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A Matter of Distinction

Candidate Polarization and Information Processing in Election Campaigns

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Because Republican and Democratic elites have polarized in recent decades, American voters increasingly face choices between candidates who hold divergent policy positions. Such a development has potential implications for the way voters process information during campaigns and choose between candidates on election day. Drawing on research in political psychology and using a nationally representative survey-experiment, we argue and find that levels of candidate polarization—the convergence or divergence of candidates' issue positions—affect voter information consumption, recall of campaign information, and the balance of on-line and memory-based processing employed in the vote decision. In showing that voters faced with more similar candidates rely more heavily on memory-based processing, we provide further support for hybrid models of political information processing and suggest that candidate polarization has consequences for voter attitude strength and resistance to persuasion.

Keywords: *political campaigns; voting; elections; information processing; persuasion; candidate polarization*

Republican and Democratic elites in the United States have polarized in recent decades (Hetherington, 2001; McCarty, Poole, & Rosenthal, 2006; Stonecash, Brewer, & Mariani, 2003). As a consequence, voters

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increasingly face choices between candidates who hold divergent policy positions. Whereas in past decades, the two parties' candidates regularly adopted similar stands on issues such as civil rights and social welfare programs, issue agreement has grown rarer in the contemporary era. According to data from the American National Election Studies, for instance, voters in 2004 perceived George W. Bush and John Kerry to be the most ideologically distinct pair of presidential candidates since 1972.[1] While scholars are conducting a vigorous debate about the extent to which the mass public's issue positions have polarized (Abramowitz & Saunders, 2008; Fiorina, Abrams, & Pope, 2006, 2008), there is widespread agreement that the politicians between whom they choose have diverged.

The development has potential implications for the way voters process information during campaigns and choose between candidates on election day. A growing body of work suggests that the nature of the alternatives presented to voters, including the characteristics of politicians, can significantly influence the way they acquire, process, and use information to judge candidates for office. These differences can influence attitude strength and subsequent information processing, with downstream consequences for citizens' reasoning about politics. This literature has not taken up the issue of elite polarization, so our question here is whether candidate ideological similarity influences the way people formulate their electoral judgments.

We draw on insights from recent work in political psychology that suggests "hybrid" models of information processing, which posit that voters use a combination of "on-line" and "memory-based" processing in evaluating and choosing candidates, may best describe the way people acquire and use information in campaigns. Our results, based on data from a nationally representative survey-experiment, reveal that subjects presented with a choice between ideologically similar candidates spend more time examining the candidates' positions than those asked to choose between dissimilar candidates. Polarization also affects recall, with subjects remembering more about ideologically divergent candidates. And critically, we find a tighter relationship between memory and vote choice—indicating more memory-based processing—for individuals choosing between similar candidates than dissimilar ones. In sum, our findings provide support for hybrid models of information processing and suggest that the polarization of Republican and Democratic candidates may lead voters to develop stronger political attitudes and become more resistant to persuasion.

Information Processing in Election Campaigns

On-line and memory-based models have dominated the political information processing literature in the last two decades.[2] The on-line model, drawn from social psychology (Hastie & Park, 1986; Lichtenstein & Srull, 1987), was ushered into political science by Milton Lodge and his collaborators at Stony Brook (Lodge, 1995; Lodge, McGraw, & Stroh, 1989; Lodge, Steenbergen, & Brau, 1995). Its central tenet is that voters encode information about candidates as they receive it, use the affective content from that information to update a running evaluative tally, and later rely on the summary judgment to make a candidate evaluation. Memory plays little role in this process, as individuals discard the specific information that brought about their overall impression.[3]

In memory-based processing, by contrast, individuals make decisions based on what they recall when asked to make a judgment. Instead of relying on a summary evaluative tally, individuals search their memories for relevant bits of data and base their choice on whatever comes to mind. Kelley's (1983; Kelley & Mirer, 1974) voting model, for example, relies on a memory-based process, positing that citizens weigh the stored "likes" and "dislikes" about each candidate and vote for the one with the highest net favorability.[4]

Most recent work, however, has eschewed the either/or orientation that characterized the debate in its initial form (McGraw, Hasecke, & Conger, 2003). Instead, scholars have begun to argue and demonstrate that voters use a mix of memory and on-line processing strategies. Most prominently, Richard Lau and David Redlawsk (e.g., Lau & Redlawsk, 2006; Redlawsk, 2001) have shown that memory plays a larger role in voter decision making than the early Stony Brook studies found. By designing experiments with a more realistic campaign simulation—dynamic process tracing—and by examining voters' electoral choices, rather than candidate evaluations only, their work has suggested voters do in fact rely on memory to a substantial degree. This research has provided support for the "hybrid" processing models suggested by others (Cook, Crigler, & Marion, 1995; Hastie & Pennington, 1989).

Several factors—most prominently, the information environment and an individual's level of political sophistication—have been identified as mediators of the use of on-line and memory-based processing (see McGraw, 2000). For example, when voters are exposed to information in a fast-moving, cognitively demanding format, the ability to constantly update an

on-line tally appears to be more difficult. The stringent processing demands may lead to a heavier reliance on recalled information in making a judgment (Lau & Redlawsk, 2006; Rahn, Aldrich, & Bordiga, 1994; Redlawsk, 2001), and less on the on-line tally. In addition to its structure, the nature of the available information may also matter. McGraw and Dolan (2007) find that political news coverage about a foreign country that is "personified"—emphasizing leaders over institutions, for instance—encourages on-line processing. Political sophistication has been the most commonly studied individual-level attribute that might affect processing mode, but its effects have been found to be inconsistent (McGraw, Lodge, & Stroh, 1990; McGraw & Dolan, 2007; McGraw et al., 2003; Rahn et al., 1994; Redlawsk, 2001).

More work to specify the factors that influence processing is clearly needed (Luskin, 2002; McGraw 2003), and one possibility is that variation in the choice set presented to voters—the attributes of candidates themselves—could be an important mediator. Redlawsk (2004), for example, notes that an individual's decision making process may be altered when "alternatives are many or indistinct" (p. 596), suggesting that voters may use different strategies depending on the nature of their choices. To our knowledge, no work has taken up this question empirically, and we believe the level of polarization between candidates in an election—the extent to which they are, or are not, easily distinguished—may have consequences for information processing. When candidates are ideologically indistinct, the judgment task may be more difficult than when candidates are clearly polarized.

Specifically, we propose that ideological distinctiveness shapes the way voters consume campaign information, how much of that information they remember or forget, and the way they make their ultimate judgment on election day. We thus explore the effects of candidate ideology throughout the course of campaign information processing. We posit (a) an information consumption hypothesis, (b) an information recall hypothesis, and (c) a vote choice hypothesis. Our expectations turn on the differences in information processing induced by candidate similarity.

