

# Priming under Fire: Reverse Causality and the Classic Media Priming Hypothesis

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*This study reevaluates the classic “media priming” hypothesis, which argues that, when news coverage raises an issue’s salience, voters align their overall evaluation of the president with their assessment of him on that issue. Conventional studies typically show greater correspondence between issue approval and overall approval among individuals exposed to issue-related news. Although this is taken as evidence of media priming, this phenomenon is also consistent with another explanation. Precisely the opposite, the “projection” hypothesis argues that voters exposed to issue news align their approval of the president on that issue with their prior approval of his overall performance. Existing studies cannot rule out this alternative, so we conduct a survey experiment to evaluate the priming and projection hypotheses jointly. Despite recent evidence in support of projection, we show that the causal arrow runs from issue approval to overall approval (media priming), not the reverse (projection).*

The media priming hypothesis (Iyengar and Kinder 1987; Iyengar et al. 1984) fundamentally reshaped scholars’ understanding of the political power wielded by the media.<sup>1</sup> After decades of research turned up little evidence that mass communication could alter vote choices directly, many researchers concluded that the mass media affect political behavior only at the margins, if at all (e.g., Patterson and McClure 1976).<sup>2</sup> Priming theory challenged this skeptical assessment, contending that the media exert widespread and substantial, though indirect, effects on both presidential approval and vote preferences. Specifically, the theory holds that the news media, by determining the content of the stories to which we are exposed, alter the criteria we use to evaluate elected officials. Individuals who read about the latest jobs report, for instance, tend to judge the president based on his handling, as they see it, of unemployment.

Early experimental evidence in support of this priming effect (i.e., Iyengar et al. 1984; Iyengar and Kinder 1987) revitalized the study of the media’s role in politics. These studies showed that the correspondence between voters’ approval of the president’s handling of an issue and their overall approval of his performance in office was stronger among subjects randomly exposed to news stories on the issue.<sup>3</sup> The wave of observational studies that followed came to a similar conclusion about the effect of changing news coverage on the relationship between issue approval and overall approval (e.g., Krosnick and Kinder 1990).

Despite the apparent preponderance of evidence in support of priming, the media priming hypothesis is under fire. The controversy centers on the fact that these studies cannot rule out a plausible, alternative account of the findings. Past studies show only that exposure to news on education, for example, increases

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<sup>2</sup>Early studies conceived of similar effects (notably Cohen 1963; Lippmann 1920, 1922). Although there was some early evidence of an “agenda-setting” effect (e.g., Erbring et al. 1980; McCombs and Shaw 1972), this did not constitute evidence of media priming or a theory of priming.

<sup>3</sup>For a review of the priming literature and how it differs from agenda setting and framing, see Kinder (2003) and Scheufele and Tewksbury (2007). Alternatively, Chong and Druckman (2007) argue that priming and framing do not differ psychologically as both are triggered by changes in salience.

the *correlation* between a voter's approval of the president's handling of education (issue approval) and her approval of his overall performance (overall approval). The broader literature assumes that the increased correlation occurs because the voter shifts her overall approval to reflect her prior issue approval. However, the observed correlation is also consistent with the projection hypothesis, precisely the opposite causal interpretation. The projection hypothesis holds that news causes voters to shift their issue approval to reflect their prior overall approval.<sup>4</sup>

Unfortunately, in the confines of existing research designs, projection manifests in precisely the same way as media priming; the two behaviors are observationally equivalent. The equivalence arises because researchers measure both issue approval and overall approval contemporaneously: only *after* the experimental subject is exposed to the news and, in observational studies, after a change in news coverage.<sup>5</sup> It is unclear, therefore, which measure is aligning with which. With few exceptions (Ladd 2007; Lenz 2012) media priming studies to date provide no basis for adjudicating between these competing explanations.

What is more, there is evidence to suggest that projection is the root cause of the effect commonly identified as media priming. Most notably, Lenz's (2009) recent analysis of panel data suggests that, in seven cases where an issue became salient between panel waves, news coverage induced subjects to shift their issue preferences, not their overall candidate evaluations—suggesting an effect akin to projection, not priming. Two survey experiments (Lenz 2012) that *did* address the problem of reverse causality failed to find evidence of priming.<sup>6</sup> These results challenge the entire media-priming corpus. So, after

<sup>4</sup>We adopt Iyengar and Kinder's (1987) definition of projection, though some studies (e.g., Conover and Feldman 1982) define it as the process by which voters assign their own issue positions to a candidate.

