

How Voters Become Misinformed: An Investigation of the Emergence and Consequences of False Factual Beliefs*

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Objectives. Voters develop not only different opinions about politics but also different sets of empirical beliefs. It is less clear how falsifiable beliefs take hold. In particular, it remains unclear as to whether news and campaign messages, moderated by political knowledge, drive the process, or whether deep-seated values principally sway voters' acceptance of factual claims. These contrasting views point to a set of testable hypotheses that we use to refine a model of ideologically-biased empirical belief generation, which we call "knowledge distortion." *Methods.* We conduct an analysis of survey data on three ballot measures in Washington State, testing hypothesized relationships between voters' empirical beliefs about political issues, news and campaign messages, political knowledge, political values, and partisanship, as well as vote choices on the ballot measures. *Results.* Our analysis reveals that voters' values and partisanship had the strongest associations with distorted beliefs, which then influenced voting choices. Self-reported levels of exposure to media and campaign messages played a surprisingly limited role. *Conclusion.* Our findings provide further evidence of politically motivated factual misperceptions on political issues, which have an independent effect on voters' ballot decisions. These misperceptions do not seem to be driven by news media and campaign messages, suggesting that citizens may be generating relevant empirical beliefs based on their underlying political values and ideology.

A recent study by the Annenberg Public Policy Center found that 85 percent of the money spent on presidential ads from December 2011 through May 2012 went to spots that included at least one deceptive claim (Annenberg Public Policy Center, 2012). As citizens readily absorb this misinformation, inaccurate factual claims can have a profound influence on their policy

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preferences (Jerit and Barabas, 2006; Kuklinski et al., 2000; Kunda, 1990; Nyhan and Reifler, 2010; Taber and Lodge, 2006).

This process, which we call “knowledge distortion,” has deep roots in cognitive theory. Research on motivated reasoning has shown how people selectively analyze messages they encounter to fit preexisting attitudes (Ditto and Lopez, 1992; Kunda, 1990; Taber and Lodge, 2006), with partisan biases shaping one’s responses to factual policy questions (Kuklinski et al., 2000; Jerit and Barabas, 2006; Wagner, Tarlov, and Vivyan, 2012). These studies have revealed cognitive processes that diverge from the deliberative ideal, in which citizens weigh evidence and make reasoned judgments using both (accurate) facts and values (Fishkin, 2009; Gastil, 2000).

Though we know that distorted beliefs can have political implications, we know relatively little about how misperceptions form and the conditions under which they become politically consequential. The present study aims to advance our understanding of the role of factual beliefs in opinion formation and expression by refining a model introduced in Wells et al. (2009), which elaborated previously unacknowledged implications of Zaller’s (1992) theory of how empirical political beliefs can shape opinions.

In particular, our model posited that individuals will accept claims congruent with their values—including empirically false beliefs—only to the extent that they have sufficient political knowledge to see the linkage between the claims and their underlying values. Those beliefs, like any other consideration, then significantly and independently shape public policy preferences. With its assertion that knowledgeable citizens are most adept at developing systematically distorted beliefs, the model runs counter to traditional conceptions of democratic theory, which implicitly equate political sophistication with enlightened understanding (Dahl, 1989). Nonetheless, our pilot data provided clear evidence of knowledge distortion (Wells et al., 2009).

The present study advances this line of research in two ways. First, we attempt to replicate the basic findings of our pilot study with more extensive measures of key variables and on a wider range of issues. Second, we refine our model by drawing on contrasting theoretical perspectives—conventional heuristic theories (e.g., Lupia and McCubbins, 1998) and cultural cognitive theory (Kahan et al., 2007, 2010). Testing the divergent predictions of these perspectives will clarify how misinformation takes hold and influences public opinion.

A Theoretical Model of Distorted Empirical Beliefs

Scholars have long recognized the public’s lack of knowledge about political matters (Delli Carpini and Keeter, 1996) and concluded that citizens typically form opinions and make voting choices in the absence of important policy-relevant information (Campbell et al., 1960; Converse, 1964; Lewis-Beck et al., 2008). Though some have brushed the question aside by arguing

that when aggregated, public opinion appears rational (Alvarez and Brehm, 2002; Page and Shapiro, 1992), concerns about public knowledge abound. Lippmann (1922) thought the problem was so dire that he called for a Platonic retreat from full democracy toward an oligarchy of experts. By contrast, modern deliberative (Fishkin, 2009) and epistemic (Estlund, 2009) democratic theorists have sought ways to better inform the general public. This has led to innovations such as the Citizens' Initiative Review (Knobloch et al., 2013), a deliberative process enacted by the Oregon government that uses small random samples of the public to generate short analyses of ballot initiatives that the wider electorate can access through the official Voter's Guide.

The most prominent and influential social scientific response has come from "heuristic" theorists. In their view, citizens need only a modicum of heuristic information that tells them which elites or political organizations share their values, and citizens then form policy views by following the cues provided by these like-minded entities (Lupia, 1994; Lupia and McCubbins, 1998; Popkin, 1994). The most comprehensive treatment of this perspective is Zaller's (1992) celebrated receive-accept-sample model. In his view, people with sufficient political knowledge who "receive" political news can filter out opponents' political messages while "accepting" those of political allies. This results in a reasonably consistent set of considerations that can be "sampled" when one is asked to express political opinions. One might worry that a public reliant on elite cues might be vulnerable to deception (Delli Carpini and Keeter, 1996; Graber, 1994), yet this hazard has received scant attention within the heuristic paradigm.