Hypotheses About the Processing Effects of Candidate Similarity

Candidate similarity will likely affect the effort people devote to considering information they encounter about the candidates. We expect that people encountering information about ideologically polarized candidates will spend less time processing information about the candidates, because the task will be less cognitively demanding than for voters encountering

information about candidates who are more ideologically similar. In a campaign, voters' ultimate goal is to make a choice between or among their alternatives. To do so, they need to draw conclusions about which candidate they prefer. When voters encounter information about a candidate, they have an incentive to compare that information with what they know about other candidates in the race, so long as the choice environment is not overwhelmingly complex (Redlawsk, 2004). Thus, when exposed to information about a candidate's issue position, the question on voters' mind is not merely whether the candidate has the "right" position, but whether one of the candidates has a "better" position than the other. The nature of an election, then, suggests that voters will engage in a process of comparative evaluation, trying to draw distinctions between the candidates (Rahn et al., 1990; Redlawsk, 2001).

It follows that the task should be easier when faced with candidates with divergent ideological views; the differences in their issue positions will be obvious. For example, a candidate vehemently opposed to a strengthening of environmental regulations is easily distinguished from one that wants much tougher environmental standards. But the difference between a candidate who prefers the status quo and one who prefers slightly more restrictive environmental laws is much more subtle, and much less obvious. In an effort to discern meaningful differences, we expect voters will spend more time considering information about similar candidates than citizens exposed to information about two polarized candidates (Hypothesis 1).

Ideological similarity may also influence voters' memory for what they learn about candidates during a campaign. In an election, people's default assumption is likely that the candidates will be readily distinguishable, since this is the scenario that most frequently characterizes political campaigns. This strong expectation is then likely to guide the way that people process campaign information (Fiske & Taylor, 1991, pp. 125-131; Higgins & Bargh, 1987).

Stark contrasts between candidates are consistent with those expectations (Owens, Bower, & Block, 1979), whereas similarity is not. Information consistent with expectations is more easily integrated into an existing cognitive framework (Howard & Rothbart, 1980; Wyer, Srull, Gordon, & Hartwick, 1982) and more easily remembered (Hastie, 1981; Owens et al., 1979). Thus, we expect recall of campaign information will be better when people are faced with polarized candidates than with similar ones (Hypothesis 2). Although there are cases in which information that contradicts expectations is more easily recalled, this tends to occur only when prior expectations are weak (e.g., Pryor, McDaniel, & Kott-Russo, 1986), which we do not believe characterizes the electoral environment.

Finally, although recall may be stronger when candidates are polarized, we actually expect candidate similarity will increase the role of memory in a voter's choice. When candidates are ideologically divergent, the differences between their positions are very obvious. It is easy for voters to identify the distinctions between a candidate who wants to substantially cut government spending on Medicare and one who wants to publicly fund a government health insurance program. Faced with such a stark contrast, voters might rely heavily on on-line processing, given the clear affective judgment that can be encoded from the divergent issue positions. When the time comes to make a choice, the voter merely has to retrieve the summary judgments and choose the (much) more favorably evaluated candidate. In such a case, there is likely to be a weaker relationship between memory and judgment, as the particular issue positions that led to the overall impression would not need to be recalled.

In comparison, a voter faced with very similar candidates may be forced to use a more thorough memory search to make his choice. If both candidates argue for an expansion of Medicare, but the scope of their spending increases vary minimally, it might prove difficult for a voter to employ the on-line tally; its evaluative content likely will not be decisive. As a result, the voter may rely on a deeper memory search to identify salient differences between the ideologically similar candidates. This formulation is consistent with the evidence that uncertainty about candidates encourages memory-based processing (McGraw et al., 2003). In the end, the relationship between memory and judgment would be tighter for the voter choosing between similar candidates than the voter picking between two polarized ones (Hypothesis 3).

In keeping with McGraw and Dolan's (2007) call for more work with a "Person × Situation" theoretical orientation, we also consider whether reliance on memory or the on-line tally varies from voter to voter. Though its effects have not been found to be consistent, political sophistication is the most likely individual-level attribute that could affect the mode of processing. Voters with higher levels of sophistication—knowledge of and facility with political issues—could be more likely to rely on the on-line tally, even in the absence of clear distinctions on issue positions (Rahn et al., 1994). People with high levels of political knowledge and interest are more able to classify candidates as Republican or Democrat based on their issue positions, which facilitates extraction of an affective tag necessary for on-line processing (Lodge & Hamill, 1986). People without the same level of sophistication may be less able to draw the distinctions between candidates necessary to update the on-line tally. Thus, it may be that political

sophistication encourages on-line processing, especially when voters are faced with ideologically similar candidates. In the analyses below, we examine whether political sophistication interacts with candidate similarity to affect information processing. It is also possible that voters faced with candidates who are even slightly to the left and right of one another may be able to classify them as Republicans or Democrats, thus facilitating the use of a partisan heuristic, an affectively laden piece of data that should encourage on-line processing. But we would anticipate this to occur only among the highly politically aware.

To be sure, voters most likely use both information processing strategies (Lau & Redlawsk, 2006; Redlawsk, 2001), but our point here is that candidates' ideological similarity can affect the *balance* of the processes employed. There is some evidence that voters use similar decision strategies across electoral contexts (Lau & Redlawsk, 2006, pp. 191-201), but it is not possible from the existing work to determine whether candidate similarity could influence decision making.[5] Our study builds on this important work by allowing for a parsimonious test of the ideological distinctiveness argument.

We should also note one important limitation of our approach. Our focus on issue positions sets aside the possibility that individuals faced with ideologically similar candidates may look for other distinguishing characteristics on which to base their choice. Voters asked to choose between two candidates with nearly identical policy positions, for instance, may turn to the candidates' traits, political experience, or other attributes as discriminating factors. But because there is relatively little work probing the mechanisms by which different processing modes may be activated—and none that focuses on the candidates themselves—we chose to focus here only on candidate ideology. Though the scope of our conclusions may be somewhat limited, we believe there is value in focusing on ideological similarity, laying the groundwork for future work on the effects of other candidate attributes.

Design

To evaluate our candidate similarity hypotheses, we designed an experiment that was conducted online by the survey firm Knowledge Networks.[6] A representative sample of the American adult population was recruited to participate in our study. The sample was composed of 352 subjects, each randomly assigned to one of two treatment groups.[7]

Figure 1
Outline of the Experimental Procedure

Part 1. Issue importance
Subjects were asked to rate on a 0-10 scale the importance of six political issues (help to the poor, national defense, protecting the environment, health care, education, and crime).

Part 2. Issue placement
Subjects were asked to place themselves on scales on the same six political issues.