<sup>5</sup>A few studies measure issue approval prior to the treatment (e.g., Banks and Valentino 2012; Mendelberg 2001; Nelson and Kinder 1996; Sears and Funk 1999). While they find evidence of priming (alternatively, Huber and Lapinski 2006), the outcome variable is another issue attitude, not overall approval. Research in psychology also demonstrates that activation of a mental schema "primes" that schema so that it is called to mind more readily in subsequent judgment tasks (see Fazio 2001). Whether the increase in the correlation between issue and overall approval after exposure to issue specific news is an example of this psychological process, or is the result of projection, remains unclear.

<sup>6</sup>Brewer, Graf, and Willnat (2003) and Berger, Meredith, and Wheeler (2008) conduct similar experiments, and, although they do not test for projection, they fail to find evidence of priming.

almost three decades of inquiry, serious doubts about the veracity of the media priming hypothesis persist.

To advance the extant understanding of the indirect effects of news coverage in light of these ambiguous results, we replicate a classic media-priming experiment. However, we use pretreatment measures of issue and overall approval as baselines for determining whether news induces subjects to align overall approval with pretreatment issue approval, or issue approval with pretreatment overall approval. Thus, our study tests whether the effect commonly identified as "media priming" is actually due to priming, projection, or a combination of the two. Our experimental design provides a highly diagnostic test of the causal effect of news stories without relying on self-reported measures of media exposure.

Distinguishing priming and projection is an important enterprise. The priming hypothesis implies that the media have the capacity, via issue coverage, to shift the terms of presidential support. If projection holds, however, voters are unresponsive to changing news coverage. They simply interpret new information so as to remain consistent with prior beliefs. Priming, therefore, ascribes to the media a significant role in politics while projection does not. The implications of this difference for the study of political communication are substantial.

In the next section, we describe the priming and projection hypotheses and the reasons why existing studies of media priming cannot rule out projection as a plausible alternative explanation for their findings. We then describe our experimental design and the ways in which it corrects the limitations of prior studies. The next sections replicate the conventional (confounded) media-priming finding and then present unconfounded tests for both priming and projection. We show that, for the issues we tested, exposure to news induced a priming effect. We find no evidence of projection. Although this study does not rule out the possibility that projection effects exist in some contexts or for some issues, our findings are notably the first unconfounded experimental evidence of media priming. The final section discusses the implications of our findings and suggests avenues for future research.

## Priming and the Problem of Reverse Causality

Priming refers to shifts in the criteria individuals use to make political judgments. A media-priming effect occurs when, in response to an issue's increasing

salience in the news, an individual reevaluates a politician's tenure in office based on considerations of the now salient issue. The voter shifts her overall approval to reflect her prior issue approval. If news coverage highlights unemployment, for instance, priming holds that citizens who disapprove of the president's economic stewardship will downgrade their overall approval to reflect their negative economic opinion. Alternatively, citizens who approve of the president's handling of the economy will adopt more positive overall assessments when exposed to news on employment.

In the conventional lab-based experiment, the researcher tests the media priming hypothesis by regressing overall approval on issue approval for subjects assigned to the treatment group—who were exposed to news about a given issue—and subjects assigned to the control group—who were not. If the issue weight (i.e., the estimated coefficient for issue approval) is greater among subjects in the treatment group than among those in the control group, the researcher concludes that the treatment induced priming. Similarly, in the typical observational study, the researcher compares the weight of an issue among survey respondents sampled after that issue became prominent in the news with the weight among respondents sampled just before the change in media coverage. If the weight is greater among “posttreatment” respondents, the researcher assumes that issue news primed issue approval. Studies relying on these methods identify effects of issue news coverage for a wide range of issues—including foreign policy (e.g., Krosnick and Brannon 1993), the economy (e.g., Mutz 1998), and racial attitudes (e.g., Valentino, Hutchings, and White 2002). These effects are apparent in the short and long term (Althaus and Kim 2006) and among citizens around the globe (e.g., Anderson 2003).<sup>7</sup>

Unfortunately, these methods cannot isolate the priming effect because they cannot eliminate potential bias due to reverse causation. As Lenz (2009) details, observational studies to date are constrained in this way because they measure overall approval and issue approval (the key dependent and independent variables) contemporaneously.<sup>8</sup> Therefore, an observed increase in the correspondence between these contemporaneous measures could be evidence of a change in overall

approval to reflect issue approval (priming), a change in issue approval to reflect overall approval (projection), or both. The direction of causality is a matter of mere speculation.

