosnick, and Berent 1995). Though the motivational quality of importance is fairly intuitive, the linkage between importance and motivated reasoning has faced little empirical scrutiny (Eaton and Visser 2008). But the initial evidence, in experiments by Leeper (2012) and Brannon, Tagler, and Eagly (2007), suggests that high attitude importance leads individuals to prefer attitude-congruent information over incongruent information.⁸

I therefore expect that personally important issues and attitudes will increase the likelihood of attitude-congruent information seeking and directionally motivated political reasoning (i.e., attitude-defensive evaluations of political information). When importance is high, motivated reasoning and its dogmatic effects are likely; when importance is low, citizen responsiveness to the information environment is likely to be high. The effects of the information environment might therefore be highly conditional — depending on the way that individuals obtain and process information, the slant of one's information environment might be a central factor in the formation of one's opinions or it might be irrelevant.

Hypothesis 3: High attitude importance will lead those with Pro *t1* (pretreatment) opinions to choose more Pro information and those with Con *t1* opinions to choose more Con information, regardless of environment.

In other words, selective exposure and evaluation may not be constrained by the con-

⁸Other extant evidence documents increased searching for information when an issue is personally important (Holbrook et al. 2005; Lee et al. 1999; Hart et al. 2009; Kim 2008), but no published work documents how the contents of the environment constrain choice behavior.

tents of the information environment alone. An importance-driven motivation to seek out congruent information has the potential to yield selective exposure when the environment is evenly balanced or even when it is stacked against one's prior opinions. Those with high importance Pro (Con) attitudes at $t1$ will seek out Pro (Con) information regardless of the environment they are in at $t2$. For those with low importance, however, the environment should be much more influential in shaping the choices that people make and the opinions they hold thereafter. This leads to two very different expectations about how those with high and low importance attitudes, respectively, will respond to similar environments:

Hypothesis 4a: Those with high importance Pro (Con) $t1$ attitudes will hold similarly positive (negative) opinions regardless of the environment they are in.

Hypothesis 4b: Those with low importance Pro and Con $t1$ attitudes will tend to hold positive opinions in a Pro environment, negative opinions in a Con environment, and moderate opinions in a mixed environment (comparable to the control group).

In other words, those most likely to engage with politics (those for whom politics or particular issues are personally important; Krosnick 1990) are most likely to polarize, while the remainder of the public might simply comply with the slant of the information environment. In testing these hypotheses, Study 1 examines Hypotheses 1 and 2. Study 2 serves to replicate those findings and then tests Hypotheses 3 and 4, using a manipulation of personal importance in order to identify clear causal effects of prior attitudes on choice behavior and downstream opinions. While past work has examined information search behavior, it has typically done so with an eye toward understanding choice per se (Lau and Redlawsk 2006; Taber and Lodge 2006) rather than the effects of search on opinion dynamics (but see Druckman, Fein, and Leeper 2012). The critical difference between this research and extant work (e.g., Arceneaux and Johnson 2012; Levendusky 2012) is a focus on the effects of multiple distinct information environments and the manipulation (rather than measurement) of the key causal variable: attitude importance. While survey-based research has made clear that the public's information experiences are heterogeneous, no previous experimental work has

Table 1: Study 1 Experimental Conditions

	<i>Search</i>	<i>Captive</i>
Pro	1 (35)	3 (40)
Con	2 (42)	4 (32)
Control	5 (27)	

Note: Note: Numbers in parentheses are treatment group sample sizes.

been designed to accommodate this obvious reality that people face different information environments from which they then choose what to attend to. The research presented here therefore sets up a realistic test of whether information choice serves as a microfoundation for polarization.

Study 1

In order to test Hypotheses 1 and 2, Study 1 looked only at the effects of slanted information environments relative to captive exposure to Pro, Con, or non-political Control information on information choices and the opinions that result from those choices. The findings from Study 1 suggest that information environments can have a direct effect on opinions on two different issues: health care reform and U.S. military actions in Libya. The Pro health care articles focused on the benefits that health care reform would bring to those without insurance and with poor access to medical care, while the Con articles focused on the expansion of government bureaucracy. The Pro Libya articles focused on protecting civilians from violence on the part of the (then-reigning) Gaddhafi regime, while the Con articles focused on the burden placed upon the military and costs of U.S. involvement in, then, a third overseas conflict. All of these frames were selected for use in the study as a result of pretests conducted with respondents not involved in the full study, the results of which are described in the Online Appendix.

The study involved two manipulations. First, half of the participants were assigned to

Figure 1: Screenshot of Example Study 1 Search Environment

Please choose some articles to read. You may read any article, in any order. You do not need to read every article.