Part 3. Review of candidate fact sheet, evaluation, and vote choice
Subjects were randomly assigned to a *Similar or Dissimilar* treatment group and asked to review information on two candidates (William Fields and Patrick Mayer) running for political office. The information presented consisted of the candidates' issue positions on the same six issues. The issue positions of both candidates were presented on individual pages, which subjects reviewed one at a time, at their own pace. Finally, subjects were also asked to evaluate both candidates and indicate a vote preference.

Part 4. Distraction
Subjects were distracted by being asked six questions about sports followed by five questions measuring subjects' general political knowledge.

Part 5. Recall task
Subjects were asked to recall as many things as possible they liked and disliked about both candidates.

The experimental procedure is similar to Lodge et al. (1995), though it differs in its details. The experiment proceeded in several stages, as described in Figure 1. Subjects first filled out a survey that asked them to rate the importance of a series of political issues, and to indicate their positions on each of those issues. After completing the initial questionnaire, subjects were told they would be presented with information about two political candidates, and that they would later be asked to evaluate and indicate which candidate they would be most likely to vote for.

Of the candidates, the text told respondents they would be asked to "evaluate them and indicate a vote preference as if you were voting in an actual election." The choice of language was deliberate. The paramount condition affecting the processing mode is the goal of the individual (Hastie & Park, 1986). When impression formation is the goal, as in everyday

person perception, on-line processing is likely to prevail (e.g., McGraw et al., 1990). Asking subjects to evaluate candidates has been the approach used in the Stony Brook studies (e.g., Lodge et al., 1995). But because an election forces citizens to do more than evaluate candidates—ultimately, they make a choice (Rahn, Aldrich, Bordiga, & Sullivan, 1990)—impression formation alone may not accurately represent citizens' orientation toward campaign information processing (Lau & Redlawsk, 2006; Redlawsk, 2001). For that reason, we made it clear to the subjects that their task was to make a choice between the two candidates, while also evaluating them, to mimic the decision tasks in an election.

The issue positions of the two candidates—William Fields and Patrick Mayer—were then shown to each respondent on a series of screens, and the subjects reviewed this information at their own pace. After reviewing the issue positions, subjects were asked to rate each candidate on a feeling thermometer and then to choose the candidate they would be most likely to vote for. Finally, after a brief distraction activity that included questions about professional sports and a series of general political knowledge questions, participants were given an unexpected recall task in which they were asked to list what they could remember about each of the candidates.[8]

The experimental manipulation occurred in the presentation of the two candidates' issue positions. Subjects were randomly assigned to one of two conditions: a *Similar* or *Dissimilar* treatment. In the *Dissimilar* condition, Fields and Mayer's issue positions were considerably more polarized than the candidates' positions in the *Similar* treatment. For example, on the issue of poverty in the *Dissimilar* treatment, subjects were told that Fields "believes that government spending on the poor should be reduced," whereas Mayer "believes that government spending on the poor should be increased." In contrast, in the *Similar* treatment, subjects were told that Fields "believes that government spending on the poor should be slightly reduced," whereas Mayer "believes that government spending on the poor should be kept at its current level." The differences between the candidates were varied across issues, as occurs in real campaigns. But we made sure in designing the treatments to clearly differentiate the *Dissimilar* candidates without exaggerating their differences to an unrealistic degree. In the *Similar* condition, Fields and Mayer sometimes held the same positions—for example, on the issue of defense spending—or differed only slightly.

Figure 2 shows the spatial representation of the candidates' positions on the six issues by treatment group. For example, in the *Similar* condition, Fields's and Mayer's positions were one unit apart (on a 5-point scale) on "help to the poor." In the *Dissimilar* condition, their positions on the

issue were four units apart, the largest difference a 5-point scale can accommodate. The *Similar* treatment presented subjects with candidates who were, on average, 1.17 units apart, while those in the *Dissimilar* treatment chose between candidates who were 3.17 units apart—an average difference of 2 points between the two treatments. Moreover, the candidates in the *Similar* treatment differed *at most* by a distance of 2 points, and on only two of the six issues, whereas those in the *Dissimilar* treatment differed by at least two points on each issue.[9]

As a manipulation check, we examined the differences in the evaluations of the candidates in the two treatments. The average difference in the evaluations of Fields and Mayer in the *Dissimilar* condition (−14.94) was significantly larger than in the *Similar* treatment (−7.30) at .05 (one-tailed), as would be expected if the positions of the *Dissimilar* set of candidates were perceived as more polarized. Thus, we can be confident that subjects saw the candidates as we intended. A total of 169 and 175 valid subjects were assigned into the *Similar* and *Dissimilar* conditions, respectively.[10]

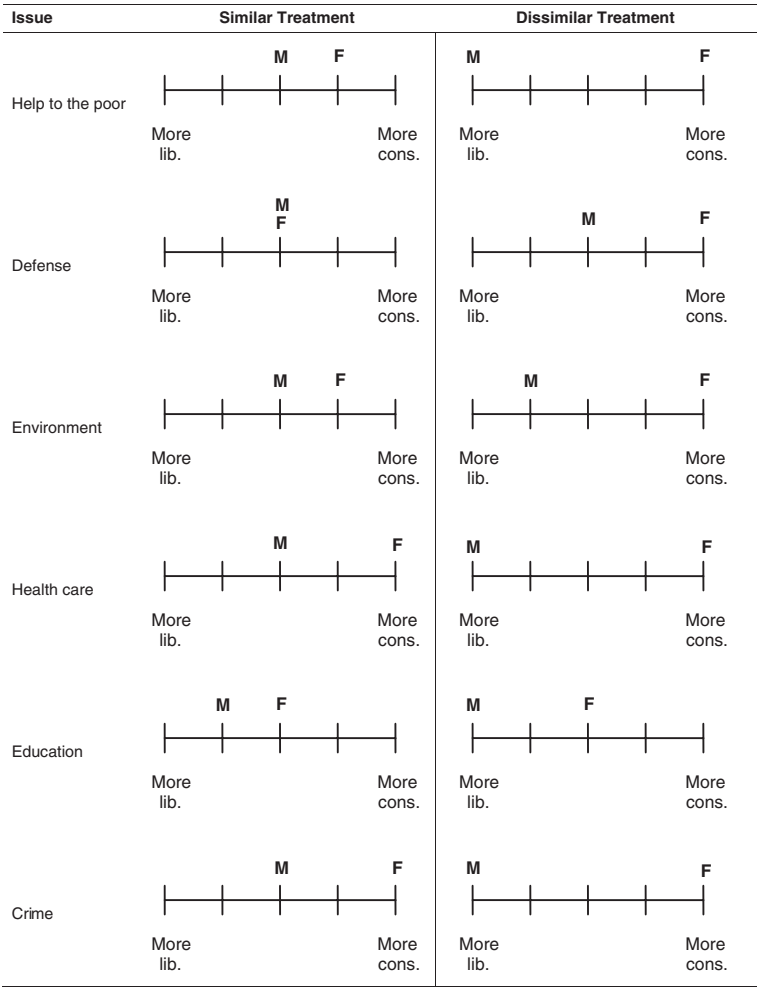
The Effects of Candidate Similarity on Information Processing

Our experimental design allows us to explore whether voters evaluating ideologically similar candidates spend more time reviewing their issue positions than individuals exposed to dissimilar candidates (Hypothesis 1), whether voters exposed to dissimilar candidates recall more about them than those choosing between similar candidates (Hypothesis 2), and whether memory-based processing is more likely to occur when the candidates are similar (Hypothesis 3).