Conventional experimental designs, attractive to many researchers precisely because they promise to isolate causal effects, are similarly vulnerable. In existing experimental studies of media priming, both overall approval and issue approval are measured posttreatment.<sup>9</sup> Individual responses to either question, or both, might be affected by exposure to the news story. Therefore, without suitable pretreatment measures of overall *and* issue approval, priming and projection effects manifest in exactly the same way: the researcher observes that the correlation between issue approval and overall approval is larger among treatment subjects than among control subjects. Advocates of the media priming hypothesis can only assume that the treatment affected responses to overall approval but not issue approval. This problem of observational equivalence is depicted in Figure 1.

## The Case for Projection

The projection hypothesis posits that the voter's overall approval of the president affects her impression of the president's performance on salient issues. When news coverage raises the salience of an issue, the voter responds by shifting her approval on that issue to reflect her prior overall approval. If economic news coverage spikes, projection holds that voters with a positive overall evaluation of the president will bump up their opinion of his economic management to reflect their prior positive overall approval. Similarly, voters with negative overall evaluations will respond to the news by adopting a more negative view of his handling of the economy.<sup>10</sup>

The tendency among voters to adopt opinions held by their preferred party, or to develop a positive

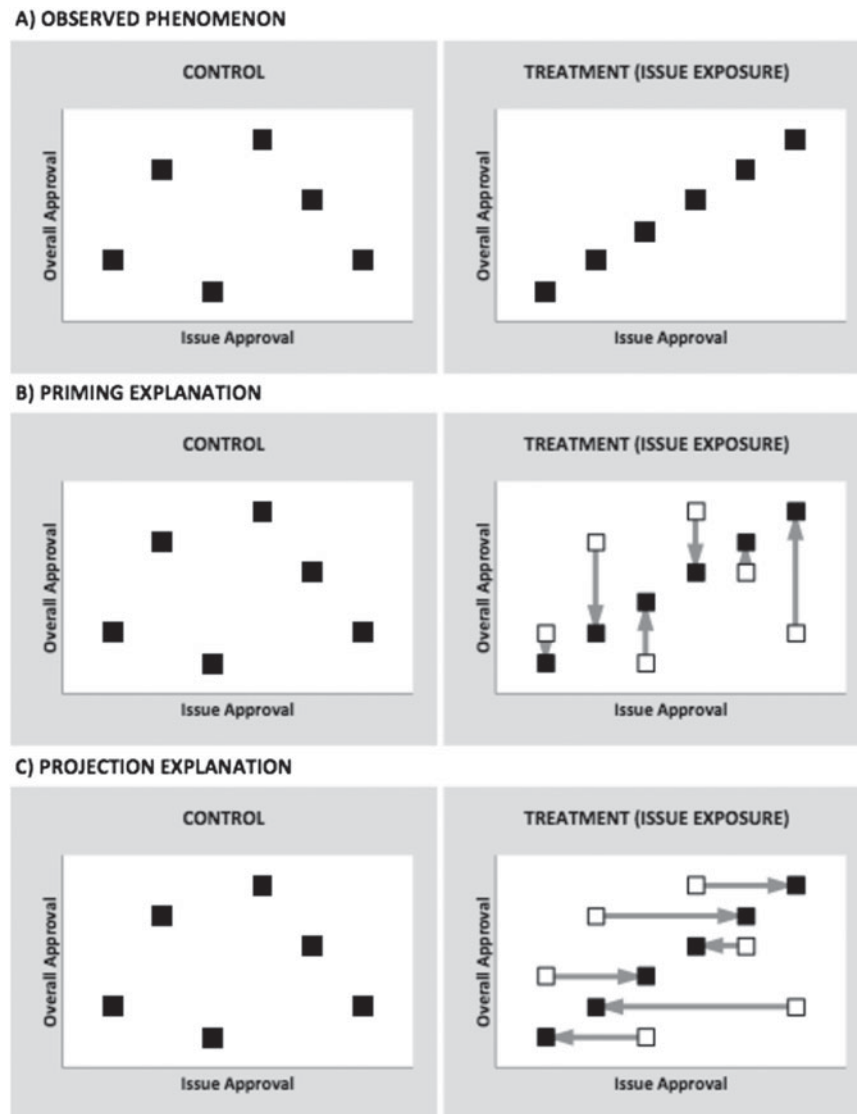
<sup>9</sup>Note that Iyengar and Kinder's Experiment 8 measured issue and overall evaluations before and after treatment, but the results provided used posttreatment measures. Their appendix says data was also analyzed using pretreatment measures, but model specifications are not provided, and only one of three confirmatory estimates are provided in the text (1987, 147).