The Path to Playoffs in College Football?	Health Care Reform Aims to Reduce the Number of the Uninsured	Foreign Journalists, Finally Allowed in Libya, Report on Atrocities Against Civilians	Told to Eat Its Vegetables, America Orders Fries
Top Priority for Reform: Improving the Health of At-Risk Populations	Qaddafi's Siege on Populace Leads Thousands to Flee Country	Noise Pollution from SunChips Bags Prompts Change in Packaging	The Coffee-House Effect
Obsessions With Minutiae Thrive as Databases	Action Needed to Protect the Rising Numbers of Uninsured Americans	The Gimmick Makes the Beer	Working Class Families Have Most to Gain from Healthcare Reform
Libyan Civilians Struggle to Resist Unprovoked Attacks by Qaddafi's Forces	Qaddafi Brutalizes Foes, Armed or Defenseless	Community-Garden Rules Receive a Mixed Reaction	Why are 3-D Movies so Bad?

“search” conditions, where they were presented with a 4x4 matrix of news article headlines from which they could choose to read any number of articles for up to 15 minutes (the approximate amount of time it took captive participants to read 8 articles; thus participants were not expected to read every article). Figure 1 shows an example search environment. Eight of these articles were non-political filler, four addressed Libya, and four addressed health care reform. Second, participants were assigned either to a Pro condition, where all the Libya and health care reform articles were Pro-framed, or to a Con condition, where all the Libya and health care reform articles were Con-framed. In other words, respondents were assigned to the same treatment condition for two simultaneous experiments: one about Libya and one about health care reform. However, fifty-percent of the available articles did not address either of the target issues.

Though the information environments used in both experiments are stylized — being relatively context-free — they simulate the common experience one might have on an online news site, where different news stories on different topics (political and non-political) are available to read. Beyond the mundane similarity to such online news-viewing, the information environments also mimic the broader process by which individuals choose to focus on subsets of the stimuli in their political environment (just as the dynamic process tracing environment [Lau and Redlawsk 2006] mimics the process of a political campaign).

The remaining respondents were assigned to “captive” conditions, where they were as-

signed to read eight news articles. These respondents were assigned to read either 2 Pro articles about Libya and 2 Pro articles about health care reform (along with 4 nonpolitical filler articles) or to instead read 2 Con articles about Libya and 2 Con articles about health care reform (along with the same nonpolitical filler). An additional control condition read only nonpolitical articles in a captive fashion. Table 1 describes the design.

A total of 176 Northwestern University undergraduates participated in the study in Spring 2011 in order to fulfill a course requirement. Though questions are persistently raised about the appropriateness of student participants, there is little a priori reason to believe they should behave differently than others (Druckman and Kam 2011). Participants were not told anything about the purpose or content of the study prior to entering the laboratory. The study involved pretest measurement of opinions (t_1) about one month before the 30-minute, in-person experimental session. These pretreatment opinions are needed to assess within condition variations in information choice among those supportive of and opposed to each policy. At the lab session, individuals read articles (in either the search or captive fashion) and then completed a short post-treatment questionnaire that measured their opinions toward both issues.⁹ All variables are coded 0-1 with higher values indicating greater support. Given the experimental design, all results focus on treatment group means and statistical significance is calculated based upon nonparametric randomization/permutation tests.

Results

Recall that Study 1 is primarily intended to test Hypothesis 1, which expects that the contents of information environment shape search behavior, and Hypothesis 2, which expects

⁹The opinion question about Libya asked “To what extent do you oppose or support U.S. military action in Libya?” and allowed respondents to indicate their opinion on a seven-point scale from “strongly oppose” to “strongly support.” Following the lead of Druckman, Fein, and Leeper (2012), the health care question asked respondents “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...” and allowed them to favor, on a seven-point scale, the relative balance between private and public health care insurance. Exact question wordings are available in the Online Appendix.

Table 2: Health Care and Libya Opinion Changes

Condition	Health care	Libya
Search Pro	0.00 (0.03)	0.05 (0.04)
Captive Pro	-0.05 (0.02)	0.03 (0.03)
Search Con	-0.04 (0.04)	-0.04 (0.03)
Captive Con	-0.12 (0.04)	-0.03 (0.04)
Control	0.03 (0.03)	0.06 (0.03)

Note: Note: Cell entries are treatment group means (of individual-level changes $t2 - t1$) with standard errors in parentheses.

that slanted environments move opinions in the direction of the slant. I first examine evidence testing Hypothesis 2 and then relate this back to evidence of information choice behavior for testing Hypothesis 1.

At $t1$ participants reported favorable opinions toward government involvement in health care and, on average, moderate opinions toward military involvement in Libya. The first column of Table 2 reports changes in mean health care opinions (by treatment group) between $t1$ and $t2$. The second column does the same for the Libya issue.¹⁰ As should be clear, exposure to Pro rather than Con messages (in either search or captive fashion) appears to have affected opinions (with Pro participants holding more positive opinions than Con participants), consistent with Hypothesis 2. More specifically, on the health care issue, the difference between reading information from a slanted Pro or slanted Con information environment is a difference in opinions of 0.04 (on a 0-1 scale, $p=0.21$), as opposed to a difference of 0.07 ($p=0.04$) for being captively exposed to the same messages. This suggests searching within a slanted environment can have similar effects to being captively exposed to a biased subset of available information. The effects for Libya opinions are similar. The difference in opinions between those captively exposed to Pro rather than Con information was 0.06 ($p=0.02$), while the difference for those searching in slanted Pro and slanted Con environments was 0.09 ($p=0.11$).¹¹ While these effects are fairly small (on

¹⁰Given that treatment conditions differed somewhat in their $t1$ opinions, changes rather than $t2$ opinions are a better metric of treatment effects.