Information Consumption

To examine whether subjects took longer considering information about similar candidates, we calculated the time subjects spent viewing the candidates' issue positions. Recall that subjects in both treatment groups were presented with candidates' positions on six issues (help to the poor, defense, protecting the environment, health care, education, and crime). The issue positions were presented separately on six different pages, with each page displaying the positions of both candidates. Knowledge Networks measured in milliseconds the time subjects spent on each of the six pages. Table 1 presents the average number of seconds subjects in each condition spent on each issue page.[11]

Figure 2
Spatial Representation of Candidate Issue Positions, by Treatment



Note: "M" represents the position for Patrick Mayer; "F" represents the position for William Fields.

The results support the hypothesis that issue similarity increases information processing time. For all six issues, subjects in the *Similar* treatment spent more time reviewing the candidates' issue positions. Subjects in that

Table 1
Time Reviewing Candidate Information (in Seconds)

	Time (*SD*)		
Issues	Dissimilar	Similar	Dissimilar−Similar (*p* Value)
Help to the poor	8.496 (6.463)	10.144 (8.801)	−1.648[a] (.03)
Defense	8.905 (6.641)	11.211 (9.183)	−2.306[a] (.00)
Environment	8.473 (8.647)	9.865 (8.537)	−1.392 (.07)
Health care	10.031 (8.660)	13.669 (12.135)	−3.638[a] (.00)
Education	8.532 (10.934)	9.728 (8.493)	−1.196 (.13)
Crime	10.278 (7.333)	11.861 (13.610)	−1.583[a] (.05)
Total	54.714 (36.299)	66.479 (47.107)	−11.765[a] (.01)
N	174	167	341

a. Statistically significant differences at .05 (one-tailed).

group spent, on average, 11.1 seconds (66.5 seconds/6) per page looking at the candidates' issue positions. By contrast, those in the *Dissimilar* treatment took, on average, only 9.1 seconds (54.7 seconds/6), or about 20% less time. In four cases, the difference was statistically significant at .05 (one-tailed), and the difference between the *Similar* and *Dissimilar* treatments on the environment only narrowly failed to reach statistical significance ($p = .07$). The largest difference was found for health care where subjects in the *Similar* treatment took nearly 3.5 seconds more, on average, examining the candidates' positions than those in the *Dissimilar* treatment (13.7 vs. 10.0 seconds). The smallest difference—and the only one that failed to reach any kind of reasonable level of significance—occurred on education.

That voters faced with similar candidates spent 12 seconds longer—an average of 2 seconds per issue—examining their positions is not especially dramatic. But the results are in line with those in previous studies that that have been interpreted as substantively significant. Taber and Lodge (2006, p. 762), for example, regard as meaningful 4- to 7-second differences in processing times between sophisticated individuals reading congruent or incongruent arguments. In a study examining how emotion affects information search, Valentino, Hutchings, Banks, and Davis (2008) had subjects review a series of candidate information pages on a computer screen, as in our design. Participants assigned to an "anger" condition spent roughly 7 seconds more per page than subjects in other emotional conditions, representing a 20% increase in processing time. That figure is roughly the same

as the 22% increase we found in the amount of time subjects in the *Similar* condition spend on the candidate information pages.

The artificial nature of the experimental conditions, of course, makes it impossible to extrapolate precisely to the differences in processing time that might occur in the real world. But given that subjects were not faced with any other distractions, our interpretation is that the modest differences we find indeed indicate substantively meaningful variation stemming from the ideological profiles of the candidates.

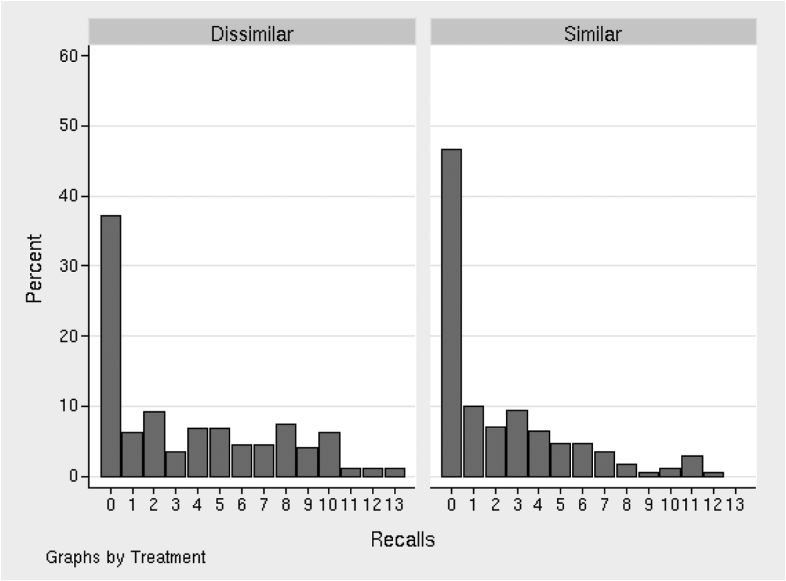
Information Recall

Our second concern is the extent to which candidate similarity affects how much subjects can remember about the candidates' issue positions, or what they can infer from them. Hypothesis 2 predicts that voters in the *Dissimilar* treatment will recall more information about the candidates than subjects in the *Similar* treatment. With large differences between the candidates, a pattern that fits with voters' expectations about political competition, the dissimilar information should prove especially memorable.

The last part of our experiment asked subjects to list things they liked and disliked about each candidate. Subjects could list up to five "likes" and five "dislikes" for each candidate.[12] We counted recalls as those mentions that explicitly referred to any of the six issues, as well as more general statements about the candidates that could have been inferred from the candidates' issue positions, such as a comment that a candidate was "too liberal," "favors big government," or "too hawkish." Some subjects listed items that were unrelated to information they had been exposed to about the candidates, such as "candidate is corrupt," "candidate lacks experience," and even "had a big nose" and "eats pie with hands." We did not count these as valid recalls because they were not connected to anything the participants had learned in the experiment—they were simply made up and thus were excluded. Including them would only have artificially inflated the recall rate.

