

How Quickly We Selectively Forget: Experimental Tests of Information Order on Memory and Candidate Evaluation

Stephen N. Goggin

San Diego State University

Despite enormous variation in the order, positivity, and content of information that real-world electoral campaigns present to voters, we know little about their interactive role in candidate evaluation. This study presents results from two multiwave experiments that varied the positivity of information, its order, and its personal or policy content and assessed its memorability and impact on evaluations over several days. Consistent with observational evidence, recent information is not only more memorable, but also more impactful, in candidate evaluation. However, these effects on evaluations are asymmetric by the positivity of the information, with negative information more impactful than positive information when it is recent, even though negative information fades more quickly in memory. Furthermore, positive and personal information is more memorable, and positive personal information can serve as a powerful anchor when presented first, diminishing recency effects.

While the political world unfolds over time, surprisingly little work has focused on how information at different points in time can affect how voters perceive electoral campaigns and the information and candidates they present. Furthermore, the manner and time in which information is presented to voters is anything but random—campaigns and political debates are carefully crafted, strategic enterprises designed to promote one's cause. A long line of work with diverse empirical strategies (e.g., Arbour, 2014; Druckman, Jacobs, & Ostermeier, 2004; Fenno, 1978) has made it clear that those who work in politics and political consulting understand the importance of timing and message in influencing voters' evaluations. Yet, most of what we know about the effectiveness of message content and timing comes from a variety of extrapolated and stylized facts, drawn from various observational studies, with few rigorous empirical demonstrations.

From the literatures on campaign advertising effects, candidate evaluation, and information processing, we know a variety of factors condition the effectiveness of information in campaign messages over time (Jacobson, 2015). This study provides evidence from two multiwave experiments designed to demonstrate the impact of information's (1) *order*, (2) *positivity*, and (3) *content* (i.e., personal or policy) on both memory and candidate evaluation. While much scholarship throughout the social sciences has focused on how variation in information's order, positivity, and content affects its role in both memory and evaluative tasks, political science work has seldom experimentally evaluated the role of these three factors, particularly their interactive role, in candidate evaluation and electoral decision making.

In the next section, I highlight what we know about each of these factors from related literatures, including what we know about their interaction and how they produce differential effects on memory and evaluations, noting critical omissions in our understanding of their effects. Then, I describe the importance of assessing both memory and evaluations for understanding the interactive effects of these factors in political decision making. Turning to empirical analysis, I discuss the need for careful design-based inference and an outline of the two multiwave experimental designs. Finally, I demonstrate the powerful effects of each of these three factors (order, positivity, and content) and their interaction on summary evaluations of candidates, as well as the memorability of the information, noting important implications for campaign strategy and democratic accountability.

Candidate Information Exposure and Its Effects on Evaluations and Memory

Inquiry across social science disciplines has sought to highlight the cognitive biases that people hold with respect to time in order to explain various empirical regularities in decision making. While much of the basic psychological work in this area was devoted to how timing and ordering relate to memory of different stimuli, much work has examined how timing can not only affect memory, but also evaluations of targets in a number of more complex domains (e.g., Crano, 1977; Hogarth & Einhorn, 1992; Jersild, 1929; Mayo & Crockett, 1964).

Together, basic and applied psychological research come to a relatively unassailable fact: Retrospective thinking over time is not simply additive; equal weight is not placed on all information; for example, see Healy and Lenz (2014) for an example about varying economic conditions. As I demonstrate in the remainder of this section, however, the amount of inequality in how information is weighted and used in candidate evaluation is often unclear. While more recent information is often found to be most important in decision making, other studies have argued that powerful preceding information may be more important, anchoring evaluations. The expectations from these literatures often depend on the characteristics of the information or individual differences of the respondent. Yet from these divergent expectations, we can generate several testable hypotheses related to the role of order, positivity, and content in affecting candidate evaluation.

A central focus of this research area has been to highlight factors that moderate the relationship between time and outcome and explain divergent results in different domains—whether it is cognitive elaboration, the nature of the decision task, or characteristics of the information presentation. This work, mostly focused on the nature of the evaluation task, provides a benchmark for considering the motivation and attention voters pay to political stimuli, particularly in electoral campaigns. As Tetlock (1983) found, when respondents are expected to be accountable for the information they consume, primacy and recency effects mostly disappear. Other work, such as Crano (1977), Forgas (2011), and Zauberman, Diehl, and Ariely (2006), has focused on moderators of primacy and recency effects, with results differing depending on the nature of the decision task.

Despite all this research in a variety of social science literatures, few studies in political psychology have examined the particular role of timing of information on candidate evaluation, yet many have implicitly made arguments regarding its role (e.g., Hill, Lo, Vavreck, & Zaller, 2013). These arguments, largely about recency effects, rest on a very simple foundation: Voters do not spend a lot of time thinking about politics, and they forget what they learn rather quickly.¹ Specifically, if we expect that evaluations of candidates are memory-based and driven by whatever information,

¹ Arguments about recency often rest on conceptualizing voters' reasoning about politics as a memory-based, rather than online, process. While the distinction between memory-based processing and online processing has been rather well-tread in discussions of candidate evaluation over time (see, e.g., Hastie & Park, 1986; Hill et al., 2013; Lau & Redlawsk, 2006; Lodge, McGraw, & Stroh, 1989; McGraw, Lodge, & Stroh, 1990; Mitchell, 2008), it is worth clarifying its role in the argument for recency effects in electoral campaigns. While both types of processing are clearly present in the electorate, a large body of evidence suggests that memory-based processing is more common, as few voters think effortfully about the information they encounter to update their online tally of the target they are evaluating.

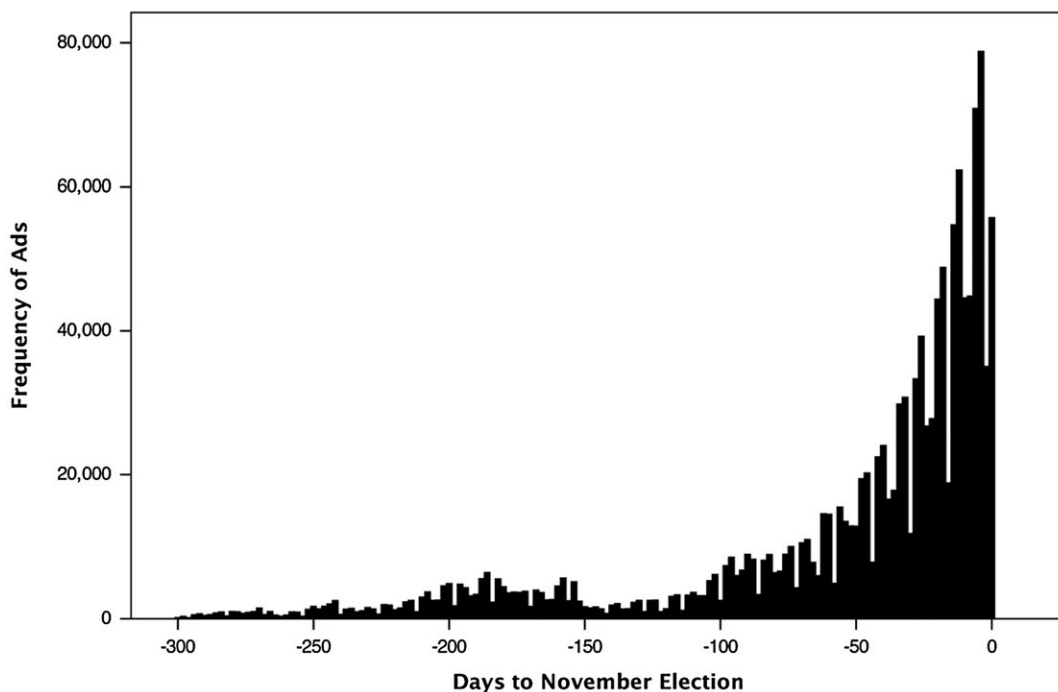


Figure 1. Campaign TV advertisements airings by time in all 2008 U.S. House & Senate races.

Source: Wisconsin Ads Project/Campaign Media Analysis Group.

or considerations, a voter currently has about the candidate, then the most accessible considerations should drive evaluation (Zaller, 1992). The argument for recency rests on this notion of accessibility—that recent memories should be more accessible and influence one’s evaluation.

Evidence for recency in observational data is rather dominant. Using large advertising and survey datasets, recent work, most notably Hill et al. (2013) and Sides and Vavreck (2013), has highlighted the transience of information effects. It is also clear campaigns believe recency is more powerful, given they air the majority of advertising appeals in the final weeks of a campaign, as shown in Figure 1. While the causes of this regularity may not be completely clear, it is remarkably clear by campaigns’ actions that they view late advertising as a valuable investment. Despite these relatively convincing studies, drawing causal inferences about the effects of order and timing on information remains problematic. Because releasing information during a campaign is extraordinarily strategic, its timing is not exogenous.