An alternative perspective questions some of the basic principles of the heuristic models. Cultural cognitive theory argues that deep-seated values drive the formation of a wide array of beliefs, including both public opinion and factual beliefs (Gastil et al., 2011; Kahan et al., 2009). Cultural worldviews "orient" one's understanding and evaluation of the political world, and this can create divergent empirical beliefs on anything from the efficacy of vaccines (Kahan et al., 2010) to nanotechnology (Kahan et al., 2009). As we explain below, the cultural cognitive view differs from conventional heuristic models with regard to both how misinformation takes hold and the extent to which it directly affects public opinion.

Hypothesis 1: *Values shape empirical beliefs.*

In refining our model of "knowledge distortion" (Wells et al., 2009), we draw on both of these theoretical accounts. We begin with a core assumption shared by both heuristic and cultural cognitive theories: individuals often possess a systematically distorted sense of the "facts" on a given public issue, and those distortions typically align with individuals' personal values.

In our pilot study (Wells et al., 2009), we found that voters predisposed to repeal a statewide referendum on workplace ergonomics regulations believed (incorrectly) that these rules applied to Major League Baseball teams, thereby preventing a catcher from squatting behind home plate for an entire game.

Conversely, voters who wished to retain these workplace regulations overestimated the extent of the existing workplace safety crisis. In cases like this, voters do not just have opposing opinions. Instead, each side has come to hold inaccurate *empirical beliefs* that buttress their positions.

The present study investigates this phenomenon across a wider range of ballot measures—again in the context of a real election—to further assess the power of knowledge distortion. We begin by testing the straightforward hypothesis (H1) that “respondents’ underlying political values will align with their factual beliefs, such that respondents will tend to be systematically misinformed in a direction congruent with their underlying values.”

Hypothesis 2: *The importance of political knowledge.*

Whereas heuristic and cultural cognitive theories both allow for the possibility of value-congruent knowledge distortion, focusing on their three key points of disagreement will help us refine our knowledge-distortion model. These divergences concern the role of political knowledge in processing empirical claims, the role of news media and campaign messages, and the ultimate impact of distorted beliefs on policy opinions.

Taking up the first of these disagreements, Zaller’s (1992) model of opinion formation emphasizes that only politically knowledgeable individuals can recognize which messages match or conflict with underlying values. An individual must have at least a rudimentary grasp of the alignments of political elites to determine which share one’s own values. Without that knowledge, one does not know where to turn for reliable cues. Following this view, we posited (Wells et al., 2009) that values play a role in distorting individuals’ empirical beliefs only when they have sufficient political knowledge to connect underlying values with the issue at hand.

This is a logical extension of the Zaller’s model, which recognizes that influential policy considerations come in many varieties (1992:49), though he consistently offers examples that are opinion oriented rather than empirically testable (e.g., whether a budget is “fair to all competing interests” or “a sham and a delusion”); (1992:40–41). Our model of knowledge distortion posits that factual claims are merely one more type of consideration, albeit a problematic one.

In contrast to some recent evidence that political knowledge can mitigate knowledge distortion (Nyhan and Reifler, 2010), we argue that those voters who have a solid grasp of the political realm are more likely than their underinformed counterparts to engage in biased filtering of factual claims. Thus, it is the more politically sophisticated individual who most readily stores in memory systematically distorted facts, as Dancey and Sheagley (2013) showed in the case of attentive partisans being the most misinformed about deviations from party-line positions.

Cultural cognitive theory arrives at a different conclusion based on its emphasis on core values. Whereas Zaller’s (1992) model loosely references predispositions and measures them with typical liberal-to-conservative

self-identification items, the cultural approach conceptualizes values across two dimensions, typically operationalized as multi-item measures of collectivism versus individualism and egalitarianism versus hierarchism (Kahan et al., 2007).¹ These deep-seated cultural orientations can predict how an individual will stand on a particular issue even at low levels of political knowledge (Gastil et al., 2011; see also Goren, 2004).

In this study, we maintain the view presented in Wells et al. (2009), which assumes the necessity of political knowledge for extensive belief distortion. To test that view against the cultural cognitive account, we assess the moderating impact of political knowledge in the context of directly issue-relevant values that correspond to the broader dimensions of cultural worldviews. Thus, we predict that (H2) “the relationship between values and systematic knowledge distortion is present only for respondents with high levels of political knowledge.”

Hypothesis 3: *Exposure to media and campaign messages.*

A long catalog of political communication research supports the notion that what citizens know about politics comes through the media, particularly mass media (e.g., Delli Carpini and Keeter, 1996; Holbert et al., 2002; Iyengar and Kinder, 1988; Jeffres, Neuendorf, and Atkin, 2012; Zhao and Chaffee, 1995). Heuristic theories presume that simple bits of information, such as endorsements from like-minded political elites, must be passed on to voters to make their choices align with their values (e.g., Lupia and McCubbins, 1998). The reception of messages about the matter at hand is a *necessary condition* for the accumulation of one’s considerations, whether these are elite value statements, policy pronouncements, or factual claims.