¹¹Some readers may desire a discussion of how the captive conditions obtained traditional levels of statis-

Table 3: Issue-Relevant Articles as Proportion of Total Articles Read, by Search Condition and Prior Opinion (Study 1)

	Health care		Libya	
	t1 con	t1 pro	t1 con	t1 pro
Search Pro	0.18 (0.03)	0.17 (0.03)	0.25 (0.04)	0.29 (0.05)
Search Con	0.15 (0.04)	0.20 (0.03)	0.26 (0.05)	0.25 (0.04)

Note: Note: Cell entries are the mean proportion of issue-relevant articles selected out of all articles read, with standard errors in parentheses. The Pro (Con) environment contained only Pro (Con) information, so values in the first row indicate Pro articles as a proportion of all articles read and values in the second row indicate Con articles as a proportion of all articles read.

average about .07 on a 0-1 scale), the consistency across issues and between search and captive conditions suggests the effects of information exposure are substantively meaningful despite only a relatively short exposure to the framed messages.

Thus, on both issues, captive exposure to messages and search for messages within slanted information environments appear to produce comparable effects on opinions, consistent with predictions about opinions laid out in Hypothesis 2. This suggests that while extant research has shown individuals to resist counter-attitudinal information in the updating of their opinions, the information environment can have effects on opinion extremity. The reason for this is clear in a simple examination of information choice behavior (which provides a test of Hypothesis 1). Table 3 clearly shows that when faced with an environment containing only Pro information or only Con information, individuals — regardless of *t1* opinion — choose to read approximately equal proportions of issue-relevant information, which is consistent with the environment effects predicted by Hypothesis 1. If there is no attitude-congruent information to choose, individuals must ultimately face incongruent information.

In sum, I find support for Hypothesis 2 — the information environment shapes opinions by exposing individuals to potentially slanted information. I also find that individuals with tical significance and the search conditions did not. Given recent arguments by Gelman and Stern (2006), I hesitate to draw a distinction between the substantive meaning of “significant” and “marginally significant” effects here. Additionally the difference-in-differences between search and captive conditions never achieve statistical significance, offering no clear evidence that captive exposure produces larger effects than search within a slanted environment.

different prior opinions seem to behave in similar ways within a given information environment. Substantively, however, this leaves little room for polarization. If everyone is swayed by the environment — in both their behavior and their opinions — choice per se would seem to matter very little, the environment alone being the driver of opinion dynamics. Individuals are constrained by the information available to them; their opinions reflect both the perseverance of prior attitudes and their evaluations of new information. If information choice is supposedly the basis of polarization, there must be more complicated relationships linking the information environment, choice, and opinion change. I take up this question in greater detail in Study 2.

Study 2

Given that Study 1 showed clear directional effects of the issue environment (i.e., environments constrained information choice behavior such that the Pro environment led to more positive attitudes and Con environment led to more negative attitudes), Study 2 aimed to provide a replication of those results and to further understand heterogeneity of both information search behavior and opinion changes between those with high and low importance attitudes (that is, to test Hypotheses 3 and 4). Recall that Hypothesis 3 predicted that high attitude importance would lead individuals with pro $t1$ opinions to choose more Pro information and those with con $t1$ opinions to choose more Con information, regardless of how much attitude-congruent information was available in their environment. Hypothesis 4a expected that those with high attitude importance would therefore develop more extreme opinions regardless of environment and Hypothesis 4b expected the opinions of those with low attitude importance would move in the direction of the environment. To provide a rigorous test of these hypotheses, I largely replicate the design of Study 1 (and the findings regarding Hypotheses 1 and 2) but gain additional leverage on the causal effects of attitude importance by providing a direct manipulation of importance. Similar to the first experi-

ment, Study 2 focused on an aspect of health care reform, which I describe before turning to the details of the experimental design.