A number of experimental studies have begun to address timing of political information. For example, Mitchell (2008) shows that information revealed late in a hypothetical multiweek campaign is far more impactful than early information (see also Mitchell, 2012, 2013, 2014). Unfortunately, despite some manipulation of when certain information is revealed during the campaign, experiments often do not directly manipulate the order of how positive/negative and personal/policy information are revealed, rather, hold it constant.²

² Relatedly, some experimental studies have examined issues related to the framing of issues over time (e.g., Chong & Druckman, 2013; Cobb & Kuklinski, 1997; Druckman, Hennessy, St. Charles, & Webber, 2010). While not directly addressing candidate evaluation and the temporality of information about candidates, they provide strong evidence of how effects of frames and cues may be different over time, with frames being more effective anchors at the beginning of policy debates.

Despite the relatively strong existing evidence for recency effects in political information, there are still a number of plausible arguments for the power of primacy effects. If information is important, salient, or vivid, it can anchor evaluations and remain memorable throughout a campaign. While we know much about anchoring effects with simple information in estimation tasks (e.g., Jacowitz & Kahneman, 1995), we know little about the possibility of anchoring effects in person-centric candidate evaluation tasks.

These arguments for the effects of primacy in candidate evaluation often grow out of the first-impressions literature, which argues that some early information can be so vivid that it serves as a defining memorable attribute of the target. The Obama campaign's negative framing of Romney as out-of-touch or elitist in early summer 2012 is held up as an example of a prominent display of primacy, anchoring evaluations among voters. Some argued Obama created an insurmountable gap through this large advertising push, allowing him to win the election (Halperin & Heilemann, 2013; though, see Sides & Vavreck, 2013 for a rather convincing rebuttal regarding the endurance of these effects). Of course, this argument is not novel to 2012; in particular, Popkin (1994) argues for what he calls "Gresham's Law of Political Information," or the idea that certain bits of salient "bad" information can push out policy-relevant information over the course of campaigns. The theoretical foundation for expecting primacy effects is quite simple: Strong, relatable, and vivid information early in a campaign may help anchor evaluations of that candidate and make it hard for evaluations to shift far away from the initial evaluation.

Arguments about order and timing ultimately hinge on the debate around the accessibility of information and its impact in evaluations. For this reason, assessing both memory and overall evaluations is crucial. Unfortunately, much of the work intended to disentangle primacy and recency in the political landscape has largely ignored the possibility that information can vary greatly in its nature. If we presume that information varies not just with respect to timing, but also in valence and content, we can better understand why we see conflicting evidence in observational studies of campaign effects.

The idea that the *type* of information might affect established findings of primacy and recency is not wholly novel. One key variation in type—valence—has received extensive study within the domain of psychology. Matlin and Stang (1978) marshal evidence from a broad array of psychological literatures noting a robust bias toward positivity in human language, memory, and thought. Within the domain of evaluation of others, they describe a number of studies finding a tendency to give others, even in a political domain, a generally more positive evaluation than we might expect from the underlying information. Yet, this bias toward positivity is less well-understood when competing positive and negative information is presented with its order varied.

Within the context of electoral campaigns, the valence, and particularly the negativity, of campaign information, has received extensive study (Ansolabehere, Iyengar, & Simon, 1999; Brooks, 2006; Lau & Pomper, 2001, 2004; Lau & Rovner, 2009; Mark, 2009). While much of the debate surrounding negative campaigning has focused on what overall effects, if any, it has on persuasion and mobilization, work has seldom focused on the variation in effectiveness of negative campaigning, particularly with respect to its timing in a campaign. Yet there is meaningful variation in the positivity of ads over the course of the campaign, as displayed in Figure 2. Markedly, the percentage of positive ads decreases significantly over the course of a campaign, decreasing from over 80% to under 40%.³

Why might the positivity of information matter for its impact? We should expect that, if information is persuasive, positive information should increase evaluations of a candidate, while negative

³ This general trend may be due to several strategic factors, three of which I highlight here. First, ads during the primary campaign may be more positive because of uncertainty about the general election opponent. Second, campaigns may feel the need to generate name recognition for their own candidate early by running promotion ads. Third, campaigns may view last-minute negative ads as having maximum impact.

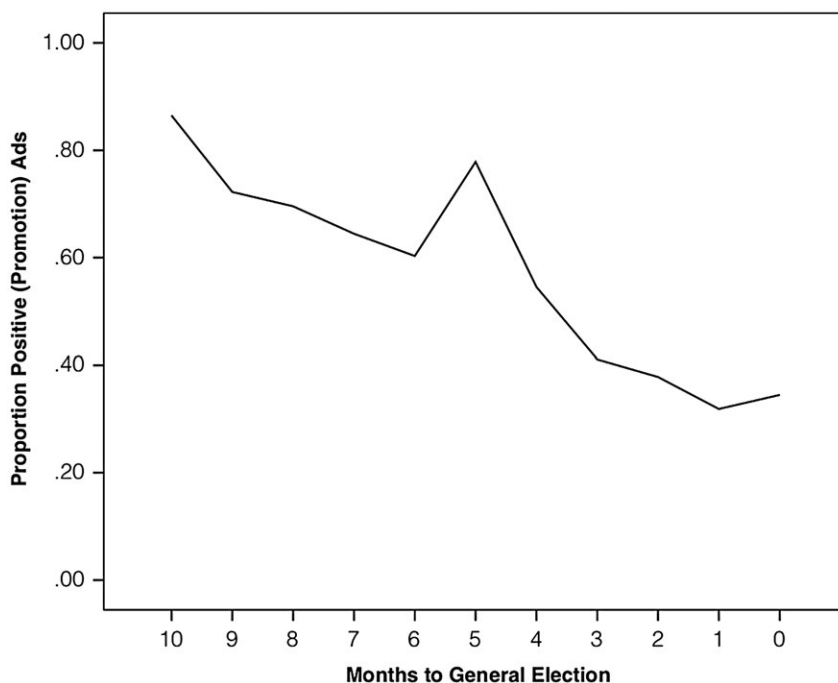


Figure 2. Promotion television advertisements by time in all 2008 U.S. House and Senate races. Timing is rounded to the nearest month, so month zero consists of ads aired in the last two weeks of the campaign. Other ads are either categorized as contrast or attack ads.

Source: Wisconsin Ads Project/Campaign Media Analysis Group.

information should decrease evaluations. Yet its relative impact over time is less clear. Taylor (1991) describes the “mobilization-minimization hypothesis,” in which humans mobilize quickly to negative and aversive information, eventually minimizing its impact over time. As such, while negative information may have more initial impact, that impact may significantly diminish over time, with less eventual impact than positive information. This time-based interaction comports with the patterns of political campaigns shown in Figure 2, with campaigns choosing to air more negative advertising near the end of the campaign, giving it less time to fade. As Fridkin and Kenney (2011) highlight, the effects of negative campaign advertising, contingent upon its content and tone, are generally known, yet we know little about its interactive role with the “variance in the timing of the negative messages (e.g., early vs. late in the campaign)” (p. 323).

Information can also vary significantly in its content. Survey-level discussions of electoral choice (e.g., Erikson & Tedin, 2011) often succumb to the temptation to separate types of candidate information into neat, mutually exclusive silos such as *party*, *policy*, *personal*, and *performance*. These categories are often not cognitively mutually exclusive, nor are they communicated separately in campaigns (Goggin, 2016; Goggin & Theodoridis, 2017). Despite these issues, we can think of two broad types of candidate information: *personal*, communicating information about the candidate’s character as a person, and *policy*, communicating information about the candidate’s policy positions, political groups or party, or experience in political office. This distinction is commonly used to code campaign communications, such as television ads: For example, the Wisconsin Advertising Project (Goldstein, Niebler, Neiheisel, & Holleque, 2011) uses these two categories, as well as a third category for both, in hand-coding political advertising.