<sup>10</sup>Although our aim is not to evaluate the psychological causes of projection, one possible mechanism is motivated reasoning (Kunda 1990). Because partisans are motivated to believe that officials of their party are successful, the increased salience of an issue may cause the voter to focus on positive recollections about a candidate's issue performance and adjust her issue to reflect her prior overall evaluation.

<sup>7</sup>These methods have also been used to evaluate potential moderators of the media-priming effect (e.g., Iyengar and Kinder 1987; Togeby 2007).

<sup>8</sup>Ladd (2007), Lenz (2012), and Hart (2013) use panel data as a corrective.

FIGURE 1 Projection and Priming



Note: Panel A illustrates results from a hypothetical priming experiment; subjects exposed to issue news show greater association between issue and overall approval. Priming (Panel B) argues that voters aligned their overall approval with their issue approval; voters move vertically. Projection (Panel C) argues that voters align their issue approval with their overall approval; voters move horizontally. Without observing pretreatment coordinates, the two effects are observationally equivalent.

view of their party's performance in office, is well established (e.g., Campbell et al. 1960; Carsey and Layman 2006; Sears and Lau 1983). This is especially true with respect to evaluations of national economic performance (e.g., Bartels 2002; Wlezien, Franklin, and Twigg 1997). Gerber and Huber (2009, 2010), for instance, find that voters quickly change both their evaluations of economic performance and their real-world economic behavior in response to news about whether or not their favored party will maintain power. Projection, therefore, is a plausible alternative

explanation for the effect the literature identifies as media priming.

Similarly, Lenz (2009, 2012) demonstrates that seven cases of apparent priming were actually the result of projection-like effects.<sup>11</sup> He shows that when a real-world increase in the salience of an issue informs voters of the parties' respective positions

<sup>11</sup>Note that Lenz does find observational evidence that the economy was primed in three cases (see chap. 2); however, his experimental test fails to support this claim (2012, 273–74).

on an issue, voters discard their prior opinion on that issue in favor of the one espoused by their party. These findings are notable because, unlike past studies, Lenz addresses the problem of reverse causality through the analysis of panel data. Because panel data records responses to the key dependent and independent variables at multiple waves, it allows the researcher to observe whether issue evaluations or overall approval move over time in response to changing media coverage.

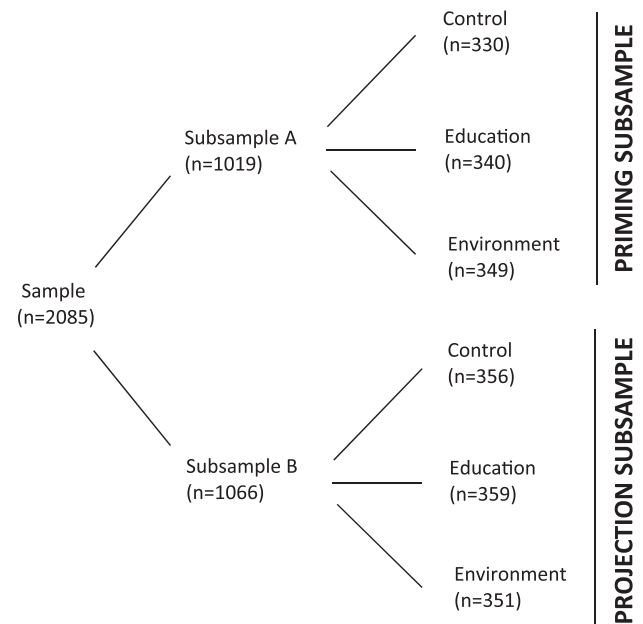
Lenz’s studies raise serious challenges to the media priming hypothesis and suggest, at the very least, that projection may be more prevalent than previously understood. Yet additional analyses are needed to evaluate priming and projection as competing theories of media influence. Observational studies are limited in that they cannot raise the salience of news issues in isolation; instead, many other factors may change when the salience of an issue increases in the real world (e.g., when party elites take positions on the issues and begin to make persuasive arguments that put the issues into partisan context). It may be the corollary events, not increased salience per se, that lead to projection-like effects. The experimental setting, on the other hand, provides an opportunity to control issue salience in isolation of other factors.