Issue Selection and Frames

The experiment focused on opinions surrounding medical provider compensation — an aspect of health care policy that, while important, has received dramatically less media coverage and public debate than other facets of the Patient Protection and Affordable Care Act (PPACA). The specifics of provider compensation are — like most areas of health care policy — complex, but status quo policy is that most providers are paid fixed dollar amounts based upon an itemized list of procedures or services performed regardless of how those procedures benefit or harm patient well-being. Some argue that this current “fee-for-service” system leads to over-utilization of health care because providers have little incentive to withhold unnecessary care and providers benefit from performing unnecessary tests and procedures. As one possible alternative, compensation schemes built around physician performance in terms of patients’ health outcomes have been proposed in order to increase accountability for services rendered and reduce overall health care spending, somewhat analogously to proposals for performance-based pay for educators. Reforms could feasibly reduce health care expenditures by more efficiently improving health without the excessive use of costly tests or procedures as well as provide “integrated care” where physicians work collaboratively to more efficiently and effectively satisfy patient needs.¹² Outcome-accountable care is a topic of ongoing policy debate spurred by portions of the PPACA, so understanding public preferences over alternative compensation schemes is therefore a relevant contemporary issue. And unlike more general opinions about health care policy, individuals’ opinions toward this specific policy should not be heavily crystallized.

Articles used in the experiment were constructed from a mix of recent news coverage and academic writing on different compensation schemes. The Pro and Con messages were

¹²Another alternative is to pay providers fixed salaries or fixed per-patient fees regardless of services performed or outcomes.

framed so as to reduce confounding due to a multitude of distinct arguments in the environment. The Pro frame focused on improvements to health care quality under outcome-based compensation and the Con frame focused on possible reductions in health care access under that scheme. These frames were chosen as a result of pretesting, described in the Online Appendix.

Design

Similar to Study 1, the experiment involved two stages because it is necessary to examine information search and attitude changes in the context of prior opinions. Basic participant characteristics and opinions were measured during the first stage (t_1) and treatments were applied and outcomes measured during the second stage (t_2) several weeks later. At t_2 , two manipulations were introduced. (The design is described in Table 4.) The first provided an exogenous manipulation of attitude importance. These manipulations follow from evidence that attitude importance is driven in part by self-interest (Boninger, Krosnick, and Berent 1995). Though previous research has correlated attitude importance with various outcomes (Holbrook et al. 2005, e.g.), a manipulation provides clear causal leverage. The importance manipulation was embedded in instructions provided to participants at the beginning of t_2 .¹³ Importance was manipulated to be high by providing half of the participants with the following instructions:

In today's session, you will have the opportunity to choose to read a number of recent news articles. Some of the articles focus on issues of clear direct personal relevance to you, such as rules regarding how physicians are paid (which affects your access to quality health care). Other articles focus on issues that are likely of little direct personal relevance to you, such as issues surrounding agricultural policy.

The other half of the participants were manipulated to believe the issue was unimportant by instructing them that:

¹³Participants had been given (and were subsequently given) no other indications about the purpose of the study.

Figure 2: Screenshot of Example Study 2 Search Environment

Reports From the Hive, Where the Swarm Concurs	Doctors Can Work Together to Improve Patient Health, But Need Appropriate Incentives	SEC Vote Requires Business Filings to Add Environmental Risks to Bottom Line	Wellness, Rather Than Illness, Is Focus Under Outcome-Accountable Care
Pay for Performance Improves Quality of Health Care Through Collaborative Medicine	Patients Better Served When Providers Paid for Health Outcomes	Anatomy of a Tear-Jerker	Gender Differences in Education Need Innovative Solutions
Why are 3-D Movies so Bad?	Improving America's Health Requires Provider Incentives, Not 'Fee-for-Service'	Spammers Use the Human Touch to Avoid CAPTCHA	Heart Attack While Dining at Heart Attack Grill in Las Vegas
Physicians Group Says Quality Will Improve Under Outcome-based Payments	When Paid for Outcomes, Doctors Have Little Reason to Treat Highest Risk Patients	USDA Raises Corn Export Outlook	Out of the O.R., T.R. Knight Back Onto the Stage
Council Is Set to Consider Increases in Hotel and Property Taxes	A Bowl of Chili with Bragging Rights	Will a Standardized System for Verifying Web Identity Ever Catch On?	Paying Doctors Based on Outcomes Will Lead to Rationing

In today’s session, you will have the opportunity to choose to read a number of recent news articles. Some of the articles focus on issues of direct personal relevance to you, such as agriculture policy (which affects prices consumers pay for food). Other articles focus on issues of little direct personal relevance to you, such as health regulations (which are not currently being debated and seem like they will not significantly affect you personally). Other articles address additional topics that have nothing to do with policymaking.

While attitude importance is often seen as a relatively fixed characteristic of attitudes, these manipulations can be as attempting to increase (or decrease) importance directly as well as priming (or not) participants’ existing levels of attitude importance.¹⁴ After reading these instructions, participants were given 15 minutes to choose and read articles from an environment that consisted of 20 articles (see Figure 2).¹⁵ As the second manipulation, the contents of the search environments were as follows:¹⁶

- Eight articles about provider compensation:
 - Pro environment contained six Pro messages and two Con articles

¹⁴Similarly, other recent research has shown that attitude importance is manipulable through the channels described by Boninger, Krosnick, and Berent (1995), for example through the use of party cues (Druckman, Peterson, and Slothuus 2012).