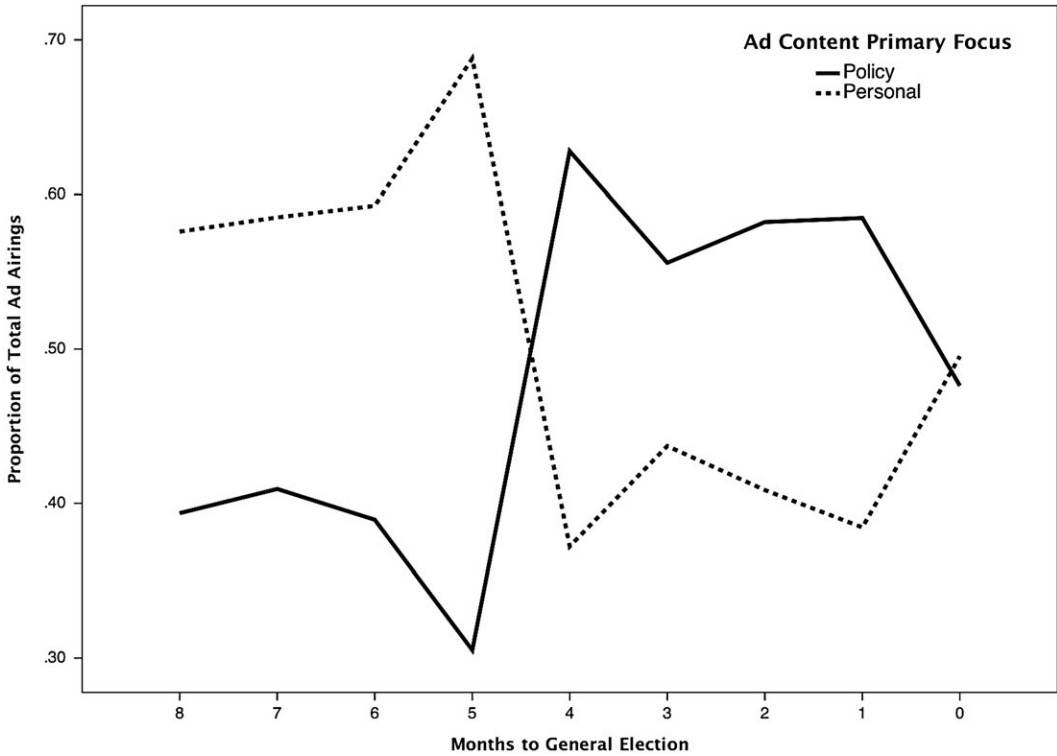


Figure 3. Television advertisement focus by time in all 2008 U.S. House and Senate races. Ads with a mix of personal/policy content collapsed into personal category so that proportions sum to one. Timing is rounded to the nearest month, so month zero consists of ads aired in the last half-month of the campaign.
Source: Wisconsin Ads Project/Campaign Media Analysis Group.

Electoral campaigns vary greatly in the types of information they present at different times. Figure 3 shows this pattern clearly, drawing on television advertisements from all U.S. House and Senate races in 2008 (Goldstein et al., 2011). As we would expect, candidates are more likely to advertise personal characteristics in the primary season, probably to differentiate themselves from copartisan candidates, and are more likely to air policy ads in the general election period.⁴ Additionally, the proportion of personal ads rises close to both the primary and general elections, likely intended to bombard viewers with memorable and recent information. While this last push toward personal information is clear in the primary, its pattern in the general election is more mixed. However, despite these observational patterns, we do not know how effective these strategies are.

The long literature on duration neglect in psychological reasoning studies (e.g., Fredrickson & Kahneman, 1993) highlights how variance in information can factor into retrospective evaluations. The key finding of this prominent study, often called the “peak-end” rule—the two most impactful parts of an experience are the peak and the end—highlights an important distinction that needs to be made in political information: It is not all the same. Certain types of information may be particularly memorable or impactful if they resonate with voters and remain accessible.

⁴ Not all primaries occur at the same time, so this point on the plot shifts slightly from state to state, although most occur four to five months from the general election. If one centers the time on the primary election or presents primary and general ads separately, similar clear patterns emerge. Because either of these strategies requires fixing multiple points in time, the time period between the two must either be stretched or compressed to normalize the distance. For simplicity, the time to the general election is shown here.

Because of its ubiquity and centrality to person perception, we should expect personal information to be more accessible in memory, and therefore, more impactful. As laid out in Popkin (1994), personal information is extremely sticky in voters' minds and can help color later information they receive. This ability of personal information to vividly anchor evaluations suggests it may play a far different role in information processing over time than do policy positions. Arbour (2007, 2014) argues persuasively for the power of personal appeals, or utilizing a candidate's personal background, to anchor and affect evaluations. Indeed, this effect is born out in Mitchell (2012), finding that exposure to personal information seems to produce enduring effects larger than that of policy information onevaluations.⁵

Considering Both Evaluations and Memory

When considering the ways in which information may affect voters' decision making processes, it is important to consider two important pieces separately: memory and evaluations. While candidate evaluations are ultimately of interest to those interested in electoral behavior because they shape the choice between candidates, voters' memory of candidate information is distinct from evaluations and important in its own right. Furthermore, the relationship between memory and evaluation is the focus of an extensive literature (e.g., Lodge et al., 1989; Lodge, Steenbergen, & Brau, 1995; Lodge, Stroh, & Wahlke, 1990; McGraw, Lodge, & Stroh, 1990), but we have surprisingly little knowledge about how their relationship may vary across types of information.

In memory-based processing, memory of particular salient information is a necessary mediator for information to impact evaluations of political targets (e.g., Zaller, 1992). However, the late 1980s saw a wealth of literature that began to reassess the normative standards to which we should hold voters to in their decision making. Particularly, advocates of online processing (spurred by Hastie & Park, 1986) argued that while voters may not remember the information, voters did update their online tally of whether they liked or disliked the candidate. This online tally was viewed as sufficient to hold well-formed opinions of candidates and often operationalized as a single tally based on issue positions, casting aside memories of all the underlying information (Lodge et al., 1989, 1990, 1995).⁶

Second, memory of information, even if it is not used in a single voter's decision, if the decision is made online, may anchor a candidate's image in ways that affect the reception and processing of future information. That is, particularly memorable and accessible information may remain in voters' minds, affecting the reception of future information, dampening (or heightening) its impact on evaluations. Unfortunately, a common problem in these literatures is a heavy reliance on policy information in adjudicating between online and memory-based models of information processing. While personal information may be presented in experiments, it is not typically entered into an online tally or measured for its memorability, limiting the tests of the models and the scope of the conclusions.

It is, therefore, imperative to measure both the memorability and impact on evaluations of the full set of information available to voters, personal and policy, which allows us to cleanly assess their role in an experimental setting. Because asking respondents to evaluate a politician multiple times

⁵ While this study can compare the impact of these different types of information, it does not directly manipulate its order, so it is unable to test their competing role in a voter's cognition.

⁶ Put simply, these authors argued for a largely complete disconnect between memory and evaluations, including that once controlling for online evaluations, there should be no correlation between memory and evaluations. More recently, these rather strong claims have been weakened by research demonstrating specific instances when memorability of information does, in fact, have an independent effect on evaluations (Kim & Garrett, 2012; Redlawsk, 2001). Indeed, later experimental work has often induced memory-based or online processing with certain experimental protocols designed to induce one or the other, as it is clear that both operate in the real campaign environment (Druckman et al., 2010). Only recently have a few notable exceptions tested for memorability of information other than policy information, although even then, it is often not experimentally varied. For example, Mitchell (2014) examines the impact of scandal information in memory. Because scandals are universally negatively valenced, there was no need to control for an online tally. Because the extensive online versus memory-based processing literature almost exclusively measures these processes with policy or issue information, we know little about how a variety of candidate attributes will likely be processed by voters in memory.

may induce them to either (1) integrate all the information into more of an online tally or (2) better remember some particular details due to the evaluative task, we must ensure that the evaluation itself does not contaminate other results. Additionally, examining both memory and evaluations and delaying the measurement of both has additional benefits for the external validity of this research. Given that the expectations from extant literature differ for evaluations and memory, it is crucial to assess both, in case results diverge in expected ways. Furthermore, by examining their relationship, we can revisit many well-tread debates in the information-processing literature, examining how these findings may vary across information type.

Hypothesis

Thus, from these literatures across the social sciences, we can generate important expectations regarding the relationship of order and information with respect to their impact on evaluations, memory, and the relationship between the two.

Regarding evaluations,

H1: We should expect more recent information to be more impactful, in line with well-established findings.

However, this finding of recency should not be uniform across types of information. Thus,

H2: We should expect that more recent negative information will be more impactful than more recent positive information.

Finally, given the “stickiness” of personal information,

H3: We should expect recency effects to be minimal for personal information compared to policy information, with earlier personal information retaining its impact longer.

With respect to voters’ memories, we should expect somewhat similar findings. While somewhat obvious,

H4: We should expect more recent information to be more memorable.