Once again, the cultural cognitive perspective diverges. By its account, an individual’s deep-seated values are the overriding force in opinion formation. Cultural cues, ideas, and knowledge litter the landscape to such a degree that one readily forms opinions on all but the most novel issues (Kahan et al., 2007). Thus, cultural orientations can generate worldview-consistent empirical beliefs *independent of* news coverage, elite messages, or campaign ads.

To test these rival predictions, we included standard self-report measures of message exposure, distinguishing between campaign messages and news about the initiatives.² Drawing on the heuristic perspective, we expect that

¹Methodological differences may account for some of the differences between heuristic and cultural accounts. Cultural cognition research often involves experimental studies, whereas Zaller’s findings come from general surveys that give respondents little context, thereby increasing the importance of political knowledge in connecting one’s values to a political issue.

²Relying on self-reported media exposure data can introduce error. However, real-world political campaigns are often best approached through public opinion polling, which limits options for experimental manipulation and often relies on self-report measures of media exposure and information sources (e.g., Bowler and Donovan, 1994; Jerit and Barabas, 2006).

distortion effects become apparent only in cases where individuals have been exposed to sufficient campaign-relevant messages, thereby permitting the filtering and sifting of information necessary to arrive at a value-distorted set of beliefs. Thus, we posit that (H3) “only those respondents exposed to issue-related messages will align their empirical beliefs with their underlying values.”

Hypothesis 4: *Distorted beliefs influencing policy choices.*

Finally, we consider the net impact of misinformation on the electoral choices citizens make. Deliberative democratic theory argues that citizens should reason about their voting choices, with relevant facts about the world playing a vital role in that process (Fishkin, 2009; Gastil, 2000). If voters become systematically misinformed about current issues, public deliberation on those issues will be deeply distorted. Kuklinski et al. (2000) showed precisely this effect: many study participants holding false beliefs about major political issues shifted their policy preferences away from those they would have held if not so misinformed.

The heuristic and cultural cognitive accounts offer different predictions about the impact of misinformation on policy preference. In Zaller's (1992) parsimonious model, once a fact has been accepted as a consideration, it may be used as the basis for a policy choice regardless of the individual's values. In the cultural cognitive model, by contrast, one's orientation shapes both factual beliefs and policy preferences, but beliefs are not presumed to have an *independent* effect on final preferences (Kahan et al., 2007). Rather, those beliefs are epiphenomenal—just another direct consequence of cultural values and signals orienting people to a particular set of cognitions. Expressed in statistical terms, once cultural values are taken into account in a regression, distorted beliefs entered into the model should have no additional impact. Once again siding with heuristic accounts, we anticipate that (H4) “an individual's perceptions of the facts relevant to a ballot initiative will have an independent relationship with that individual's policy preference, even when controlling for values, party affiliation, and demographics.”

A Note on Causality and Cross-Sectional Data

Before reviewing our research method, we wish to offer this note about our epistemological position and assumptions of causality in the above relationships. In our theory and analysis, we often frame variable relationships along the causal lines assumed by political communication and public opinion research—that values and considerations combine to shape policy opinions. The data analyzed in this study, however, are cross-sectional. As such, we do not presume to offer conclusive evidence of causal direction. For H4, in

particular, the causal direction of the relationship could be the reverse of what we hypothesize. That is, one may hold policy preferences first, then mold empirical beliefs to align with those preferences. We return to this in the Discussion section when we assess the implications of our findings for future research.

Method

Sample

We test our hypotheses with data from the 2006 Washington Poll, a statewide survey conducted by the University of Washington. The survey included 700 registered voters and covered a wide range of political topics (AAPOR response rate 4 was 15 percent). Some analyses presented herein rely on subsamples of respondents who were asked a bank of questions on each initiative; those subsamples consist of roughly 400 respondents each.

The 2006 election was an off year for the presidential campaign, but Washington's general election featured a race for one of the state's U.S. Senate seats, between Democratic incumbent Maria Cantwell and GOP challenger Mike McGavick. Voters were also weighing three high-profile state initiatives, each of which received substantial media coverage along with television, radio, print, and Internet campaign ads both for and against.

Initiative 933, hereafter called the Landowner Compensation Policy, would have rolled back land-use regulations by forcing the state to reimburse landowners for expenses incurred from those regulations. Initiative 937, which we call the Renewable Energy Mandate, required a proportion of the state's energy to come from renewable sources and was the only measure approved by voters that year. Initiative 920, hereafter referred to as the Estate Tax Repeal, aimed to repeal Washington's estate tax. To limit survey length, each individual respondent was randomly assigned to answer detailed questions on just two of the three initiatives.