¹⁵Participants had to remain in the environment for the full 15 minutes, but could choose to stop reading at any point.

¹⁶While the choice of the size of the search environment and proportions of different types of articles contained therein is inevitably somewhat arbitrary, the environment was designed to be larger than what the average participant could read in the allotted time, consist of a mix of political and non-political articles, and not be composed disproportionately of articles addressing the target issue (only 40% of articles addressed health care). For a similar justification of the search environment, see Druckman, Fein, and Leeper (2012).

Table 4: Study 2 Experimental Conditions

	Issue Importance	
	<i>High</i>	<i>Low</i>
Slanted Pro	1	2
Balanced	3	4
Slanted Con	5	6
Control		7

- Con environment contained two Pro messages and six Con articles
- Mixed environment contained four Pro and four Con articles
- Control environment contained eight additional nonpolitical articles
- Four articles about other political issues (unrelated to both health care and the frames)
- Eight nonpolitical articles

Data were mostly collected in the Northwestern Political Science Research Laboratory, involving a diverse sample of 300 participants. The sample included 109 students who completed the study for partial course credit, 96 nonstudents recruited from the campus area and online advertisements who completed the study for a \$15 cash payment, and 95 participants recruited from Amazon Mechanical Turk, who completed the study remotely and were paid \$6 each. Recruitment of each sample was planned in order to increase statistical power and diversify the subject population lest students responded differently to the experiment than others (Druckman and Kam 2011).¹⁷

After choosing and reading articles from the environment, participants reported their opinions and answered a few additional questions. In order to test the robustness of effects, two issue opinion questions were used: one that measured respondents’ preferences for fee-for-service versus performance-based provider compensation on a seven-point scale¹⁸ and a

¹⁷Supplemental regression results, included in the Online Appendix, indicate there were no significant differences in causal dynamics across samples.

¹⁸The exact wording asked “There is ongoing debate about how medical providers (i.e., physicians and hospitals) should be compensated for the care they provide. Some argue that these providers should be paid based entirely upon the services and procedures they perform. Others argue that pay should be based entirely or at least partially on the quality of patients’ health outcomes. How do you think medical providers should be paid?” The available responses ranged from “Pay based entirely on serviced performed” to “Pay based entirely on health outcomes.”

secondary measure (asked only at $t2$) that captured preferences on an 11-point scale of exact percentages of compensation that should be generated by services-based fees versus patients' health outcomes.¹⁹ These opinion questions structure the issue of provider compensation as degree of support for one possible move away from the status quo position of service-based compensation rather than trying to capture support for all possible policy alternatives. Given that both questions are intended to measure the same construct, hypotheses for both measures are the same.²⁰ All outcomes are scaled -1 to 1 and, as in Study 1, non-parametric tests are used for testing all hypotheses.

Results

Though Study 2 largely serves to test Hypotheses 3 and 4, it also allows for a replication of the results of Study 1 with regard to the direct effects of information environment on search behavior (Hypothesis 1) and opinion dynamics (Hypothesis 2). Consistent with the results in Study 1, the Pro environment made individuals more supportive over time relative to the control group and the Con environment made individuals less supportive relative to the control group. These results are consistent with the direct effect of the environment outlined in Hypothesis 2. Averaging across all conditions, opinions became significantly more negative between $t1$ and $t2$ ($\bar{x}=-0.31$, $SE=0.07$), but these changes were uneven across treatment groups.²¹ Given the overall negative change in opinions, results will be presented hereafter as difference-in-differences estimates. Specifically, the control group change in opinion ($t2 - t1$)

¹⁹The question asked "In your view, what percentage of medical provider compensation should be based on services performed and what percentage should be based on their patients' health outcomes?" The responses were on a scale from "100% based on services performed and 0% based on health outcomes" and "0% based on services performed and 100% based on health outcomes," with each option summing to 100%. Exact question wording is available in the Online Appendix.

²⁰A pretest of the dependent measures was conducted with twenty-one of the participants from the frame-selection pretest, described in the Online Appendix. On the original variable scales, these respondents reported a mean opinion of 4.71 ($SD = 1.55$) on the ordinal measure and a mean of 62.86% ($SD = 21.94$) on the percentage measure, both of which indicate a slight preference for service-based compensation. The two measures correlated at $r = .86$, suggesting they likely measure the same attitude construct.