Additionally, due to the nature of the task,

H5: Repeated evaluations should produce better memory for that information.⁷

Related to the asymmetries described in previous literatures,

H6: We should also expect that positive information is more memorable than negative information.

H7: Personal information is more memorable than policy information.

Bringing memories and evaluations together, the information-processing literature would generally suggest that once we control for either prior evaluations or the valence of prior information, as a measure of an online tally, memories will not add any explanatory power in predicting the final

⁷ Alternatively, the online-processing literature might predict that the evaluative task itself causes respondents to discard the underlying information, simply integrating it into a valence.

Table 1. Sample Demographics and Political Affiliations

	Experiment 1	Experiment 2
Average Age	31.5 (s.d. = 9.4)	31.6 (s.d. = 10.9)
% Male	66.3	62.7
% White	74.4	77.8
% Highest Education: High School	24.1	32.0
% Highest Education: Associate's	11.9	15.3
% Highest Education: Bachelor's	49.3	40.7
% Highest Education: Graduate	10.3	10.5
% Democrat (with leaners)	65.2	61.7
% Republican (with leaners)	17.8	21.0
% Independent	13.7	15.7
% Liberal	63.5	57.7
% Moderate	14.1	19.3
% Conservative	18.2	21.7
<i>N</i> respondents completing all waves	265	502

evaluation. Yet given the primary focus of these literatures on policy positions, we may see memories remain predictive of evaluations, particularly for other types of valences of information.

Empirical Strategy: Multiwave Experiments

To test these numerous hypotheses, two separate three-wave survey experiments were conducted in spring 2014 on Amazon’s Mechanical Turk. Survey experiments are ideal for evaluating these effects, as we can keep the information constant and only vary information order, timing, and the content of the information presentation. While the patterns in advertising data highlighted in the first section of this study demonstrate broad variation in information type and time, we understand little about the mechanisms that shape these aggregate patterns.

The designs of the experiments were broadly similar, with the first designed to provide a clean test of order effects and their relation to positivity without varying information type and with the second designed to more closely examine the moderating role of information type, operationalized as either personal or policy information. I first discuss characteristics of the sample, followed by the design of the first experiment, then discuss the second experiment, noting only how it differs from the first’s design. Details on the exact presentation of the stimuli are included in the online supporting information.

As many authors have pointed out (e.g., Berinsky, Huber, & Lenz, 2012; Buhrmester, Kwang, & Gosling, 2011), samples drawn from Mechanical Turk tend to be younger, better-educated, and more liberal than the larger U.S. population.⁸ Still, as shown in Table 1, the experimental samples were relatively diverse.

The first experiment (*N* = 265) was conducted in three waves, with each wave occurring a minimum of 18 hours apart and a maximum of 36 hours apart. Depending on a respondent’s original completion time of the survey, they were emailed between 18 and 24 hours after completion of the previous wave. Respondents were given up to 36 hours between waves to complete the follow-up wave, although the vast majority of responses were completed within several hours of the recontact emails. Four hundred respondents completed Wave 1, 299 respondents completed Wave 2, and 265 successfully completed all three waves, and attrition did not systematically differ by treatment group.

While this time variation is quite small relative to the overall length of a campaign, it allows us a clean test of many of our critical hypotheses. While there are external validity concerns regarding the durability of information effects over weeks, let alone months, there is little reason to believe that the additional time will change the relationships between the experimental factors. Rather, it will only serve as an additive shift in terms of place on the forgetting curve with far less information retained. The first wave was substantially longer than the second and third waves, due to the inclusion of a demographic questionnaire at the beginning. The first and second waves presented respondents with a battery of four screens of both personal and policy information about a hypothetical politician, including his name, photo, and partisan affiliation, while the third wave only asked questions about the politician. Respondents were given the politician's name and photo to aid in recall in the third wave, but no other information.⁹

The first experiment used a 2×2 factorial design. The first factor, order, determined whether respondents viewed a battery of entirely positive information or negative information in Wave 1, with the opposite battery presented in Wave 2.¹⁰ The second factor, online evaluation, determined whether respondents received questions about the hypothetical politician in all three waves, or only in Wave 3. This was manipulated to ensure that questioning respondents about the politician in each wave, and forcing them to come to a summary evaluation, did not substantially alter the impressions they formed in Wave 3. The party of the politician was not manipulated between subjects. Respondents were presented with a party cue attached to the politician; however, this party cue was tailored to the respondent's own partisan identification, including independents.¹¹

The second experiment ($N = 502$) was also conducted in three waves, with the same time bounds. 759 respondents completed Wave 1, 590 respondents completed Wave 2, and 502 successfully completed all three waves, and attrition did not systematically differ by treatment group. The second experiment also used a 2×2 design.¹² The first factor, information type, determined whether the respondents were presented with positive policy information and negative personal information, or positive personal information and negative policy information, with only one type displayed in each of the first two waves. This information is nearly identical to the information presented in the first experiment, except the content subsetting by its personal or policy content. The second factor, order, determined whether these two sets of information were presented with positive or negative first.¹³

⁹ The full set of information presented can be seen in the online supporting information. To give a broad sense of the content of information, snippets of positive personal, negative personal, positive policy, and negative policy statements follow: "[Name] was most recently the CEO of one of the state's largest technology companies, overseeing a workforce of several thousand and a period of rapid growth for the company." / "His involvement on the board of a number of nonprofit organizations and charities has also raised some ethical concerns regarding his own business interests." / "[Name] has been a strong advocate for a reasonable foreign policy that respects the needs and sacrifices of our troops." / "[Name] has also pushed for relatively controversial economic policy in his home state. Economists from both parties have noted lower than average growth rates, and a rising deficit as cause for concern."

¹⁰ This manipulation has the virtue that by Wave 3, respondents in both conditions had been exposed to the exact same stimuli, with only order manipulated. Therefore, any differences in conditions is not due to possible confounds in the vignette content.

¹¹ Therefore, all Democratic respondents rated a Democratic candidate, Republican respondents rated a Republican candidate, and independents rated an independent candidate. While this may limit external validity, it provides an approximate scenario of evaluating a candidate in one's partisan primary, while controlling for the effects of party information.

¹² Because results from the online evaluation condition were comparable to those from respondents who only rated the politician in Wave 3, respondents were asked to evaluate the politician in all three waves in Experiment 2.

¹³ One can more easily conceptualize this design as containing two separate parallel experiments that contain identical information with only order manipulated. The full factorial of positive/negative and personal/policy was not manipulated in order to save power, as limited inference would come from positive/negative policy comparisons and positive/negative personal comparisons.

In Experiment 1, respondents were asked to rate their favorability toward the politician on a 0–100 scale. Half rated the politician in all three waves, while half rated the politician (on the same scale) only in Wave 3.¹⁴ In Experiment 2, this 0–100 evaluation occurred in all three waves for all respondents. In Wave 3 of both experiments, all respondents also completed a multiple-choice memory battery, which is shown in the online supporting information.¹⁵

Empirical Results

Because of the similarities in experimental designs, results from both experiments are presented side-by-side in the following sections, organized by outcome and experimental factors.¹⁶ I first highlight the effects of the experimental factors on summary evaluations of the candidates, then discuss observed effects in memory, and finally exam the relationship between memory and evaluation.

Effects on Evaluations

The simplest way to evaluate the effect of order is to examine differences in the evaluations in Wave 3, based on whether respondents saw positive or negative information first. If there were no difference, we would conclude there are no order effects and that respondents perfectly averaged the information from the first two waves. If we saw that the group that received positive information second had higher evaluations than those that received it first, we would say that this is evidence of recency. If the opposite were true, we would have evidence of primacy. The gap, as shown in Figure 4, is highly statistically significant, with respondents receiving the positive information second rating the candidate 12.2 points higher, which corresponds to over 10% of the length of the evaluation scale, suggesting a strong overall recency effect.

Another illustrative way to look for order effects is to compare the evaluations in each wave to Wave 3. We would have evidence of primacy if the evaluations in Wave 3 were closer to those at the beginning in Wave 1. We would have evidence of recency if the evaluations in Wave 3 were closest to those in Wave 2, and we would have evidence of neither if the evaluation in Wave 3 was merely an average of the evaluations in the first two waves.

Beyond the robust finding of recency, there is also evidence for an asymmetry in the recency effect by positivity. Specifically, more recent negative information anchors evaluations more than recent positive information. This effect can be seen in the right panel of Figure 4 by comparing the slopes of the lines between Wave 2 and Wave 3 to see the extent to which the information's effect on evaluations fades. Specifically, the evaluation in Wave 3 is more similar to the

¹⁴ This was done as a precaution in case the evaluation in each wave altered how respondents approached the evaluative task. This design choice mirrors Mitchell (2012) in its design. Because no differences were obtained between conditions, as described below, this manipulation was dropped in Experiment 2.