Figure 3 presents the distribution of recalled likes and dislikes for subjects in both treatment groups, as a percentage of total recalls. The figure indicates notable differences, in line with our hypothesis. First, nearly half (47%) of the subjects in the *Similar* treatment recalled nothing they liked or disliked about the candidates. But that proportion was much smaller for subjects in the *Dissimilar* treatment, where just 37% could not recall anything about the candidates. Overall, subjects in the *Dissimilar* treatment recalled an average of 3.1 items while those in the *Similar* treatment remembered significantly fewer items (2.4), a difference of about 30% that reaches the conventional .05 level (one-tailed) of statistical significance.

Figure 3
Distribution of Recalls by Treatment Group (as a Percentage of Subjects in Each Group)



Just as with the results from the time spent processing information about the candidates, we want to be cautious in interpreting the substantive magnitude of these differences. A difference of less than a single item does not indicate a massive divide in subjects' ability to recall information about the candidates across the two conditions. But our findings are, once again, in line with the magnitude of differences that appear in other experimental information-processing studies. Lodge et al. (1995), for instance, found that subjects who were exposed to a postexposure "depth of processing" manipulation—in which participants were asked some 50 follow-up questions about the candidates—were later able to recall more items about the candidates than those who were not asked the follow-up questions. The overall recall rates, measured days or weeks after the original experiment, were uniformly low; the averages for the two groups were 1.06 and 0.74, respectively. But the proportional difference in the average number of recalls between the two groups, 43%, is slightly larger but similar in size to our findings about the effect of candidate similarity.

The results suggest that people can more easily recall information about distinct candidates than very similar ones, despite having spent less time reviewing the dissimilar candidates' issue positions. It appears that because the issue positions of more polarized candidates are more clearly differentiated, they are also more memorable.[13]

Information Processing Strategies and Vote Choice

The final question asks whether candidate similarity affects the information processing strategies subjects employ to choose between candidates. We hypothesize that while people generally use a combination of both on-line and memory-based processing when choosing between candidates, candidate similarity may affect the balance of each strategy employed. Specifically, we expect subjects choosing between more similar candidates to engage in greater memory-based processing because, despite being still useful, the on-line tallies of the respective candidates may not be sufficient to decide which candidate is preferred. Thus we expect people to search for memories about the candidates that would assist in choosing between them. As a result, we anticipate on-line processing will be relatively more prominent when people choose between polarized candidates than similar ones.

To evaluate the balance of the on-line and memory-based information processing strategies employed, it is necessary first to specify how we operationalize the concepts. Although there is no universally agreed-on measure for either on-line or memory-based processing, the measures we employ are generally guided by the approach that has been used most commonly in the literature.

A measure of on-line processing must represent the construction of an evaluative tally as information about a candidate is being encountered, but that is not "contaminated by memory traces" (Redlawsk, 2001, p. 39). In operationalizing on-line processing, Lodge and his colleagues have used several different measures that ask subjects to evaluate or state their agreement with candidate issue positions. Positive or negative assessments of issue positions have been measured through questions that ask about a hypothetical candidate (Lodge et al., 1995, p. 312), as well as while participants are evaluating the candidates who constitute the stimulus in the experiment (Lodge et al., 1989, pp. 404-406). The Stony Brook studies have also employed a measure that asks respondents how much they agree with a congressman's statement (McGraw et al., 1990, pp. 46-47). The on-line tally is typically computed by comparing a subject's evaluations of issue positions—in terms of either

the positivity of an evaluation or stated agreement—and the positions of the candidates in the experiment.

Redlawsk's (2001; Lau & Redlawsk, 2006) approach differs slightly, in that subjects are not explicitly asked to evaluate the candidates as they encounter information or to state their agreement with their policy positions. Instead, the on-line measure is created by comparing respondents' issue positions and other information from a preexposure questionnaire to the information about the candidates they encounter during the experiment itself. In addition, Redlawsk's measure includes not only issue positions, but also group endorsements, candidate personality, and partisanship.

Although our study is focused only on issues, our measure more closely follows Redlawsk's than the Stony Brook studies, in that we do not ask participants to explicitly state their reaction to candidate information as they encounter it.[14] Instead, our measure is based on the observed level of agreement, or proximity, between the respondent's issue positions (measured in the preexposure battery) and those of the candidates. Our assumption is that the more congruent the respondent's and the candidate's issue positions are, the more favorable the on-line tally will be. As the respondent and the candidate's issue positions diverge, the on-line tally will be less favorable. The principal advantage of this measure is that it offers a conceptualization of the on-line tally that is probably more similar to the way it operates in the real world because it does not require explicit statements of affect or agreement about a candidate's position. In an actual campaign, voters do not express their evaluation verbally or in writing each time they learn something about a candidate. But it is likely that some updating of their on-line tally is going on, based on the relationship between their own views and those of the candidate. Following Redlawsk's approach, our measure is intended to capture that process in as unobtrusive a way as possible.

Specifically, *On-line* is constructed from ideological proximity measures for each candidate and issue.[15] For example, the ideological proximity measure for Fields on health care is the absolute difference between the subject's health care position and that of Fields. We define *On-line* as the sum of the weighted differences between Mayer's and Fields's ideological proximity measures on the issues for which the subject expressed a preference. The weights control for issue importance, as indicated by the subjects' ratings in the first part of the experiment, just as in Lau and Redlawsk (2006). Finally, *On-line* is divided

by the number of issues for which the subject expressed a preference, which corrects for the fact that some subjects did not express issue positions for all six issues. The mathematical form of the on-line measure is as follows:

$$On\text{-}line_i = \frac{1}{n}\sum_l W_{il}(|x_{il} - M_l| - |x_{il} - F_l|),$$

where x, M, and F represent the subject's, Mayer's, and Fields's issue placements, respectively; and

$$W_{il} = \left(\frac{I_{il}}{\sum_l I_{il}}\right)$$

where I stands for issue importance, measured on a 0 to 10 scale, l represents the issues, and i the subjects. Theoretically, *On-line* runs from –4 to 4.

Our memory measure is similar to the seminal work by Hastie and Park (1986, p. 263) and the Stony Brook studies, which rely on a postexposure recall test as a measure of the information people have stored about the candidates (Lodge et al., 1989; Lodge et al., 1995; McGraw et al., 1990). But just as with the on-line measure, it adheres most closely to Redlawsk's (2001), which explicitly asks respondents to report the way each piece of recalled information about the candidates makes them feel. Our measure is similarly evaluative; it is derived from the postexposure questions that asked the respondents to list what they liked and did not like about each of the candidates (Kelley & Mirer, 1974).

Using these recalls, we construct a *Memory* measure that consists of the difference between the *net* number of likes for Fields and that for Mayer. The net number of likes for Fields (Mayer) is defined as the difference between the number of likes and dislikes recalled for Fields (Mayer). In mathematical terms, *Memory* was measured as follows:

$$Memory_i = \left(\left(\sum_j (LF_{ij}) - \sum_k (DF_{ik})\right) - \left(\sum_j (LM_{ij}) - \sum_k (DM_{ik})\right)\right),$$

where *LF* (*LM*) and *DF* (*DM*) represent likes and dislikes for Fields (Mayer), respectively. The subscript i defines the subjects and j and k the likes and dislikes, respectively. Theoretically, *Memory* runs from –10 to 10.