Measures

Political Knowledge. All respondents answered five general political knowledge questions modeled on Delli Carpini and Keeter (1996), the kind of "neutral, factual test of public affairs knowledge" recommended by Zaller (1992:43). These included three federal-level and two state-level knowledge items asking about the party controlling the U.S. House of Representatives (87.1 percent correctly naming the Republicans); the office held by Alberto Gonzales (47.7 percent correctly responding that he was Attorney General); the entity charged with determining the constitutionality of laws (81.6 percent correctly citing the Supreme Court); the party controlling the state senate

(67.3 percent correctly naming the Democrats); and the state-level office held by Sam Reed (29.4 percent correctly naming him Secretary of State). Reduced to dichotomous variables, these were combined into a scale of political knowledge ($M = 3.13$, $SD = 1.36$, Cronbach's $\alpha = 0.62$).

Relevant Political Values. Respondents answered values questions pertinent to each of the initiatives. These offered more concrete measures of respondents' issue-relevant value orientations than could be obtained by left-right ideology (Zaller, 1992) or abstract cultural orientation measures (e.g., Kahan et al., 2007). That said, the value items had clear relevance to both the conventional liberal-conservative scale and the two cultural dimensions. Two of the initiatives focused on a single value dichotomy, and the third initiative cut across two.

For the Landowner Compensation Policy, respondents were asked about their agreement with two statements about government's role in regulating land use: "Society is better off when government limits how private owners can develop their land" and "Government regulations are almost always a waste of everyone's time and money." The two items (the former reversed) were combined into a single variable testing respondents' desire for government regulation of land, with higher values indicating opposition to regulation and thus more support for the initiative ($r = 0.210$, $p < 0.001$, 1–5 scale; $M = 2.86$, $SD = 1.03$).

For the Renewable Energy Mandate, respondents were asked about their agreement with two statements regarding how society should approach the production of clean energy. One emphasized the moral imperative of reducing carbon emissions ("We have a moral obligation to reduce the rate at which we burn fossil fuels for energy"), and the other focused on the role of the market in determining energy use ("When investing in new energy sources, we should pay attention to the market, not environmentalists"). Respondents' agreement scores for the two statements were combined (with the latter reversed) to form a variable testing respondents' commitment to clean energy investment ($r = 0.331$, $p < 0.001$, 1–5 scale; $M = 3.72$, $SD = 0.94$). Again, higher values indicated greater support for clean energy and, thus, the initiative.

The Estate Tax Repeal offered a special case in that voters were deciding on a policy that addressed two separate issues: taxation *and* public education (the latter being the primary beneficiary of Washington's estate tax). In light of this, we created two separate measures. Respondents were asked two questions about the primacy of property rights (e.g., "Estate taxes unjustly penalize the savings of people who were successful in business") and two questions on their commitment to public education (e.g., "Any law that reduces public education spending and benefits the rich is immoral"). The two taxation items combined into a variable measuring the sanctity of private-property values and freedom from taxation ($r = 0.603$, $p < 0.001$, 1–5 scale; $M = 3.19$, $SD = 1.28$). The two items on education were combined into a variable showing the value respondents placed on public education ($r = 0.439$, $p < 0.001$, 1–5 scale;

$M = 3.60$, $SD = 1.08$). The former value would logically incline people to support the initiative, the latter to oppose it.

The Knowledge Distortion Index. Our pilot study (Wells et al., 2009) established the Knowledge Distortion Index, an effective survey method for measuring the degree and direction of an individual's knowledge distortion on a given issue. For the current study, we chose eight empirically verifiable knowledge items for each initiative. The process of designing the items was not a formal content analysis, nor did it address every argument invented in the campaigns. By surveying campaign websites, news reports, and commentary, however, we grounded the knowledge-distortion items in texts that were highly salient in the initiatives' respective debates.

Responses to the knowledge items were coded so that correct responses received a 0. Incorrect answers that suggested a conservative bias related to the initiative received +1, whereas erroneous responses showing a liberal bias received -1. For each initiative, the resulting indices yielded an overall measure of each respondent's knowledge distortion—that is, the degree to which each individual's empirical beliefs were *systematically* incorrect. (An outlier analysis was conducted to see whether a subset of respondents was giving automatic answers to the large battery of factual questions in the survey. No such patterns were found in the data.)

On the Landowner Compensation Policy, for example, respondents were asked to respond to empirical statements such as "Washington landowners can be forced to leave their land unused if it provides habitat for species that are not even endangered," which was false and coded as +1 for an incorrect "true" response (45.2 percent of respondents) and 0 for all other responses. The eight items, including both true/false and multiple choice, were combined into a knowledge distortion index (-3 to +7 index, $M = 1.84$, $SD = 1.66$). Following the same general procedure for the Renewable Energy Mandate, eight items concerning this initiative were combined into an index from -4 to +5 ($M = 0.54$, $SD = 1.49$). Finally, for the Estate Tax Repeal, eight similarly structured items were combined to create a -5 to +6 index ($M = 0.82$, $SD = 2.02$).³

Communication Variables. All respondents answered two items specific to each initiative. One measured how closely respondents reported they were following initiative-specific news (four-point scales ranging from "not at all"

³There is, of course, a difference between a person who gets a factual question correct and one who answers "don't know." Nevertheless, in this study both those responses would get a "0" added to the knowledge distortion scale for that question. To test the robustness of this approach, scales were also created and tested an alternative way, with "don't know" on factual questions counting instead as missing data. That approach showed no substantial differences in the results. In addition, that alternative makes less sense for our study, which is concerned with the difference between those who hold incorrect factual beliefs and those who do not; the latter group includes people who are uncertain and express that as a "don't know" response.