¹⁵ In both experiments, respondents also completed a short battery of trait evaluations, scaled 1–7. Included traits were strong leader, moral, compassionate, honest, hard-working, experienced, moderate, and trustworthy. Because the seven trait evaluations in Wave 3 scale quite strongly together (Cronbach's α in Experiment 1 = 0.923, Experiment 2 = 0.920) and are highly correlated with the overall evaluation, they are omitted from this article. One can obtain substantially similar results as those from the overall evaluation by scaling the trait ratings together. Respondents also were asked to place the politician on a 1–7 liberal-conservative scale, although little variation in this variable occurs due to the strength of the party cue. These alternative measures of evaluation are omitted for brevity, although several of the main analyses from both experiments are replicated with the scaled traits in the online supporting information.

¹⁶ All plots specifically note the experiment from which the data were drawn, and data are never pooled in the same plot. All data presented is pooled across party of the respondent, as the presented candidate was always copartisan. As shown in the online supporting information, the policy and personal information was crafted to be ambiguous as to the party of the politician, with valence issues and relatively nonpartisan political backgrounds.

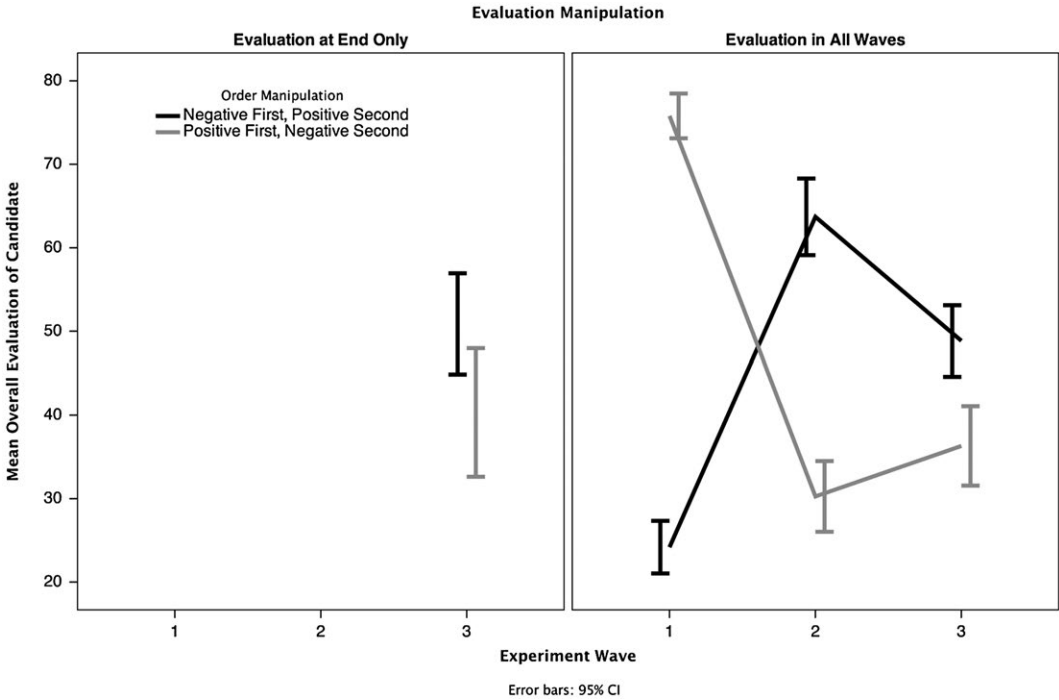


Figure 4. Experiment 1: Evaluation of candidate by wave, evaluation manipulation, and order.

evaluation in Wave 2 when the information in Wave 2 was negative. A comparison of the absolute value of these slopes (−14.66 and 9.33) reveals they are statistically different, $t = 2.9$, $p = 0.004$, indicating that the effect of positive information in Wave 2 fades more quickly than the negative information.¹⁷ If we examine the slopes from Wave 1 to Wave 2, we see that having negative information first leads to less improvement when exposed to positive information than the reverse effect when exposed to positive information first. Thus, together, we see that negative information is “stickier” in impacting evaluations and appears to fade less quickly in its impact than positive information.

We can also assess these effects using several simple regression models. Table 2 displays the results from three OLS regressions of Wave 3 evaluations on both the experimental factors, as well as the Wave 1 and 2 evaluations. Model 1, showing the Wave 3 evaluation regressed on the two experimental factors, reproduces the main recency effect noted above, indicating that those that received negative information in the second wave gave the candidate an evaluation 11.9 points lower than those that received positive information in the second wave. This model also controls for the effect of being asked to evaluate the candidate in all three waves, demonstrating this has no overall positive or negative effect on the candidate evaluation. Because asking for evaluations in each wave did not substantially affect the evaluation outcomes of interest, this manipulation was dropped in the design of the second experiment.

¹⁷ Note that the baseline evaluations in Wave 1 for both positive and negative information help rule out the alternative explanation that negative information is simply more impactful. On the 0–100 scale, those who received negative information in Wave 1 evaluated the candidate at 24.18, while those that received positive information evaluated the candidate at 75.80, essentially identical in terms of their absolute distance from the midpoint of the scale. However, it is possible the midpoint of the scale would not be the prior of respondents absent information, as respondents rated copartisan candidates. Nevertheless, it should suggest that the treatments are roughly of equal strength.

Table 2. Experiment 1: Predicting Wave 3 Evaluations

	Model 1	Model 2	Model 3
Wave 2 Eval	–	0.724*** (0.040)	0.734*** (0.044)
Wave 1 Eval	–	0.179*** (0.034)	0.151* (0.062)
+ First / – Second	–11.867*** (2.683)	–	2.288 (4.304)
Eval in All Waves	–2.882 (2.797)	–	–
Constant	51.394 (2.472)	0.756 (3.161)	0.504 (3.203)
Adj. R^2	0.070	0.668	0.667
N	265	170	170

Note. Standard errors in parentheses. The N varies between models because some of the sample was randomly assigned to not complete evaluations of the candidate in the first two waves. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

The second model in Table 2 demonstrates the recency finding another way. By regressing the Wave 3 evaluation on the evaluations from the first two waves, we find that the second wave evaluation is far more predictive—just over four times as large—as the predictive power of the Wave 1 evaluation.¹⁸ Finally, the third model displays the Wave 3 evaluation regressed on the experimental-order factor and the Wave 1 and Wave 2 evaluations.¹⁹ This model shows quite clearly that the entirety of the variance introduced by the experimental treatment is captured by the Wave 1 and Wave 2 evaluations of the candidate.

The results from the second experiment corroborate the main findings from the first, as well as provide evidence for an additional asymmetry by the type (policy or personal) of information. The mean evaluations over all three waves by experimental treatments can be seen in Figure 5. First, we find that those that received negative information in Wave 2 evaluated the candidate in Wave 3 an average of 7.96 points lower than those that received positive information in the second wave, $t = -4.6$, $p < 0.001$. If we look for evidence of an asymmetry in the recency effect by positivity, we find that the absolute values of the change in evaluation from Wave 2 to Wave 3 are marginally statistically significant. This effect, while of similar but smaller magnitude in Experiment 2 than in Experiment 1 (slopes of -9.20 and 6.67), is not statistically significant at conventional levels, $t = 1.85$, $p = 0.064$. This difference is likely due to the additional manipulation of the type of information in the design of the second experiment.²⁰

In order to systematically evaluate the main and interactive effects in Experiment 2, a set of three OLS regressions were run, regressing the Wave 3 evaluation on the experimental factors, their

¹⁸ Given that respondents have both sets of information when making the Wave 2 evaluation, it is not all that surprising that it is larger than the Wave 1 evaluation. However, the fact that it is four times as large, controlling for the Wave 1 evaluation, suggests it has an outsized effect. Because it encompasses two sets of information, we might ordinarily expect it to be up to two times as large, but not the four times as large that we observe.

¹⁹ The evaluation in all waves experimental factor cannot be included in this model, as only those that completed evaluations in all waves are included.

²⁰ While the first experiment bundled policy and personal information together, resulting in a strong positive (and negative) battery, the second experiment separated this information, so it is possible that one type of information alone diminishes this asymmetry. The findings in the next several paragraphs demonstrate this is the most probable explanation.