We estimated a vote choice model by maximum-likelihood (logit model) where we include the two processing variables (*Memory* and *On-line*) and a treatment dummy (*Similar*) that identifies whether or not the subject was in the *Similar* (1) or *Dissimilar* (0) treatment group. We rescaled both *Memory* and *On-line* from −1 to 1 by dividing the former by 10 and the latter by 4. *Similar* was interacted with the two processing variables (*Memory* and *On-line*) and included in the estimation to capture their respective effects in both groups.

The dependent variable is a dichotomous variable where a vote for Fields is coded 1, and a vote for Mayer is coded 0. Consequently, we expect an increase in *Memory* or *On-line* will increase the probability to vote for Fields. More specifically, as the net likes for Fields increases as compared to those for Mayer, as captured by *Memory*, a respondent should be more likely to cast a vote for the former. Similarly, as an individual's issue positions move closer to Fields's and farther from Mayer's, as measured this time by *On-line*, he or she should be more likely to vote for Fields. The results are reported, by treatment group, in Table 2. The effects of *Memory* and *On-line* are reported separately for subjects in the *Similar* and *Dissimilar* treatments to ease comparison of their importance between the two groups.[16]

The results support the hybrid information processing model arguments, as well as our candidate similarity hypothesis. First, for subjects in both treatment groups, *Memory* and *On-line* have statistically significant effects (and in the expected direction) on the likelihood of voting for Fields. People appear to use a mixed processing strategy when choosing among candidates (Lau & Redlawsk, 2006; Redlawsk, 2001). Second, the results also indicate that the balance of on-line and memory is indeed affected by candidate similarity. In line with what we hypothesized, the results show that memory plays a greater role when subjects choose between more similar candidates. Specifically, the effect of *Memory* is more than twice as strong in the *Similar* treatment as in the *Dissimilar* treatment (8.43 vs. 4.06), a difference that reaches statistical significance at .05 (one-tailed). The effect of *On-line* is also stronger in the *Similar* treatment (from 29.11 to 48.47), but that increase, unlike the increase for *Memory*, fails to reach statistical significance.

The size of the coefficients for *Memory* and *On-line* cannot be readily compared, however, to evaluate precisely whether memory or on-line processing matters most. Both measures have been rescaled to theoretically equivalent ranges (from −1 to +1), but their actual distributions and ranges are substantially different. *Memory* does indeed range from −1 to +1, with a mean and standard deviation of −0.08 and 0.26, respectively. *On-line*,

Table 2
Explaining Vote Choice

	Coefficients (*SE*)	
Variables	Dissimilar	Similar
Memory	4.06[a] (1.42)	8.43[a,b] (2.23)
On-line	29.11[a] (5.88)	48.47[a] (11.30)
Constant	1.06[a] (0.30)	0.83[a] (0.33)
Log likelihood	−133.07	
Pseudo-R^2	.35	
N	308	

a. Statistically significant coefficients at .05 or higher.
b. The coefficient is statistically different at .05 (one-tailed) than the one estimated for subjects in the *Dissimilar* treatment.

however, ranges only from –0.14 to +0.13, with a mean and standard deviation of –0.03 and 0.04, respectively.

One way to compare the impact of memory and on-line on vote choice, however, is to compute, by treatment group, the change in probability of voting for Fields by manipulating the values on each of the two information processing variables. We can thus calculate the probabilities of a vote for Fields when *Memory* (*On-line*) is set at 1 standard deviation below its mean value and 1 standard deviation above it, holding *On-line* (*Memory*) at its mean.

The results are reported in Table 3. First, recall from Table 2 that the weight of both *Memory* and *On-line* increases from the *Dissimilar* to the *Similar* treatment, with the relative increase in memory being more important. But what about their substantive effect on vote choice? The results confirm the larger increase for memory. Specifically, the change in the probability of voting for Fields from the *Dissimilar* to the *Similar* group, when manipulating the values on *Memory*, is larger than that for *On-line*, as expected. The change in probability attributed to memory goes from .45 for subjects in the *Dissimilar* treatment to .62 for those in the *Similar* group, an increase of nearly 38%. ((.62–.45)/.45). The change in probability attributed to on-line, however, increases by just 15% ((.61 – .53)/.53).from the *Dissimilar* to the *Similar* treatment. Second, and most important, the relative impact of *Memory* in the *Dissimilar* treatment is .46 (.45/(.45 + .53)) but increases to .50 (.62/(.62 + .61)) in the *Similar* treatment, also as expected. The relative importance of memory increases by a substantial 11%.

Although adequate for explaining vote choice, our measure of memory may not translate very well the actual use of memory. For example, if a

Table 3
Simulating the Impact of *Memory* and *On-line* on Vote Choice

	Probability of Voting for Fields			
	Dissimilar		Similar	
	Memory	On-line	Memory	On-line
One *SD* below mean	.23	.19	.03	.03
One *SD* above mean	.68	.72	.65	.64
Difference	.45	.53	.62	.61

subject recalled three likes and three dislikes for both candidates (indicating heavy recall), the subject's score on *Memory* would be 0, whereas another subject who recalled only one like about only one of the two candidates (indicating limited recall) would receive a score of 1 on the same measure.[17] In light of this limitation, we revisited our measure of memory to account for the number of raw recalls. To do so, we created two memory measures. The first is the sum of likes for Fields and dislikes for Mayer and the second one is the sum of likes for Mayer and dislikes for Fields. An increase in the former should increase the probability of voting for Fields and an increase in the latter should reduce it.

The results are reported in the appendix. They are supportive of our earlier findings: The role of memory is larger in the *Similar* treatment than it is in the *Dissimilar* one and its increased role is more substantial than that of on-line. More specifically, memory and on-line both explain the vote decision in ways expected, but the role of the two memory measures, together and alone, is strongest in the *Similar* treatment. Indeed, the weight of the first memory measure (likes for Fields + Dislikes for Mayer) increases more than six times (from 0.89 to 5.50) from the *Dissimilar* to the *Similar* treatment, that of the second memory measure (likes for Mayer + Dislikes for Fields) is increased by nearly 2 times (from −2.41 to −4.22), but that of on-line is only increased by a factor of 1.6 (from 31.04 to 49.70). Moreover, the increase in on-line is not statistically significant. The effect of the first memory measure is highly significant ($p = .01$), that of the second is not, but their combined effect is (the appropriate likelihood ratio chi-squared test yields a $p = .04$). Thus, we can conclude with more confidence that when faced with similar candidates, voters rely more heavily on memory-based processing than when the ideological differences between the candidates are starker.[18]

As discussed earlier, initial work on information processing found a conditioning role for political sophistication (Rahn et al., 1994), but more recent work has failed to replicate those results (e.g., Redlawsk, 2001). We tested for that possibility by including a measure of political sophistication based on subjects' ability to correctly answer five political information questions asked in the distraction section of the experiment (Delli Carpini & Keeter, 1996). The political sophistication measure, in turn, was interacted with the other variables and included in the estimation. The results indicated no conditional effect for political sophistication. Neither political sophistication nor any of its interactive terms reached statistical significance. Moreover, their combined effect also failed to attain statistical significance, $\chi^2(6, 308) = 5.98$, $p = .43$.