²¹Treatment group sample sizes, as well as means for $t1$ opinion, $t2$ opinion, the change over time, and the secondary $t2$ opinion measure are reported in the Appendix.

is subtracted from every other treatment conditions' mean change in opinion ($t2 - t1$).²²

Breaking out results by $t1$ opinion, interesting patterns of effects emerge that allow us to examine Hypotheses 3 (that $t1$ opinions shape information choices) and 4 (that $t1$ opinions and attitude importance shape over-time opinion changes). In regards to opinion changes, significant differences across treatment conditions emerge when looking at both $t1$ *opponents* (those with con $t1$ opinions; Kruskal-Wallis $\chi^2(6)=10.62$, $p=0.10$) and $t1$ *supporters* (those with pro $t1$ opinions; $\chi^2(6)=26.83$, $p=0.00$).²³ The same pattern emerges for the salary measure, which was asked only at $t2$ (opponents: $\chi^2(6)=16.93$, $p=0.00$; supporters: $\chi^2(6)=29.30$, $p=0.00$).²⁴

To clarify the pattern of effects, Figure 3 shows the changes in opinions over time in each treatment condition (relative to the control group as discussed above), separated by opponents (gray bars) and supporters (black bars). Looking at the Pro environment conditions (left set of four bars), opponents who were induced to have high-importance attitudes actually became more negative over-time, while supporters became more favorable toward outcome-based compensation. The plot clearly shows that the effect of the environment on polarization is highly conditional — the environment alone seems to matter less than how different types of individuals behave within that environment. The high-importance respondents engaged in motivated evaluation of the available information, polarizing in their responses to the same Pro information (consistent with Hypothesis 4a). Under low importance, however, opinions among those with low importance moved in a fashion very similar to the no-information control group, which was unexpected (by Hypothesis 4b).

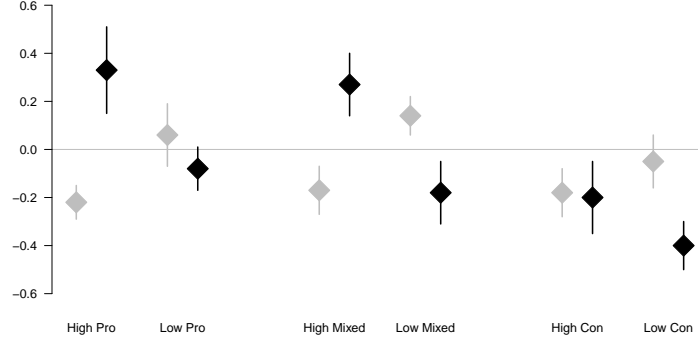
A similar pattern emerges in the Mixed conditions (middle set of bars). High importance

²²This has no effect on inference, but eases interpretation by having a change of zero within a treatment group signify no change relative to the control group (which received no issue-relevant information at any time during the experiment). When results are presented for individuals with con $t1$ (pro $t1$) opinions, the control group average for only those participants with con $t1$ (pro $t1$) opinions is used in making this calculation. Regression results, available in the Online Appendix, show that inference is substantively similar if either $t2$ opinion or $t2 - t1$ opinion change are regressed on treatment condition.

²³The Kruskal-Wallis χ^2 is a nonparametric analogue to ANOVA that does not require a Normality assumption.

²⁴Looking just at $t2$ opinions, significant differences across treatment conditions are also present (con: $\chi^2(6)=21.60$, $p=0.00$; pro: $\chi^2(6)=39.07$, $p=0.00$).

Figure 3: Opinion Changes



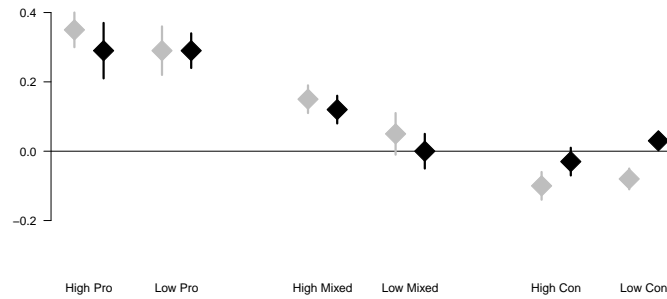
Note: Figure displays difference-in-differences estimates (and associated standard errors) of treatment effects, separated by opponents (gray) or supporters (black), less the mean change in control group opinion. Reading left-to-right, statistics displayed are: -0.23 (0.07), 0.44 (0.16), 0.07 (0.13), -0.04 (0.09); -0.17 (0.10), 0.38 (0.08), 0.14 (0.08), -0.18 (0.13); -0.14 (0.10), -0.27 (0.15), -0.05 (0.11), -0.43 (0.11).

respondents again polarized in response to the even balance of Pro and Con information available to them, while low importance respondents moderated (Con respondents becoming more supportive and Pro respondents becoming less supportive).

The results for the Con conditions (right set of bars) are somewhat different. High importance respondents, regardless of $t1$ opinion became slightly less supportive (reflecting the information in their environment). Low importance opponents moved very little (consistent with behavior in the other information environments), but low importance supporters became significantly — indeed, dramatically — less supportive.²⁵ This change was not expected but may reflect the slightly right-skewed $t1$ opinion distribution: there were very few individuals offering scores of 6 or 7 (i.e., very supportive of outcome-based compensation), suggesting that on this particular issue individuals held relatively moderate and possibly ambivalent opinions that, lacking importance, were easily swayed by con information. This also bolsters the evidence opponents: regardless of environment, those with high-importance con $t1$ opinions become consistently (indeed indistinguishably) more opposed after reading quite different mixes of information in each of the three environments.