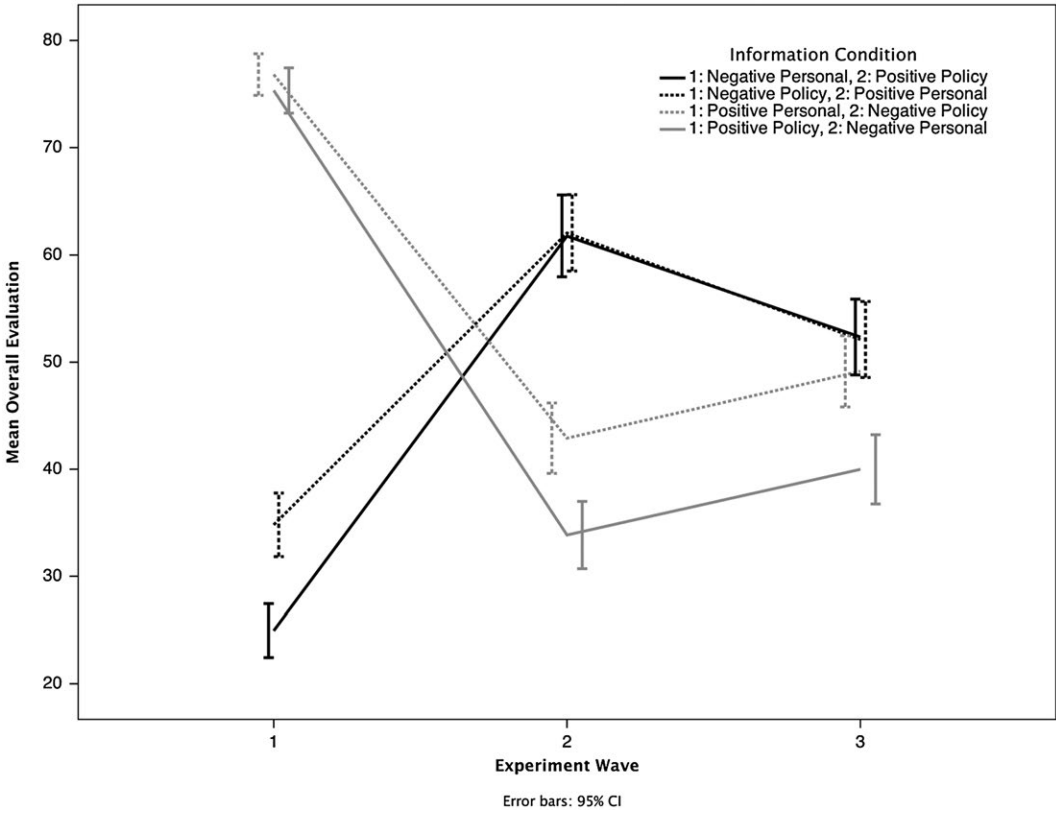


Figure 5. Experiment 2: Evaluation of candidate by wave, information condition, and order.

Table 3. Experiment 2: Predicting Wave 3 Evaluations

	Model 1	Model 2	Model 3
Wave 2 Eval	—	0.652*** (0.026)	0.627*** (0.030)
Wave 1 Eval	—	0.169*** (0.022)	0.213*** (0.039)
+ First / – Second	–12.356*** (2.367)	—	–5.750* (2.887)
+ Personal / – Policy	–0.229 (2.461)	—	–2.013 (1.740)
+ First * + Personal Interaction	9.387*** (3.460)	—	5.195* (2.432)
Constant	52.341 (1.683)	7.260 (2.005)	8.831 (2.148)
Adj. <i>R</i> ²	0.061	0.569	0.571
<i>N</i>	502	488	488

Note. Standard errors in parentheses. The *N* varies slightly as a small number of respondents declined to answer the evaluation question in Wave 1 or 2. **p* < 0.05, ***p* < 0.01, ****p* < 0.001.

interactions, and Wave 1 and 2 evaluations. These results are shown in Table 3. The first model in this table shows the effects of the experimentally assigned conditions, as well as their interaction.²¹ Notably, this model demonstrates a main effect of recency but no main effect of the personal/policy information manipulation (that is, which combination of positivity/negativity and personal/policy information respondents received), but a significant interaction effect of the two. The interaction of having positive personal information displayed first and negative policy information displayed second largely erases the overall effect of recency, suggesting the positive personal information served as a powerful anchor. Thus, while positive policy information first yields an estimated negative effect of -12.36 , when positive information was presented first, the recency effect was only -3.20 . This interaction can be clearly understood in Figure 5, as the condition with positive personal information first and negative policy information second is not statistically distinguishable from the two conditions with negative information first.²²

As with Experiment 1, we see strong evidence for the recency effect by examining Model 2 in Table 3. This regression of Wave 3 evaluations on evaluations in the first two waves results demonstrates the far stronger predictive power of the evaluation in the second wave. Not only are these coefficients statistically distinguishable from one another ($p < 0.001$), the second wave effect is four times as large as the coefficient for evaluations in Wave 1. Finally, the third model in Table 3 shows the same regression with both wave evaluations and experimental factors in the model. Unlike with Experiment 1, the effects of the experimental factors are still significant, although are attenuated by about half. Notably, the effect of Wave 1 and Wave 2 evaluations remain quite strong, indicating that these evaluations mostly absorbed the variance introduced by the information in the experimental treatments. That is, respondents are updating their evaluations of the candidate in response to the treatment information, and these evaluations capture most of the effects of the experimental treatment.

Effects on Memory

While the effect of time, order, and information on candidate evaluations are of primary interest, we should also examine respondents' memories of the information presented to them across waves to see if it corresponds to the patterns in evaluations.²³ Two experimental factors are of interest here: First, did the evaluation manipulation in Experiment 1 create stronger memories because of the presence of the evaluative task? Second, is there similar variation in memory, as there was in evaluations, by recency, positivity, or the type of information?

Memory checks in Experiment 1 provide some basic tests about whether the online manipulation, in which respondents were asked the dependent variable battery in each wave, versus only in Wave 3, affected their memory for the details contained in the vignettes. The proportion recalling each fact about the candidate, as well as a composite scale of all the items, by online condition, is shown in Table 4. As we might expect, asking respondents to evaluate the candidate in each wave resulted in their remembering more details about the candidate in the third wave, relative to only having respondents evaluate the candidate at the end. Despite this difference in memory resulting

²¹ This experiment has a 2×2 design, in which one factor could either take the form of "+ Personal / - Policy" or "- Personal / + Policy," while the second factor determined whether the positive information would be presented first or second. As such, their interaction as represented in the table assesses whether there is a differential effect when personal information is presented first, while the main effect of each assesses whether there is a particular effect of that informational combination, or the order of positivity itself.

²² At first, it appears this finding could be partially explained by the negative policy information simply being less negative than the negative personal information. However, several pieces of evidence demonstrate this cannot fully explain the asymmetry. First, while negative policy information is less negative than negative personal information in both Wave 1 and Wave 2 of the study, we see that when comparing the (1) negative personal and (2) positive policy condition to the (1) negative policy and (2) positive personal condition, that both are similar in Wave 2 and Wave 3, despite the divergence in Wave 1. Thus, if it were less impactful overall, then its effects must also diminish less quickly to lead to the correspondence in Wave 2 and Wave 3.

²³ All memory questions for both experiments are shown in the online supporting information.

Table 4. Experiment 1: Proportion Remembering Candidate Attributes by Evaluation Condition

	Eval at End Only	Eval in All Waves	Diff <i>p</i> -value
Party	0.74 (0.047)	0.84 (0.028)	0.059
Occupation	0.57 (0.053)	0.71 (0.035)	0.030*
Branch of Military	0.46 (0.053)	0.52 (0.038)	0.343
Type of Company	0.43 (0.053)	0.53 (0.038)	0.119
Previous Elected Office	0.46 (0.053)	0.41 (0.038)	0.405
Full Scale	2.68 (0.115)	3.01 (0.091)	0.048*

Note. Standard errors in parentheses. **p* < 0.05, ***p* < .01, ****p* < 0.001.