to “very closely”; for the Landowner Compensation Policy, $M = 2.86$, $SD = 0.92$; for the Renewable Energy Mandate, $M = 2.40$, $SD = 0.93$; and for the Estate Tax Repeal, $M = 2.81$, $SD = 0.93$). A second asked how often they were receiving messages from campaigns (five-point scales ranging from “not at all” to “more than once a day”; for the Landowner Compensation Policy, $M = 2.55$, $SD = 1.28$; for the Renewable Energy Mandate, $M = 2.04$, $SD = 1.19$; and for the Estate Tax Repeal, $M = 2.41$, $SD = 1.33$).

Initiative Support. All respondents were asked to state their level of support for each initiative. This was measured as a seven-point scale (1–7) ranging from “no-certain” to “yes-certain” (for the Landowner Compensation Policy, $M = 3.55$, $SD = 2.65$; for the Renewable Energy Mandate, $M = 4.61$, $SD = 2.56$; and for the Estate Tax Repeal, $M = 3.26$, $SD = 2.50$).

Demographics. All respondents were asked basic demographic information, such as sex (55.7 percent female), ethnicity (95.4 percent white), age ($M = 58.34$, $SD = 15.00$), education (48.9 percent had at least some college or technical school), and income (median income fell between \$40,000 and \$60,000). In addition, respondents stated whether they identified with the Democratic or Republican Party, which yielded two dummy variables, Democrat and Republican (vs. neither).

Results

Two separate regression equations tested our four hypotheses: the first determined the key predictors of knowledge distortion, and the second assessed the significant influences on respondents’ final voting choices, including the net effect of knowledge distortion.

Predicting Knowledge Distortion

Regarding how values create systematic belief distortion, Table 1 displays a hierarchical multiple regression on the Knowledge Distortion Index (i.e., the eight-item index measured separately for each initiative). Recall that across all three initiatives, the index is valenced such that a higher Distortion Index score shows factual beliefs biased to align with a conservative position on the initiative, whereas a lower score indicates beliefs in line with a liberal position. A mid-range score represents generally accurate beliefs and/or an even mix of liberal and conservative beliefs.⁴ As shown in Table 1, the Distortion Index was

⁴Few respondents had moderate distortion scores that mixed liberal and conservative distortions. For the Landowner Compensation Policy, for instance, only 10 percent of respondents who held two or more liberal misconceptions had two or more conservative ones. Equivalent

TABLE 1
Predicting Knowledge Distortion

	I-933: Landowner Compensation	I-937: Renewable Energy Mandate	I-920: Estate Tax Repeal
Block 1:			
Gender (female)	0.237 (0.170)	-0.421 (0.154)**	0.400 (0.210)#
Race (white)	0.768 (0.393)#	0.974 (0.357)**	0.123 (0.488)
Age	-0.015 (0.006)*	-0.004 (0.005)	-0.016 (0.007)*
Education	-0.033 (0.082)	0.020 (0.075)	-0.122 (0.102)
Income	-0.096 (0.055)#	0.078 (0.050)	-0.113 (0.068)#
Political knowledge	-0.058 (0.068)	-0.040 (0.062)	-0.108 (0.084)
Democrat	-0.019 (0.189)	-0.251 (0.172)#	-0.121 (0.234)
Republican	0.854 (0.217)**	0.256 (0.197)#	0.519 (0.269)*
Change in R^2	0.083**	0.079**	0.066**
Block 2: Initiative- specific values			
	0.237 (0.083)**	-0.087 (0.087)	0.290 (0.092)**
Change in R^2	0.019**	0.001	-0.024 (0.100)
Block 3: Media use			
Initiative-specific messages	-0.050 (0.067)#	0.083 (0.066)	-0.112 (0.118)
Initiative-specific news	0.154 (0.097)	0.162 (0.086)#	-0.118 (0.080)
Change in R^2	0.006	0.019*	0.011
Interactions			
Block 4: Values by knowledge	0.117 (0.063)*	0.023 (0.058)	0.068 (0.061)
Change in R^2	0.008#	0.000	0.002 (0.072)
Block 5: Values by msgs	0.028 (0.065)	-0.048 (0.068)	0.003
Values by news	0.024 (0.081)	0.017 (0.087)	-0.048 (0.065)
			-0.015 (0.075)
Change in R^2	0.001	0.001	-0.013 (0.094)
			-0.015 (0.108)
Final R^2	0.118	0.108	0.107
N	392	387	385

NOTES: Entries are unstandardized regression coefficients with standard errors in parentheses. Values for the direct effects (Blocks 1–3) are upon-entry coefficients, while each set of interaction terms (Blocks 4 and 5) were entered in a separate block. For I-920, which has two relevant values, the conservative value is always listed first. All variables used in interaction terms were centered on their mean values for final regressions.

$p < 0.10$, * $p < 0.05$, ** $p < 0.01$, two-tailed tests, with one-tailed tests for hypothesized directional effects.

regressed on demographic variables, including political ideology and initiative-specific values items, two forms of initiative-specific media use, and several interaction terms.