### Experimental Design

In order to provide an unconfounded test of the media priming and projection hypotheses, we conduct an online survey experiment that, as we explain below, corrects for the limitations of prior experiments. Our study was funded through Time-Sharing Experiments in the Social Sciences (TESS) and fielded by Knowledge Networks. The 2,085 Knowledge Networks panel members included in our sample have demographic characteristics representative of the adult population of the United States.<sup>12</sup> Figure 2 depicts our study design.

The key challenge in discriminating a media-priming effect from a projection effect is identifying whether, when the salience of an issue is raised, voters shift their overall approval to reflect their preexisting issue approval, or the reverse. Such a judgment requires pretreatment measures of both issue approval and overall approval. This necessitates two separate waves

FIGURE 2 Research Design



Note: Tests of priming are limited to Subsample A because, after treatment, subjects in this subsample answered the overall evaluation question (the left-hand-side variable in the test of priming) before the issue evaluation questions. Tests of projection are limited to Subsample B because, after treatment, subjects in this subsample answered issue evaluation questions (the left-hand-side variables in the test of projection) before the overall evaluation. Partitioning the sample in this fashion allows us to eliminate posttreatment question order as a confound.

of data collection: one to record baseline measures of overall and issue approval, and a second, conducted at a later date, to administer the treatment and again record overall and issue approval.<sup>13</sup> Fortunately, in order to join the Knowledge Networks panel, participants must complete a questionnaire that, among other things, asks them to rate the president’s overall performance (i.e., “Do you approve or disapprove of the way Barack Obama is handling his job as President?”) as well as his performance on a number of issues (i.e., “Do you approve of the way Barack Obama is handling each of these issues?”). Thus, suitable pretreatment measures of issue and overall approval are already *on file* for many of the panelists, and our sample was limited to those for whom such measures were available.

We randomly assigned subjects to one of two treatment arms or the control arm. We choose two

<sup>12</sup>Knowledge Networks uses probability sampling to achieve representative samples. While sampling bolsters external validity, the basis for internal validity in this study is randomized treatment.

<sup>13</sup>This could be done in a single wave wherein the researcher measures overall and issue approval, then delivers the treatment, and then again records overall and issue approval. However, we prefer the two-wave design because it reduces the likelihood of carryover effects.

treatment issues to ensure that our results are not issue specific. In the *environment* (En) arm, respondents read a news article about greenhouse gas regulations and the Environmental Protection Agency.<sup>14</sup> In the *education* (Ed) arm, respondents read about student test scores in the United States and abroad. Finally, in the *control* (C) arm, respondents read a news article about male pattern baldness which, presumably, should not affect political considerations. These stories were adapted from published news items to maximize believability. Text of the full stories is provided in the appendix.

Respondents were also randomly divided into two subsamples. In subsample A, after reading the assigned news article, respondents provided their overall evaluation of the president before providing issue evaluations. Conversely in subsample B, after reading the assigned article, respondents provided their issue evaluations before providing an overall evaluation. We limit our tests of the priming hypothesis to subsample A and our tests of the projection hypothesis to subsample B. This avoids any question-order effects that might arise from the posttreatment ordering of issue approval and overall approval questions. Nonetheless, we ask both issue and overall evaluations of each subject. This allows us to replicate the classic priming result. It also allows us to estimate treatment effects using two-stage least squares (2SLS). Although 2SLS may be preferable to some readers, we present ordinary least squares (OLS) regressions using pretreatment variables in the main text for simplicity and 2SLS estimates in the appendix.

## Analysis and Results

The analysis proceeds in three parts. The first presents the replication of the result scholars conventionally identify as priming. The second and third sections use pretreatment measures of overall approval and issue approval to evaluate whether this conventional finding is evidence of priming, projection, or a combination of the two.