Table 5. Experiment 2: Proportion Correctly Remembered by Wave and Content

	In First Wave	In Second Wave	Diff <i>p</i> -value
Positive Personal	0.489 (0.022)	0.474 (0.025)	0.659
Positive Policy	0.321 (0.017)	0.314 (0.019)	0.779
Negative Personal	0.351 (0.024)	0.443 (0.021)	0.004**
Negative Policy	0.303 (0.022)	0.355 (0.021)	0.091

Note. Standard errors in parentheses. **p* < 0.05, ***p* < 0.01, ****p* < 0.001.

from the repeated evaluative task, there was no mean difference in evaluations of the candidate between these conditions. Additionally, these results provide some evidence that respondents were taking the evaluative task seriously, as all memories are better than chance, even if a conservative guessing correction (i.e., assume all respondents are guessing at random) is applied.²⁴

Because the tested facts were presented in both the positive and negative information about the candidate, we cannot measure whether facts obtained in Wave 2 are remembered more or less than those in Wave 1. For this, we must turn to the second experiment. The second experiment also permits us to examine whether personal or policy information is more memorable. Each of the four

²⁴ Comparing across types of information (e.g., party memory to occupation memory) is not particularly advisable, as it conflates memory of those items with the difficulty of the question. Because multiple-choice questions varied in number of responses, varying conservative guessing corrections could be applied. However, because these guessing corrections nearly all assume guessing at random, this correction would still not fully fix the problem, as respondents may use differential base rates for particular items and questions. Therefore, uncorrected for guessing means are displayed here.

conditions (positive/negative and personal/policy) had five or six facts embedded in them which were tested in the third wave, just as in the first experiment.²⁵ For the policy facts, respondents were asked to recall which policy domains the candidate spoke about. Because the exact number of facts was not constant across vignettes, proportions of correctly remembered facts are displayed in Table 5.

First, there is a striking pattern. Information in the positive vignettes is remembered at about the same rate regardless of whether it is presented in the first or second wave of the experiment. However, negative information is remembered better when it comes in the second wave, particularly when it is negative personal information. This finding suggests that despite negative information's more powerful impact, it fades more quickly in memory. There are differences across the rows in Table 5, as well. Averaging across wave of information and personal and policy type, we find that positive information is 3.0% more memorable, $t = 1.97$, $p = 0.049$. Averaging across wave of presentation and valence, personal information is remembered 11.2% more than policy information, $t = 7.88$, $p < 0.001$.

The Interactive Role of Memory and Evaluations

A question arises after seeing these results: Is memory related to evaluation? Table 6 presents results from two regressions of the overall evaluations of the candidate on the number of recalled positive and negative items.²⁶ Interestingly, recalling negative pieces of information from the vignettes strongly predicts more negative evaluations. However, the reverse is not true: Memory of positive pieces of information does not significantly predict positive evaluations. Once again, the asymmetry between positive and negative information emerges in terms of not only its memory itself, but its effect on overall evaluations, even when controlling for prior evaluations in Wave 1 and Wave 2, as shown in Model 2 in Table 6. If we examine the role of personal and policy memories in Model 4, we see that both personal and policy memories exert independent influences on the overall evaluation of the candidate, even controlling for evaluations in prior survey waves. The magnitude of the coefficients for personal and policy memories are not statistically different from one another, suggesting that both types of memories are impactful.²⁷

In adjudicating between memory-based and online evaluations, previous analyses have conducted similar regressions as those in Table 6, noting that once an online tally was taken into account, measurement of respondents' memories yielded little more explanatory power.²⁸ However, these findings suggest that while this may be largely true for positive information, we see that memory of negative information exerts its own independent effect on the overall final evaluation. Given that positive personal information served as a more powerful anchor in Experiment 2, it appears it largely does so by simply anchoring an online evaluation, not embedding particularly memorable information. However, for the impact of negative information, its retention in memory is more crucial for its impact. In line with the "Pollyanna principle," respondents are generally more positive toward candidates even if they can't remember positive information, yet memory of negative information is crucial for it to impact evaluations.

²⁵ The second experiment had a longer multiple-choice memory battery than the first experiment. All questions are shown in the online supporting information.

²⁶ Note that one cannot split this apart by personal and policy as well, as respondents only saw one type of each information. However, all respondents saw one positive and negative information block, allowing this analysis.

²⁷ Note that these coefficients are negative, given that the personal and policy information remembered is particularly the negative information about the candidate in that domain. Unfortunately, because this experiment was not fully factorial in its presentation in multiple waves, we cannot assess the role of all four combinations. That is, the same memory items used to generate the positive and negative memory scales in Models 1 and 2 are simply recombined into personal and policy memory scales in Models 3 and 4.

²⁸ Note that some in the information-processing literature would use an online tally of the information's valence towards respondents in the equation, rather than prior evaluations. By using prior evaluations, this is a harder test, as it more closely resembles the actual online tally in participants' cognition.

Table 6. Experiment 2: Regressions of Wave 3 Evaluation on Proportion of Positive/Negative and Personal/Policy Items Recalled

	Model 1	Model 2	Model 3	Model 4
Positive Memory	4.14 (3.67)	0.38 (2.43)	–	–
Negative Memory	–19.72*** (3.60)	–7.25** (2.44)	–	–
Personal Memory	–	–	–6.22+ (3.53)	–8.46** (3.06)
Policy Memory	–	–	–10.45* (4.21)	–5.92+ (3.16)
Wave 2 Eval	–	0.65*** (0.03)	–	0.65*** (0.03)
Wave 1 Eval	–	0.18*** (0.02)	–	0.18*** (0.02)
Constant	53.73 (2.08)	9.33 (2.38)	54.26 (2.11)	9.23 (2.38)
Adj. R^2	0.055	0.602	0.018	0.602
N	486	476	486	476

Note. OLS regressions, standard errors in parentheses. Because the personal and policy content was not fully crossed in the design with positive and negative information, analyzing both together is not possible. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Discussion

While a number of other studies have sought to demonstrate the transience of information effects with observational, and, more rarely, experimental data, this study provides an important clarification: Not all information is the same in voters’ cognition over time. With respect to evaluations, recent negative information is more impactful than recent positive information, and earlier personal information retains its impact longer than earlier policy information. In memory, positive information is more memorable than negative, and personal information is more memorable than policy. In their interactive role, memories, particularly negative memories, exert their own independent influence on final evaluations, while voters need not remember specific positive information for it to still have an impact on overall evaluations.

While experiments provide excellent platforms to draw inferences in a controlled environment, they are nevertheless susceptible to a number of arguments regarding their validity in the real world. Two particular and possibly important differences exist between the carefully controlled experiment presented in this article and how voters learn about candidates in the real world. First, concerns regarding the attentiveness of the sample to the information are warranted. However, respondents spent, on average, just over 60 seconds reading the information in Waves 1 and 2. While not an extraordinarily lengthy amount of time, this closely approximates the amount of time, as well as the type of content, to which one might be exposed in a political advertisement.

Second, the timeframe of these experiments is compressed to several days, not the full length of a campaign. While a concern, this would largely only make forgetting worse, and there is no reason to believe that this extension of time would differentially contribute to forgetting certain types of information (e.g., positive, personal, positive, negative) more than others. While these studies took place over several days, not months, they provide evidence of asymmetries that would only

compound themselves over longer time periods. Furthermore, given the bombardment of advertising in the final days of campaigns, these transient effects often mirror those over short windows of campaigns.

Despite concerns about external validity, this study provides rather strong evidence of the asymmetric differences in positive and negative information in terms of its ability to be held in memory, as well as its impact on overall evaluations of political candidates. Specifically, while both positive information and negative information are more impactful when presented closer to the time when a voter evaluates the candidate, the negative information is more impactful than positive information, fading less quickly in memory and having a greater impact on evaluations. Further, both experiments provide tight control. While many vignette-based studies are susceptible to criticism that there is a confounding factor in the vignette content, nearly all of the comparisons here are not subject to this criticism. Because respondents in nearly all conditions saw the same material, with only order changed, there is nothing about the information itself that could lead to the observed effects.

The evidence from these experiments suggests that bombardments of positive and negative information, with personal or policy content, at different times in the campaign can have varying effects on voters. Particularly, campaigns appear to behave strategically by airing the vast majority of ads immediately before elections, as there are powerful recency effects, particularly for damaging negative information. However, the results in this study suggest that another trend—the use of positive, promotional personal information early—might also be strategic in order to anchor evaluations of one's candidate. While many argue that policy information should be held as more important in voters' decisions, some personal information can be more memorable and more impactful in voters' evaluations, particularly when presented early in a campaign. Even if information effects are relatively fleeting, it is clear that there is important variation in how fleeting they are, which can advantage certain campaign messaging strategies.