H1: The association between relevant values and knowledge distortion.

Consistent with both the heuristic and cultural cognitive models of opinion formation, Hypothesis 1 posited that values and political orientations would predict knowledge distortion. The results in Blocks 1–2 in Table 1 show nearly complete support: identifying as a Republican and holding conservative values had strong and significant associations with conservatively distorted views for both the Landowner Compensation and Estate Tax Repeal initiatives. For the Renewable Energy Mandate, both being a Democrat and being Republican were marginally significant in the hypothesized directions ($p < 0.10$), whereas the issue-related value measure failed to reach significance. In sum, the findings affirm the basic assumption that one's underlying values are associated with one's systematically distorted empirical policy beliefs.

H2: The moderating effect of political knowledge. *The results for the second hypothesis were more mixed. As shown in Block 4 of Table 1, the Estate Tax Repeal and the Renewable Energy Mandate showed no significant interaction between knowledge and values on Distortion Index scores. For those issues, political knowledge did not moderate the association between respondents' values and their level of knowledge distortion. For the Landowner Compensation Policy, however, the interaction between knowledge and the values variable was significant: more politically knowledgeable respondents had empirical beliefs that more closely aligned with their values than did less sophisticated respondents.*

Thus, two of the initiatives better fit the cultural cognitive account, which holds that values drive the acceptance of beliefs independent of one's political sophistication. The Landowner Compensation Policy, however, showed a moderator effect, with greater political knowledge facilitating a set of factual beliefs reflective of one's values. That finding fits our hypothesis that factual beliefs are accepted like Zallerian considerations—with the politically knowledgeable better able to accept only value-congruent beliefs (Zaller, 1992).

H3: The moderating role of exposure to initiative communications.

Our third hypothesis tested an assumption essential to heuristic accounts and underlying much public opinion research. We predicted that a public opinion effect like the one studied here depends on exposure to issue-relevant media and campaign messages. Block 5 of Table 1 shows, however, that not one of the expected communication interactions occurred. None of the two-way interactions between values and messages or values and news was significant. (We also tested

figures were 16 percent for the Estate Tax Repeal and 23 percent for the Renewable Energy Mandate. We ran regressions with the Knowledge Distortion index disaggregated into separate liberal and conservative distortion scales; this revealed only negligible differences in results, which suggests that distortion and its effects were not occurring disproportionately on one or the other side of the ideological scale.

three-way interactions in which the moderating effect of knowledge on values was further conditional on communication exposure; these also were nonsignificant.)

In short, we found no evidence that citizens required measurable political information exposure to form distorted empirical beliefs, a finding consistent with the cultural cognitive account and sharply divergent from heuristic theories. Framing that nonsignificant finding in terms of statistical power (Cohen, 1992), the subsample size of about 390 respondents for each ballot measure provided sufficient power to detect medium to large effect sizes ($b = 0.15\text{--}0.35$), but not enough power to rule out smaller effects.

Predicting Voting Choices

Turning to the impact of knowledge distortion, Table 2 presents the results of hierarchical regressions predicting respondents' vote preferences for the three initiatives. These three equations include the same variables as in the previous analyses, plus the addition of the Knowledge Distortion Index, which we entered as both an independent variable (Block 1) and as part of a two-way interaction with political knowledge (Block 3).

For all three initiatives, both party orientation and initiative-specific values were associated with voting preference (see Block 1 of Table 2). Recall that both the Estate Tax Repeal and the Landowner Compensation Policy were conservatively valenced; that is, support for those initiatives tended to come from conservative voters. Support for the Renewable Energy Mandate, meanwhile, was liberally valenced.

H4: Knowledge distortion's association with policy preference. *This second regression equation provided the test of our final prediction of our knowledge distortion model. We hypothesized that a person's systematically distorted empirical beliefs have an independent association with policy preference. That is, distortion should be associated with voting choice even after taking into account a respondent's partisanship and underlying values. The direct effect of the Knowledge Distortion Index in Block 1 of Table 2 shows unequivocal support for this view. With partisanship and values included in the model, voters' distorted factual beliefs had a strong and significant independent relationship with vote choice for two of the initiatives ($p < 0.01$), whereas the effect for the Estate Tax Repeal approached significance ($p = 0.051$). All results were in the predicted direction. Thus, the beliefs recorded in the Distortion Index are more than merely a redundant expression of the underlying values associated with them.*

Additional Evidence of Political Knowledge Moderation. A final set of findings lie outside this article's main focus on knowledge distortion, but they bear mention. First, political knowledge increased the strength of connection between values and voting choices, as displayed in the significant interaction terms for all three initiatives in Block 4. Such results are consistent with a