Finally, it is worth noting that we also estimated the same model as the one reported in Table 2, but replacing the dependent variable with the difference in evaluations between Fields and Mayer (Evaluation of Fields − Evaluation of Mayer). The results mimic very closely those reported in Table 2 in that *Memory* and *On-line* have significant effects for subjects in both treatment groups, but with a larger increase in the effect of *Memory* for subjects in the *Similar* treatment as compared with that for *On-line*. The increase in the effect of *Memory* is substantial (from 3.65 to 5.07, a 39% increase) while that of *On-line* is much smaller (from −135.10 to −144.91, a smaller increase of only 7%). The larger effect of *Memory*, however, failed to reach statistical significance.[19]

Discussion

The results here have shown that candidate similarity affects the way voters consume campaign information, memory for that information, and the way they make their vote choices. When asked to choose between two candidates who adopt similar, or identical, issue positions, voters rely more on memory-based processing. When faced with an ideologically polarized choice, on-line processing is relatively more prominent than when the choice is less stark. The results add to a growing body of work that suggests voters use both on-line and memory-based processing in making political judgments, but that the amount of memory implicated can vary depending on a variety of structural and environmental conditions. To the list of factors previously identified as influences on information processing—the number of candidates (Lau & Redlawsk, 2006), the flow of information (Lau & Redlawsk, 2006; Rahn et al., 1994), and the way political objects are portrayed in the media (McGraw & Dolan, 2007)—our study adds

candidate attributes. The extent to which candidates can be easily distinguished affects the process by which voters judge them.

Our findings have relevance for understanding political polarization, currently a major concern for students of American politics. As a result of partisan realignment in the South, the increasing influence of ideological activists, and other factors, the Republican and Democratic parties have since the 1960s become more ideologically cohesive and more polarized (e.g., McCarty et al., 2006). American voters today find themselves choosing between candidates with more divergent issue positions than did citizens just a few decades ago.

Given our findings, elite polarization has important implications for the way voters make their choices, and the consequences of the process by which those judgments are made. Attitudes formed on-line tend to be stronger—less uncertain, more accessible, and more resistant to persuasion (see Krosnick & Petty, 1995)—than those formed through a memory-based process (Bizer, Tormala, Rucker, & Petty, 2006). The more memory is implicated, the weaker those judgments are. To the extent that Americans are increasingly faced with candidates who stake out divergent ideological ground, the more likely they are to make on-line rather than memory-based judgments, and the more firmly held their choices will be. Strong views in themselves are not necessarily normatively undesirable; after all, public opinion researchers for decades have lamented the apparent instability and capriciousness of Americans' political attitudes (e.g., Converse, 1964). But attitude strength is associated with a greater propensity for motivated reasoning (Pomerantz, Chaiken, & Tordesillas, 1995; Taber & Lodge, 2006), whereby individuals engage in biased processing of incoming information in a way that threatens logical, considered judgment. If choices between polarized candidates encourage on-line processing, then political judgments will be stronger, citizens may become more resolute in their preferences, making them more resistant to persuasion from subsequent information.

To be sure, this scenario remains speculative, and our survey-experiment is hardly a replication of the typical environment in which voters encounter and process candidate information (see, inter alia, Lau & Redlawsk, 2006). Moreover, the design simply cannot capture the way that existing attitudes about political figures affect the way citizens consume and use information during a campaign, because Mr. Fields and Mr. Mayer were nothing more than blank slates to the subjects in our survey. For example, many Americans even before the start of the 2008 campaign had preconceptions about John

McCain, and those attitudes no doubt influenced the way they interpreted campaign information about his position on taxes, Iraq, and immigration. Our design, by necessity, sets that dynamic aside.

Still, these limitations noted, we believe the findings represent a contribution to our understanding of citizen information processing and decision making, especially given their consistency with other research into "hybrid" information processing models. And though our focus here has been on campaigns, the implications may also extend beyond elections. For example, in the process of forming or revisiting an attitude about a particular object, the quantity, balance, and range of considerations to which an individual has been exposed might affect the way he or she processes subsequent incoming information. Indeed, in situations where the considerations clearly favor one side over the other, our model would predict a greater reliance on on-line processing of new information. On the other hand, in situations where the considerations do not support one side over the other—in other words, when the attributes of an argument are somewhat indistinct—our model would predict an increased role for memory in processing new incoming information. If that is the case, what we propose here may also have importance for students of deliberation and persuasion in political science, communication, and psychology, as they examine the impact of information and frames on attitudes.

Appendix
Explaining Vote Choice Using Different Measures of Memory

	Coefficients (*SE*)	
Variables	Dissimilar	Similar
Memory		
Likes Fields + Dislikes Mayer	0.89 (0.87)	5.50[a,b] (1.54)
Likes Mayer + Dislikes Fields	−2.41[a] (0.78)	−4.22[a] (1.17)
On-line	31.04[a] (5.88)	49.70[a] (11.38)
Constant	−0.13 (0.69)	1.96[a] (0.88)
Log likelihood	−130.30	
Pseudo-R^2	.37	
N	308	

a. Statistically significant coefficients at .05 or higher.
b. The coefficient is statistically different at .05 (one-tailed) than the one estimated for subjects in the *Dissimilar* treatment.

Notes

1. See American National Election Studies Cumulative Data File, VCF9088 and VCF9096.

2. Among the major works are Lau and Redlawsk (2006), Lodge (1995), Lodge et al. (1989), Lodge et al. (1995); McGraw and Steenbergen (1995), McGraw et al. (1990), and Rahn et al. (1994). See McGraw (2000) and Lavine (2002) for overviews.

3. Among other contributions, the on-line model has been seen as a way to rescue the notion of the informed citizen, providing a reassuring explanation in the face of the troubling reality that voters are often unable to recall basic information about candidates even after casting a ballot.

4. The memory-based model has found its greatest success in explaining voters' responses to survey questions about policy issues, where expressed attitudes appear to depend on the "considerations" most accessible (e.g., Zaller, 1992; Zaller & Feldman, 1992).