ACKNOWLEDGMENTS

Thanks to Doug Ahler, John Henderson, Travis Johnston, Gabe Lenz, Kevin Quinn, Laura Stoker, Alex Theodoridis, Kim Twist, and Rob Van Houweling for their helpful feedback. I acknowledge the National Science Foundation Graduate Research Fellowship, the Mike Synar Graduate Research Fellowship, and the Institute of Governmental Studies at University of California, Berkeley for support of this line of research. Correspondence concerning this article should be addressed to Stephen N. Goggin Department of Political Science, San Diego State University, 5500 Campanile Drive, San Diego, CA 92108. Email: stephen.goggin@sdsu.edu

REFERENCES

- Ansolahehere, S. D., Iyengar, S., & Simon, A. (1999). Replicating experiments using aggregate and survey data: The case of negative advertising and turnout. *American Political Science Review*, 93(4), 901–909.
- Arbour, B. K. (2007). *Resume politics: How campaigns use background appeals to win votes and elections* (Unpublished doctoral dissertation). University of Texas.
- Arbour, B. K. (2014). *Candidate-centered campaigns: Political messages, winning personalities, and personal appeals*. New York, NY: Palgrave Macmillan.
- Berinsky, A. J., Huber, G. A., & Lenz, G. S. (2012). Evaluating online labor markets for experimental research: Amazon.com's Mechanical Turk. *Political Analysis*, 20(3), 351–368.
- Brooks, D. J. (2006). The resilient voter: Moving toward closure in the debate over negative campaigning and turnout. *Journal of Politics*, 68(3), 684–696.
- Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk a new source of inexpensive, yet high-quality, data? *Perspectives on Psychological Science*, 6(1), 3–5.
- Chong, D., & Druckman, J. N. (2013). Counterframing effects. *Journal of Politics*, 75(1), 1–16.

- Cobb, M. D., & Kuklinski, J. H. (1997). Changing minds: Political arguments and political persuasion. *American Journal of Political Science*, 41(1), 88–121.
- Crano, W. D. (1977). Primacy versus recency in retention of information and opinion change. *Journal of Social Psychology*, 101(1), 87–96.
- Druckman, J. N., Hennessy, C. L., St Charles, K., & Webber, J. (2010). Competing rhetoric over time: Frames versus cues. *Journal of Politics*, 72(1), 136–148.
- Druckman, J. N., Jacobs, L. R., & Ostermeier, E. (2004). Candidate strategies to prime issues and image. *Journal of Politics*, 66(4), 1180–1202.
- Erikson, R. S., & Tedin, K. L. (2011). *American public opinion*. London, United Kingdom: Pearson College.
- Fenno, R. F. (1978). *Home style: House members in their districts*. Boston, MA: Little, Brown.
- Forgas, J. P. (2011). Can negative affect eliminate the power of first impressions? Affective influences on primacy and recency effects in impression formation. *Journal of Experimental Social Psychology*, 47(2), 425–429.
- Fredrickson, B. L., & Kahneman, D. (1993). Duration neglect in retrospective evaluations of affective episodes. *Journal of personality and social psychology*, 65(1), 45–55.
- Fridkin, K. L., & Kenney, P. (2011). Variability in citizens reactions to different types of negative campaigns. *American Journal of Political Science*, 55(2), 307–325.
- Goggin, S. N. (2016). *Personal politicians: Biography and its role in the minds of voters* (Unpublished doctoral dissertation). Berkeley: University of California.
- Goggin, S. N., & Theodoridis, A. G. (2017). Disputed ownership: Parties, issues, and traits in the minds of voters. *Political Behavior*, 39(3), 675–702.
- Goldstein, K., Niebler, S., Neihsel, J., & Holleque, M. (2011). *Presidential, Congressional, and Gubernatorial advertising, 2008, combined file [dataset]*. Madison: The University of Wisconsin Advertising Project, the Department of Political Science at the University of Wisconsin-Madison.
- Halperin, M., & Heilemann, J. (2013). *Double down: Game change 2012*. London, United Kingdom: Penguin.
- Hastie, R., & Park, B. (1986). The relationship between memory and judgment depends on whether the judgment task is memory-based or on-line. *Psychological Review*, 93(3), 258.
- Healy, A., & Lenz, G. S. (2014). Substituting the end for the whole: Why voters respond primarily to the election-year economy. *American Journal of Political Science*, 58(1), 31–47.
- Hill, S. J., Lo, J., Vavreck, L., & Zaller, J. (2013). How quickly we forget: The duration of persuasion effects from mass communication. *Political Communication*, 30(4), 521–547.
- Hogarth, R. M., & Einhorn, H. J. (1992). Order effects in belief updating: The belief-adjustment model. *Cognitive Psychology*, 24(1), 1–55.
- Jacobson, G. C. (2015). How do campaigns matter? *Annual Review of Political Science*, 18, 31–47.
- Jacowitz, K. E., & Kahneman, D. (1995). Measures of anchoring in estimation tasks. *Personality and Social Psychology Bulletin*, 21(11), 1161–1166.
- Jersild, A. (1929). Primacy, recency, frequency, and vividness. *Journal of Experimental Psychology*, 12(1), 58–70.
- Kim, Y. M., & Garrett, K. (2012). On-line and memory-based: Revisiting the relationship between candidate evaluation processing models. *Political Behavior*, 34(2), 345–368.
- Lau, R. R., & Pomper, G. M. (2001). Effects of negative campaigning on turnout in US Senate elections, 1988–1998. *Journal of Politics*, 63(3), 804–819.
- Lau, R. R., & Pomper, G. M. (2004). *Negative campaigning: An analysis of US Senate elections*. Lanham, MD: Rowman & Littlefield.
- Lau, R. R., & Redlawsk, D. P. (2006). *How voters decide: Information processing in election campaigns*. Cambridge, United Kingdom: Cambridge University Press.
- Lau, R. R., & Rovner, I. B. (2009). Negative campaigning. *Annual Review of Political Science*, 12, 285–306.
- Lodge, M., McGraw, K., & Stroh, P. (1989). An impression-driven model of candidate evaluation. *American Political Science Review*, 83(2), 399–419.
- Lodge, M., Steenbergen, M. R., & Brau, S. (1995). The responsive voter: Campaign information and the dynamics of candidate evaluation. *American Political Science Review*, 89(2), 309–326.
- Lodge, M., Stroh, P., & Wahlke, J. (1990). Black-box models of candidate evaluation. *Political Behavior*, 12(1), 5–18.
- Mark, D. (2009). *Going dirty: The art of negative campaigning*. Lanham, MD: Rowman & Littlefield.
- Matlin, M. W., & Stang, D. J. (1978). *The Pollyanna principle: Selectivity in language, memory, and thought*. Cambridge, MA: Schenkman.
- Mayo, C. W., & Crockett, W. H. (1964). Cognitive complexity and primacy-recency effects in impression formation. *Journal of Abnormal and Social Psychology*, 68(3), 335–338.
- McGraw, K. M., Lodge, M., & Stroh, P. (1990). On-line processing in candidate evaluation: The effects of issue order, issue importance, and sophistication. *Political Behavior*, 12(1), 41–58.
- Mitchell, D. G. (2008). *It's about time: The dynamics of information processing in political campaigns* (Unpublished doctoral dissertation). University of Illinois at Urbana-Champaign.
- Mitchell, D. G. (2012). It's about time: The lifespan of information effects in a multiweek campaign. *American Journal of Political Science*, 56(2), 298–311.
- Mitchell, D. G. (2013). In search of enduring information effects: Evidence from a ten-week panel experiment. *Electoral Studies*, 32(1), 101–112.
- Mitchell, D. G. (2014). Here today, gone tomorrow? Assessing how timing and repetition of scandal information affects candidate evaluations. *Political Psychology*, 35(5), 679–701.

- Popkin, S. L. (1994). *The reasoning voter: Communication and persuasion in presidential campaigns*. Chicago, IL: University of Chicago Press.
- Redlawsk, D. P. (2001). You must remember this: A test of the on-line model of voting. *Journal of Politics*, 63(1), 29–58.
- Sides, J., & Vavreck, L. (2013). *The gamble: Choice and chance in the 2012 presidential election*. Princeton, NJ: Princeton University Press.
- Taylor, S. E. (1991). Asymmetrical effects of positive and negative events: the mobilization-minimization hypothesis. *Psychological Bulletin*, 110(1), 67–85.
- Tetlock, P. E. (1983). Accountability and the perseverance of first impressions. *Social Psychology Quarterly*, 46(4), 285–292.
- Zaller, J. (1992). *The nature and origins of mass opinion*. Cambridge, MA: Cambridge University Press.
- Zauberman, G., Diehl, K., & Ariely, D. (2006). Hedonic versus informational evaluations: Task dependent preferences for sequences of outcomes. *Journal of Behavioral Decision Making*, 19(3), 191–211.

SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article at the publisher's website:

Discussion of Mechanical Turk Concerns

Candidate Information in Experiment 1

Candidate Information in Experiment 2

Candidate Photographs

Memory Battery in Experiment 1

Memory Battery in Experiment 2

Alternative Analyses with Traits

Table 1. Experiment 1: Predicting Wave 3 Average Trait Ratings

Table 2. Experiment 2: Predicting Wave 3 Average Trait Ratings