TABLE 2
Predicting Policy Preference

	I-933: Landowner Compensation	I-937: Renewabl Energy Mandate	I-920: Estate Tax Repeal
Block 1:			
Gender (female)	0.047 (0.262)	0.127 (0.261)	0.005 (0.238)
Race (white)	-0.604 (0.610)	0.502 (0.598)	-1.032 (0.548) [#]
Age	0.009 (0.009)	-0.011 (0.009)	0.006 (0.008)
Education	-0.186 (0.129)	-0.008 (0.125)	0.078 (0.116)
Income	-0.017 (0.085)	0.020 (0.083)	0.074 (0.077)
Political knowledge	-0.143 (0.106)	-0.085 (0.103)	-0.075 (0.099)
Democrat	-0.837 (0.292)**	0.905 (0.286)**	-0.038 (0.274)
Republican	0.728 (0.342)*	-0.133 (0.339)	0.871 (0.313)**
Initiative-specific values	0.224 (0.130)*	0.488 (0.144)**	0.610 (0.106)**
Knowledge distortion	0.281 (0.080)**	-0.304 (0.085)**	-0.344 (0.114)**
Change in R^2	0.156**	0.143**	0.096 (0.059) [#]
Block 2: Media use			
Initiative-specific messages	-0.265 (0.104)*	0.034 (0.112)	-0.149 (0.091)
Initiative-specific news	-0.002 (0.151)	0.070 (0.145)	-0.011 (0.134)
Change in R^2	0.016*	0.001	0.006
Interactions			
Block 3: Knowledge by distortion	0.125 (0.61)*	-0.175 (0.065)**	-0.065 (0.043) [#]
Change in R^2	0.009*	0.016**	0.005
Block 4: Values by knowledge	0.203 (0.098)*	0.322 (0.096)**	0.253 (0.070)**
Change in R^2	0.009*	0.025**	-0.143 (0.080)*
Block 5: Values by messages	-0.035 (0.100)	-0.103 (0.112)	0.035**
Values by news	0.080 (0.124)	0.154 (0.143)	0.100 (0.071) [#]
			0.019 (0.082)
			-0.092 (0.104)
			-0.332 (0.118)**
Change in R^2	0.001	0.003	0.018 [#]
Final R^2	0.191	0.188	0.302
N	392	387	385

NOTES: Entries are unstandardized regression coefficients with standard errors in parentheses. Values for the direct effects (Blocks 1 and 2) are upon-entry coefficients, while each set of interaction terms (Blocks 3–5) were entered in a separate block. For I-920, which has two relevant values, the conservative value is always listed first. All variables used in interaction terms were centered on their mean values for final regressions.

[#] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, two-tailed tests, with one-tailed tests for hypothesized directional effects.

heuristic account but not with the cultural cognitive perspective (Gastil et al., 2011).

Second, for two initiatives—the Landowner Compensation Policy and the Renewable Energy Mandate—there was a significant interaction between political knowledge and initiative-specific knowledge distortion (Block 3 in Table 2). This suggests that not all respondents' distorted beliefs were equally influential on their voting choices. A further analysis splitting the sample between low- and high-knowledge respondents differentiated the effect of knowledge distortion on policy preference for the two groups. On both the Landowner Compensation Policy and the Renewable Energy Mandate measures, voters with higher political knowledge were more likely than their counterparts to make a policy choice based on a distorted stock of beliefs.

Discussion

This study advances our understanding of the role of empirical beliefs and communication in the formation of public opinion. We compared the efficacy of heuristic (Zaller, 1992) and cultural cognition theories (Kahan et al., 2007) in describing how citizens come to their beliefs about statewide ballot issues and how those beliefs, alongside other factors, relate to their policy preferences. Consistent with prior research from both traditional heuristic and cultural cognitive approaches, the results showed an association between an individual's values and his or her distorted factual beliefs about both low- and high-profile policy questions. (Only for the Renewable Energy Mandate did we fail to detect such an effect.)

We then went further, to understand how the knowledge distortion process takes place. Toward that end, we presented data testing three areas on which the heuristic and cultural cognitive approaches diverge. These points of difference include the role of political knowledge in facilitating biased-fact retention, the reception of political messages as a necessary condition for distorted information acceptance, and the impact of distorted beliefs on policy preference.

With respect to the first, we found mixed results on whether political knowledge moderates the tie between values and distorted empirical beliefs. For both the Estate Tax Repeal and the Renewable Energy Mandate, preexisting political knowledge levels did *not* moderate the association between values and distortion, a finding consistent with cultural cognitive theory. In the case of the Landowner Compensation Initiative, however, those with greater political knowledge had more distorted empirical beliefs than did their low-knowledge counterparts.

What accounts for this discrepancy? Perhaps the novel issue brought up in the Landowner Compensation Initiative left less knowledgeable voters unable to orient their values toward the empirical questions or the policy at hand. Cultural cognitive research has shown values can shape attitudes on new policy

questions, such as the risks of nanotechnology (Kahan et al., 2009) or vaccines (Kahan et al., 2010), but the ease of such cultural orientation may be weaker on fine-grained empirical questions pertaining to novel issues, such as those in this survey (e.g., "What financial impact would passing this initiative have on state agencies?"). Future experimental research could fruitfully juxtapose issue novelty and the specificity of empirical claims to test this explanation.

In addition, we found that one's self-reported exposure to campaign messages and relevant media coverage of initiatives had no interactive association with values (and only marginal direct effects on empirical beliefs). In other words, the beliefs people came to have about the three ballot measures we studied appeared unrelated to the extent to which voters reported hearing relevant messages.