<sup>14</sup>We chose these particular stories because they convey little partisan information. This reduces the possibility that our findings are driven by learning rather than increased issue salience. However, to the extent that these stories do include partisan information, Lenz's findings suggest this should increase the likelihood of observing projection, not priming (see 2012, 196–201, 271–74).

## Replicating the Conventional “Priming” Result

As our aim is to determine the underlying cause of the result conventionally identified as media priming, we first replicate the increased correspondence between posttreatment overall and posttreatment issue approval even though this is a flawed analysis. (We refer to this as the “correspondence effect,” differentiating it from a genuine media priming effect.) To do so, we follow the traditional method discussed previously and specify the issue weights for education approval and environment approval for the control group,  $\beta_{C,Ed}$  and  $\beta_{C,En}$ , as follows:

$$y_{i,t} = \alpha_C + \beta_{C,Ed}x_{Ed,i,t} + \beta_{C,En}x_{En,i,t} + \rho y_{i,t-1} + u_i, \quad (1)$$

where  $y_{i,t}$  is posttreatment overall presidential approval;  $x_{Ed,i,t}$  and  $x_{En,i,t}$  are posttreatment issue approval for education and environment, respectively;  $y_{i,t-1}$  is pretreatment overall approval;  $\rho$  is the weight determining how much pretreatment overall approval predicts posttreatment overall approval; and  $u_i$  is an error term. These “issue weights,”  $\beta_{C,Ed}$  and  $\beta_{C,En}$ , are partial slope coefficients that index the correspondence between posttreatment issue approval and posttreatment overall approval among subjects in the control arm.

Following this logic, we specify the issue weights in each of the treatment arms,  $\beta_{T,Ed}$  and  $\beta_{T,En}$ , with the same equation. For the education arm:

$$y_{i,t} = \alpha_{T,Ed} + \beta_{T,Ed}x_{Ed,i,t} + \beta_{C,En}x_{En,i,t} + \rho y_{i,t-1} + u_i, \quad (2)$$

and, for the environment arm:

$$y_{i,t} = \alpha_{T,En} + \beta_{C,Ed}x_{Ed,i,t} + \beta_{T,En}x_{En,i,t} + \rho y_{i,t-1} + u_i. \quad (3)$$

To evaluate whether the treatment stories induced a “correspondence effect,” we test the increase in the issue weights from the control group to the relevant treatment group:

$$\psi_{Ed} = \beta_{T,Ed} - \beta_{C,Ed}, \quad (4)$$

and

$$\psi_{En} = \beta_{T,En} - \beta_{C,En}, \quad (5)$$

estimating the parameters in Equations (1), (2), and (3) using OLS. We do so in a single regression by including indicator variables for the treatment and control arms (equivalent to the intercept term in each

equation) and interacting these with responses to the issue approval questions (forming the issue weights specified Equations 1–3).<sup>15</sup> We conduct post hoc tests of significance for the correspondence effects specified in Equations (4) and (5) based on these (biased) OLS estimates of the issue weights. Table 1 presents the estimates of this model.

The results show that our study successfully replicated the confounded result scholars traditionally assume is evidence of media priming. The correspondence between overall presidential approval and approval of his handling of the environment is stronger among subjects exposed to the environment treatment story than among control subjects, as evidenced by the larger coefficient ( $\hat{\beta}_{T,En} = 0.323 > \hat{\beta}_{C,En} = 0.277$ ). The difference between these issue weights, the “correspondence effect,” is statistically significant ( $\hat{\psi}_{En} = 0.046, p = 0.051$ , one-tailed).

Similarly, the correspondence between overall approval and education approval was greater among subjects who read the education story ( $\hat{\beta}_{T,Ed} = 0.314$ ) than among control subjects ( $\hat{\beta}_{C,Ed} = 0.224$ ). Again,  $\hat{\beta}_{T,Ed} > \hat{\beta}_{C,Ed}$  implies greater association between posttreatment issue approval and overall approval among those exposed to the issue. The difference between these issue weights is statistically significant ( $\hat{\psi}_{Ed} = 0.091, p < 0.001$ , one-tailed). Conventionally, this is taken as evidence of priming. The next sections evaluate whether the treatment stories induce genuine priming or, just the opposite, a projection effect, using a method free of confounds.