5. For example, in Lau and Redlawsk's (2006, Figure 3.3) experimental work, the primary candidates are typically more ideologically similar than the general election candidates, and voters seem to use similar decision strategies in both types of elections. But there is no way to disentangle the effects of other information—for example, campaign slogans and personal backgrounds—from the potential effects that could be produced by variations in candidate similarity.

6. This study was conducted through Time-Sharing Experiments for the Social Sciences, funded by the National Science Foundation.

7. The panel recruitment response rate was 27.6%. Knowledge Networks provided us with a sample weight variable intended to improve the sample's representativeness of the American adult population. The variable was used for the analyses reported here. Since there is no agreement about whether weights should or should not be used when dealing with experimental data, we conducted all the analyses both with and without the weight variable. The results were only minimally affected by the use of the weight variable and did not change the substantive conclusions.

8. The experimental stimuli include information about six issues: help to the poor, defense, environment, health care, education, and crime. These issues are frequently at the center of political debate in American politics. The list is also nearly identical to the one used in the candidate information sheets in Lodge et al. (1995), a study on which our design draws heavily. The only differences are that we use help to the poor instead of the budget deficit and do not include a seventh issue about the space program. Although a longer list of issues could have been used, we were concerned about the willingness of experimental subjects to remain engaged with the material for more than a few minutes. Thus, with those limitations in mind, we chose a set of issues that we consider perennially salient, and that also appear in previous information-processing work. A narrative and details about each stage of the experiment, including question wording and the experimental stimuli, are available from the authors on request.

9. The issues of health care and crime offered subjects only three options. For health care, subjects had to choose among a universal health system, the status quo, or an entirely private health care system. On the issue of crime, subjects were asked to choose among putting more resources into rehabilitating and treating criminals, keeping things as they are, or putting more resources into fighting and punishing criminals. For present purposes, we have rescaled those two issues on the same 5-point scale used for the other four issues, with the endpoints placed at the extreme positions and the status quo in the middle of the scale because

these positions reflect best the choices offered to the subjects. Indeed, there is not a more liberal position on health care than adopting a universal system nor is there a more conservative one than having an entirely private health care system. The implications of this operationalization are inconsequential for the subsequent analyses.

10. After close inspection of the 352 subjects who took part into the experiment, we decided to exclude 8 from further analysis. The cases were excluded for three different reasons, each of which we believe fundamentally affected the subjects' compliance with the instructions in the experiment. First, five subjects were excluded because they took an unreasonable amount of time reviewing the candidates' six issues positions (less than 2 seconds on each issue). Those subjects could not have read the issue positions and, therefore, could not have been affected by the different treatments. Those subjects likely simply hit the "Next" button on each screen. Not surprisingly, none could recall any information about the two candidates. Second, one subject, on the other hand, took nearly 2 hours perusing the candidates' issue positions. The subject took a very long break in the middle of the candidates' issue positions presentation, and we believe this long pause affected the effect of the treatments. Third, and finally, two subjects took too long answering the sports and knowledge questions, presumably also taking a break from the survey, making their distraction time excessively long.

11. Three additional cases were removed from the time analysis only. Visual examination of the time reviewing each screen suggested that these three subjects spent an abnormal amount of time on at least one of the issue positions, presumably to take a short break from the survey. For example, one subject spent nearly 4 minutes on the defense issue—that is, 32 standard deviations above the mean for subjects in that same group. Excluding these cases, beyond artificially inflating the means and standard errors, does not affect the substance of the findings reported here. Additional tests excluding other less "extreme" outliers also do not affect the results.

12. The format of the question is similar to the standard likes/dislikes batteries in the American National Election Studies and follows the design proposed in Lodge et al. (1995).

13. Had we assigned party labels to the candidates, our expectations might have been different, because voters could use partisan stereotypes to organize information about the candidates. Policy statements that violate those stereotypes—for example, a Republican supporting liberal positions—might be so resonant that information about the similar candidates would be more easily recalled. But although subjects in the experiment might have a natural tendency to try to assign Republican or Democratic labels to the candidates as they read their issue positions, the effects of partisan stereotyping are likely to be weak because the candidates were not assigned partisanship at the outset of the experiment (Howard & Rothbart, 1980). Absent the certainty of the party labels, the expectation of differences between the candidates, not partisan stereotypes, is likely to guide the encoding and recall of information. To be sure, the interaction between candidate similarity and partisan stereotyping deserves attention in future work.

14. We certainly would like to be able to include nonissue considerations, as do Lau and Redlawsk (2006; Redlawsk, 2001). But limitations on our survey design prevented an expansion beyond issues. Ultimately, we do not think the exclusion of those other considerations reduces our ability to evaluate the roles of memory and on-line processing on vote choice. If anything, our measures proposed a very conservative test of our hypothesis by relying both on the same "kind" of information.

15. We also believe this approach is an improvement on previous work, in which the on-line measure captures only whether or not the respondent is on the same side of an issue

as a candidate (Lodge et al., 1989, 1995; Redlawsk, 2001). One notable exception is the more recent contribution by Lau and Redlawsk (2006) who adopt both a spatial measure and the directional measure proposed by Rabinowitz and Macdonald (1989). The authors, however, find both directional and Euclidean distances to yield the same results. We chose the latter as it is generally more accepted and has never been demonstrated to be strictly inferior to the directional measure (Lewis & King, 1999).

16. The coefficients reported in the *Similar* column were computed by adding each variable's main effect with that from its interaction with the treatment dummy (*Similar*) as conventionally done: $(\hat{\beta}_{Memory} + \hat{\beta}_{Similar*Memory}; \hat{\beta}_{On\text{-}line} + \hat{\beta}_{Similar*On\text{-}line}; \hat{\beta}_{Constant} + \hat{\beta}_{Similar})$. The standard errors were calculated using the conventional formula: $SE(a+b) = \sqrt{\mathrm{Var}(a) + \mathrm{Var}(b) + 2\mathrm{Cov}(a,b)}$. The coefficients, and their standards errors, for subjects in the *Dissimilar* treatment are simply those of the variables' main effects.

17. We are grateful to an anonymous reviewer for pointing this out.

18. As noted earlier, the operationalization of the issues of health care and crime had to be adjusted to match the 5-point scale used for the other issues. This change affects our measure of *On-line*, but was needed for comparability purposes and to allow the use of the issue importance weights. We investigated whether this operationalization decision affected the substance of the results and found it did not. The check was performed by running a second model with the *On-line* measure broken into two variables (to allow for the differences in scales), each of which was unweighted, and found the results to be very similar to those reported in Table 2. Specifically, the effect of *Memory* was, again, significantly stronger for subjects in the *Similar* treatment. At the same time, only one of the two *On-line* measures showed a significant increased effect for subjects in the *Similar* treatment.

19. The results of the analyses exploring the role of political sophistication and the effects on candidate evaluation are available from the authors on request.

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