This finding of limited mass-communication effects fits the cultural cognitive account, which holds that one can generate relevant beliefs from mere exposure to issues. People can quickly form culturally consistent views and beliefs on novel subjects based on even brief descriptions thereof (Kahan et al., 2009). Perhaps voters can also quickly form, or at least express in surveys, empirical beliefs on ballot issues at varying levels of novelty, regardless of their levels of preexisting knowledge or self-reported exposure to news and campaign messages. For most citizens, the "new" questions they encounter on their ballots may not be new at all. Even detailed initiatives may (usually) fit into existing cultural orientations that both supply a voting stance and permit the formation of ad-hoc views on relevant factual questions.

Barring future replication, however, the most straightforward explanations for these findings are either that message effects are too small for samples such as ours to detect (i.e., $b < 0.15$) or that we lacked sufficiently sensitive message exposure measures. We relied on self-reported measures of media and campaign exposure, which are subject to errors of varying magnitude. Respondents may misremember their exposure to political news or campaign communications, or they may inflate those estimates to avoid appearing disengaged from public life. Future research could use experimental methods and more rigorous measures of message exposure (e.g., Kuklinski et al., 2000). Manipulating information and message exposure would make it easier to estimate their influence on misinformation and determine what kinds of messages accentuate or reduce misinformation on policy questions.

Turning to the last of our key findings, political knowledge played a significant role when the focus moved from predicting belief distortion to explaining voting choices. Not only did values and empirical beliefs each have direct associations with policy preferences, but their effects were also significantly moderated by political knowledge. The more one understood the political process, the stronger the connection from one's empirical beliefs to voting choices for the Landowner Compensation Policy and the Renewable Energy Mandate. Similarly, those with more knowledge more consistently expressed their value orientations through their votes. Returning to the original questions that framed this study, those results fall more on the side of heuristic

theories such as Zaller's (1992), which assume knowledge to be a prerequisite for belief-consistent political judgments.

Reflecting on the technical nature of the ballot measures in the present study, we believe it would advance this line of research to assess the importance of values, belief distortion, and knowledge in shaping voters' beliefs on issues that are more heavily value based or culturally contested (Lakoff, 2002), such as gay rights or abortion. Voters may be less likely to hold incorrect factual beliefs on those higher profile issues simply because there is much more information about those issues present in the public sphere. On the other hand, the more obvious connection between values and policy for such issues may result in an even greater distortion of empirical beliefs to fit with the disparate values held by opposing sides. The presence of systematic misinformation on issues such as welfare (Kuklinski et al., 2000), along with the present study's findings, suggest that value-heavy issues may find voters separated by a chasm created by their deeply held political values *and* the empirical beliefs that match up with those values.

For example, different views on a proposed state law to permit same-sex couples to adopt may be linked both to differences in voters' value orientations and their beliefs about the existing research on the long-term effects of having two parents of the same sex. In such situations, experimental research could shed light on the relative efficacy of engaging in deliberation that is value centered (Pearce and Littlejohn, 1997) versus fact oriented (Fishkin, 2009; Knobloch et al., 2013), all of which has an eye toward finding common ground.

Most of all, future studies need to better assess the causal direction in the relationships we analyzed. Like many other studies of public opinion, we have theorized causality since we cannot establish it with cross-sectional data. One theoretical possibility we have been unable to explore is whether respondents are in some way "working backward" by selecting their preferred policy position, then coming up with responses to empirical questions that fit that position (as opposed to building a policy preference on distorted beliefs). Future research using panel data should examine that possibility.

Whatever future refinements may be made to the value-based distortion model, the unsettling evidence remains that many voters are systematically misinformed on political issues, and those erroneous factual beliefs appear to influence how they mark their ballot on election day. These revelations lend ammunition to interventional efforts, such as FactCheck.org, that work to dispel political misinformation, as well as explicitly deliberative democratic reforms that seek to provide voters with more straightforward issue analysis or voting cues (Gastil, 2000). In particular, the aforementioned Oregon Citizens' Initiative Review (Knobloch et al., 2013) provides an ideal opportunity to investigate whether efforts by citizens' peers to provide neutral information can raise voters' issue-relevant knowledge levels, in spite of their tendency toward cultural and ideological filtering—or even reactivity (Nyhan and Reifler, 2010). Such a finding would not contradict our model so much as put a scope

condition on it by showing a carefully constructed electoral circumstance in which voters can bring themselves to deliberate.

Our inability to detect significant communication effects on belief formation, however, suggests a stark limit to the efficacy of policy interventions meant to improve the communication environment during elections. Efforts to limit problematic political speech, or to offer more credible supplementary information, have limited potency if distorted beliefs spawn directly from individuals' core values. Along with other research in this vein (e.g., Kuklinski et al., 2000; Nyhan and Reifler, 2010), our study casts an unflattering light on an electorate awash in misinformation. Our findings do not bode well for voters facing tough policy choices through statewide initiatives and referenda, on top of the numerous local ballot measures appearing across the country. If an accurate grasp of policy-relevant facts is an important feature of direct democracy, there are grounds to be concerned about the quality of such processes.

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