### An Unconfounded Test of Priming

To test for media priming, we regress posttreatment overall presidential approval on the pretreatment measure of issue approval. This eliminates bias due to projection because relying on pretreatment issue approval ensures that the effect of treatment stories evidences a change in subjects’ overall approval and not their issue approval. We first specify the issue weights of prior education approval and prior environment approval for those in the control arm,  $\pi_{C,Ed}$  and  $\pi_{C,En}$ , in the context of the following model:

$$y_{i,t} = \alpha_C + \pi_{C,Ed}x_{Ed,i,t-1} + \pi_{C,En}x_{En,i,t-1} + \rho y_{i,t-1} + u_i, \tag{6}$$

<sup>15</sup>We also estimated the effect of the treatments in separate regressions. Conclusions remain the same.

where  $x_{Ed,i,t-1}$  and  $x_{En,i,t-1}$  are pretreatment issue approval for education and environment, respectively. All other terms can be interpreted as in Equation (1).<sup>16</sup>

Second, we define the issue weights for education approval and environment approval in each treatment arm as  $\pi_{T,Ed}$  and  $\pi_{T,En}$ , respectively. For subjects who were exposed to the education news item, we specify:

$$y_{i,t} = \alpha_{T,Ed} + \pi_{T,Ed}x_{Ed,i,t-1} + \pi_{C,En}x_{En,i,t-1} + \rho y_{i,t-1} + u_i \tag{7}$$

Similarly, the model for subjects in the environment arm is

$$y_{i,t} = \alpha_{T,En} + \pi_{C,Ed}x_{Ed,i,t-1} + \pi_{T,En}x_{En,i,t-1} + \rho y_{i,t-1} + u_i. \tag{8}$$

Finally, given these specifications, we estimate the models using OLS and evaluate the priming effect as the increase in the issue weights from the control arm to the treatment arm. The priming effect for education is written

$$\theta_{Ed} = \pi_{T,Ed} - \pi_{C,Ed}, \tag{9}$$

while the priming effect for environment is written

$$\theta_{En} = \pi_{T,En} - \pi_{C,En}. \tag{10}$$

Because exposure to the news story cannot impact pretreatment issue approval, these differences reflect the extent to which subjects changed their overall approval to reflect their prior issue approval (and not the reverse) after exposure to issue news. Ordinary least-squares results for Equations (6), (7), and (8), along with the unconfounded post hoc tests of the priming hypothesis specified in Equations (9) and (10) are provided in Table 2.

The results provide clear evidence of media priming. Among control subjects, pretreatment issue approval had relatively little association with overall approval ( $\hat{\pi}_{C,En} = 0.031, \hat{\pi}_{C,Ed} = 0.014$ ). By contrast, the association between prior issue approval and overall approval was much stronger among subjects exposed to issue news ( $\hat{\pi}_{T,En} = 0.078, \hat{\pi}_{T,Ed} = 0.079$ ). This strengthening of the issue weights between control and exposure groups is significant for both the environment treatment ( $\hat{\theta}_{En} = 0.047, p = 0.014$ , one-tailed) and the education treatment

<sup>16</sup>We also ran the models with a term that interacted  $y_{i,t-1}$  with treatment. Conclusions are the same.

TABLE 1 Replication of the Conventional (Confounded) Test for Media Priming

Parameter	Estimates	Difference
Intercept, control arm ( $\alpha_C$ )	-0.050 (0.012)	
Intercept, environment arm ( $\alpha_{T,En}$ )	-0.041 (0.012)	
Intercept, education arm ( $\alpha_{T,Ed}$ )	-0.045 (0.012)	
Posttreatment environment approval, control ( $\beta_{C,En}$ )	0.277 (0.022)	
Posttreatment environment approval, treatment ( $\beta_{T,En}$ )	0.323 (0.028)	
<b>Correspondence effect, environment</b> ( $\psi_{En} = \beta_{T,En} - \beta_{C,En}$ )		0.046 (0.028) p = 0.051
Posttreatment education approval, control ( $\beta_{C,Ed}$ )	0.224 (0.021)	
Posttreatment education approval, treatment ( $\beta_{T,Ed}$ )	0.314 (0.027)	
<b>Correspondence effect, education</b> ( $\psi_{Ed} = \beta_{T,Ed} - \beta_{C,Ed}$ )		0.091 (0.028) p < 0.001
Pretreatment approval ( $\rho$ )	0.485 (0.016)	
Observations	2,085	
R <sup>2</sup>	0.783	

Note: Estimates and standard errors (in parentheses) are from ordinary least squares (OLS) regression on overall-approval-measured posttreatment. Difference statistics in the second column provide the basis of conventional tests (one-tailed) of the priming hypothesis, which we refer to here as the “correspondence effect.” In the leftmost column, parameters being estimated are in parentheses.