²⁵While this movement in the direction of the environment was expected by Hypothesis 4b, it runs contrary to the pattern of opinion moderation in the other low importance conditions.

Figure 4: Balance of Pro and Con Articles Read



Note: Figures displays the mean difference in proportions (and associated standard error) of Pro and Con articles read (Pro%-Con% of all articles read) for each treatment condition, separated by opponents (gray) and supporters (black). Statistics displayed are: 0.33 (0.05), 0.31 (0.09), 0.28 (0.06), 0.30 (0.07), 0.15 (0.04), 0.11 (0.04), 0.05 (0.06), 0.00 (0.05), -0.10 (0.04), -0.04 (0.02), -0.09 (0.03), 0.03 (0.02).

The size of these effects are also quite large. Searching for information when an issue is personally important has the potential to move opinion a substantial amount. By far the largest effect is among supporters in the high importance Pro environment, who on average moved 22% of the way up the opinion scale. This is particularly interesting because their comparable peers who were identical except for having been primed to have low attitude importance appear to have not changed their attitudes at all in response to the exact same information environment. Furthermore, despite subtle variations across the Pro, Mixed, and Con environments, one striking feature of Figure 3 is the similarity of the effects of prior attitudes and strength across the three environments. If the environment alone explained opinion dynamics, we would expect the left, center, and right portions of the figure to look quite different. Instead, they look fairly similar, which provides visual evidence that attitude importance is critical for understanding how choice might lead to polarization.

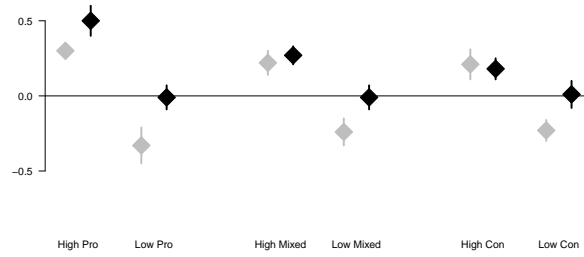
These results suggest two possible explanations for why opinions moved the way they did: either people engage in attitude-congruent selective exposure and/or evaluate whatever information they encounter in an attitude-reinforcing fashion. As a reminder, Hypothesis 3 expected that those with high importance attitudes would choose disproportionately attitude-congruent information. Overall, individuals read 8.59 (SE=0.20) articles during

their fifteen minutes in the search environment, or just about one article every two minutes. And, attitude importance — despite the expectation that it would increase information-seeking — appears to have had little effect on behavior (contrary to Hypothesis 3). Indeed, it had no effect on the balance of Pro and Con articles read across the conditions. Figure 4 shows this pattern of search behavior. Individuals in Pro environments read more Pro than Con articles, those in Mixed environments read more Pro than Con (though the balance between the two was closer), and those in Con environments read about the same number of Pro and Con articles (with opponents reading more Con articles).

The lack of differences in search behavior between those high- and low-importance attitudes and *t1* attitudes means that the patterns of opinion polarization (among high importance individuals) and opinion moderation (among low importance individuals) is due to biases in *evaluation* not biases in *search behavior*. And the behavioral results in Study 2 perfectly replicate those of Study 1. While the effects on opinions were dramatic despite few differences in participants' search behavior, effects on individuals' certainty about their opinions provide further evidence of motivated reasoning. In aggregate, the sample showed no significant over-time changes in attitude certainty during the course of the experiment ($\bar{x}=-0.02$, $SE=0.02$). But changes in certainty over time differed dramatically among those with high and low importance attitudes. Those manipulated to have high importance became significantly more certain about their opinions ($\bar{x}=0.28$, $SE=0.03$) even as they reached opposite opinions from the same information, while those manipulated to have low importance became significantly less certain about their more moderate opinions ($\bar{x}=-0.15$, $SE=0.03$) and this difference is clearly significant ($p=0.00$). Interestingly, when manipulated to have high importance, changes in certainty did not differ between opponents and supporters (see Figure 5). By contrast, under low importance, opponents became much less certain of their opinions and supporters showed little change in certainty regardless of environment.

These results, consistent with motivated evaluation of information, are interesting because those with high importance responded to any issue-relevant information, regardless of

Figure 5: Changes in Attitude Certainty



Note: Figures displays difference-in-differences estimates of treatment effects (and associated standard errors): i.e., changes in attitude certainty from t_1 to t_2 within each treatment condition, separated by opponents (gray) and supporters (black), less the mean change in control group certainty. Statistics displayed are: 0.31 (0.05), 0.48 (0.10), -0.33 (0.12), -0.04 (0.09); 0.22 (0.08), 0.25 (0.06), -0.24 (0.09), 0.00 (0.08); and 0.18 (0.11), 0.22 (0.07), -0.23 (0.07), 0.01 (0.09).

its valence, by becoming more certain of their increasingly extreme opinions. When their opinions were unimportant, however, more information led them to be less convinced, even though their opinions did not move much over time.

Discussion

The late 20th and early 21st centuries have been marked by their abundance of choice — people seem freer to make choices than ever before. For many years, this opportunity for choice was seen as a positive shift away from the homogeneous offerings of mid-century political media (Mutz and Young 2011). Yet Botti and Iyengar (2006) write that “the presumption that people are never worse off, and usually better off, as a result of making their own choices may not necessarily be true” (35). The results presented here suggest that information choice, at least among those with personally important opinions, does not appear to make those individuals or democracy better off. Freedom to choose one’s political news seemed to many scholars of the 1980s a much needed component of democratic health, but the abundance of choice that has emerged in the “post-broadcast” present is now being seen as democratically problematic (Sunstein 2002). Whereas citizens are no longer captive to media influence, they must make choices from a complex information environment.

Empirically testing the impacts of information choice depends in large part upon two underutilized features of experimental design that were used to advantage in this research: panel data and moves away from the “captive audience” assumption (Hovland 1959; Druckman, Fein, and Leeper 2012). Mass polarization is fundamentally a question of over-time dynamics of individuals’ opinions, aggregated at multiple points in time. Panel data is the only way to establish the existence of polarization and begin to understand its causes and effects.²⁶ A lack of studies involving actual information choice is even more problematic. Typically, when experiments have incorporated information choice, the set of alternatives has typically been small, such as Fox and MSNBC (Levendusky 2011; Arceneaux and Johnson 2011), pro and con (Gaines and Kuklinski 2011; Leeper 2012), etc. Studying choices among a few alternatives or among only *political* alternatives is informative, but may say little about how individuals make and respond to choices from more realistic environments. Mass polarization and its downstream effects on democratic health are too important to be examined only with old tools — the experimental designs presented here have used innovative techniques to offer novel evidence about this vitally important topic.

The research presented here corrects these deficits of empirical investigation and expands the existing extant work by looking at a broader set of information alternatives to choose from and by carefully manipulating a key causal variable — attitude importance — that has been ignored in past work. Study 1 showed that highly biased environments can shape opinions in aggregate, but raised questions about why opinions moved the way they did. Study 2 revealed that it may be quite unimportant how much information people have about an issue or what that information says. Instead, opinion dynamics depend much more on evaluations of information in one’s environment, which seem to be largely determined by one’s prior attitudes. Attitude strength biased evaluations of information, regardless of

²⁶Yet panels can also reveal limitations of findings — a third panel wave for Study 1 reveals that the opinion-changing effects of information choice may be short-lived. A figure, included in the Online Appendix shows that opinions largely returned to their pre-test positions by approximately one week after the search environment session, which is consistent with other evidence on the durability of framing effects (Lecheler and de Vreese 2011). Of course, these results do not necessarily reflect the ongoing process by which individuals repeatedly search for information (in a potentially biased fashion).

participants' environments or their actual information search behavior.

These results further suggest that caution should be used when extrapolating from evidence of selective exposure to information (e.g., Stroud 2011; Garrett, Carnahan, and Lynch 2011) to polarizing effects of those choices. Demonstration only of selective exposure²⁷ does little to substantiate the existence or causes of opinion changes because the strength of the public's opinions appears to affect polarization far more than the information they choose or happen to receive. Intriguingly, the experiments presented here suggest that while the contents of the distinct environments shaped what information people chose, those with different prior opinions chose remarkably similar information. How people *evaluate* information is most critical for understanding these dynamics; what information individuals actually choose seems rather less important. Attitude strength and its effects on information processing seem to lay at the core of mass polarization, while the contents of the information environment and the choices people make matter far less.

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²⁷If it is demonstration at all (Sears and Freedman 1967).

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Appendix. Study 2 Opinion Data

Condition (n)	t1	t2	t2-t1	t2 (salary %)
High Pro (46)	3.65 (0.20)	3.52 (0.20)	-0.13 (0.20)	5.22 (0.20)
Low Pro (37)	3.66 (0.19)	3.46 (0.19)	-0.20 (0.19)	4.43 (0.19)
High Mixed (49)	3.53 (0.21)	3.59 (0.21)	0.06 (0.21)	4.22 (0.21)
Low Mixed (36)	3.81 (0.20)	3.39 (0.20)	-0.42 (0.20)	4.28 (0.20)
High Con (46)	3.72 (0.21)	3.07 (0.21)	-0.65 (0.21)	3.85 (0.21)
Low Con (49)	3.57 (0.20)	2.98 (0.20)	-0.59 (0.20)	2.88 (0.20)
Control (37)	3.70 (0.25)	3.46 (0.25)	-0.24 (0.25)	3.73 (0.25)

Note: Cell entries are treatment group means, with standard errors in parentheses, on the original variable scales (7-points for the the first three columns and 11-points for the last column).