( $\hat{\theta}_{Ed} = 0.065$ ,  $p = 0.041$ , one-tailed).<sup>17</sup> As the media priming hypothesis predicts, exposure to issue news caused subjects to shift their overall evaluation of the president’s tenure in office to reflect their prior opinion of his handling of education or the environment.

In the appendix, two-stage least-squares estimates are provided, with  $x_{i,t-1}$  instrumenting for  $x_{i,t}$ , the posttreatment measure of issue approval which may include endogenous components induced by treatment.<sup>18</sup> In all cases,  $p$ -values differ very little and substantive conclusions differ not at all.

### An Unconfounded Test of Projection

To test whether our experimental treatments also induced a projection effect (i.e., causing subjects to shift their issue approval to reflect their prior overall

approval), we reverse the models for priming, estimating the relationship between prior overall approval and posttreatment issue approval. For respondents in the environment treatment group, we specify the issue weight for prior overall approval,  $\delta_{T,En}$ , in the context of the following model:

$$x_{En,i} = \gamma_{T,En} + \delta_{T,En} y_{i,t-1} + \varphi_{En} x_{En,i,t-1} + e_i, \quad (11)$$

where  $x_{En,i}$  is posttreatment issue approval for the  $i^{\text{th}}$  individual who is in the environment treatment group;  $\gamma_{T,En}$  is the intercept for the environment treatment group;  $y_{i,t-1}$  is the pretreatment measure of overall presidential approval;  $\varphi_{En}$  is a weight determining how much prior environment approval predicts posttreatment environment approval;  $x_{En,i,t-1}$  is pretreatment environment approval; and  $e_i$  is an error term. For the control group (which includes subjects assigned to the control arm and the education arm),<sup>19</sup> we specify the effect of prior overall approval,  $\delta_{C,En}$ , on environment approval in the context of the model:

$$x_{En,i,t} = \gamma_{C,En} + \delta_{C,En} y_{i,t-1} + \varphi_{En} x_{En,i,t-1} + e_i. \quad (12)$$

Based on these models, we estimate the environment projection effect,  $\Delta_{En}$ , as the increase in the issue weight for prior overall approval:

$$\Delta_{En} = \delta_{T,En} - \delta_{C,En}. \quad (13)$$

<sup>17</sup>Results are based on analysis of Subsample A (for whom overall approval was measured prior to issue approval). We designed the study in this way to avoid question order effects, which could diminish the observed treatment effects or induce consistency bias. Indeed, analysis of the full sample yields slightly diminished coefficients and somewhat larger  $p$ -values, suggesting the presence of question order effects. This is consistent with findings from other experimental studies of priming (for a discussion, see Althaus and Kim 2006) and suggests that future study designs should exercise caution about question order.

<sup>18</sup>Because 2SLS can correct for measurement error as well as endogeneity, its point estimates may be preferable to OLS estimates. However, both OLS using pretreatment measures (which corrects for treatment-induced endogeneity) and 2SLS provide the basis for valid hypothesis tests. To avoid a lengthy discussion of the merits of 2SLS, we place those estimates in the appendix. Conclusions are unchanged.

<sup>19</sup>If we limit our test to those in the control arm, our conclusions are unchanged.



TABLE 2 Unconfounded Test of the Priming Hypothesis

Parameter	Estimates	Difference
Intercept, control arm ( $\alpha_C$ )	-0.110 (0.020)	
Intercept, environment arm ( $\alpha_{T,En}$ )	-0.122 (0.019)	
Intercept, education arm ( $\alpha_{T,Ed}$ )	-0.106 (0.019)	
Pretreatment environment approval, control ( $\pi_{C,En}$ )	0.031 (0.023)	
Pretreatment environment approval, treatment ( $\pi_{T,En}$ )	0.078 (0.036)	
<b>Priming effect, environment</b> ( $\theta_{En} = \pi_{T,En} - \pi_{C,En}$ )		0.047 (0.027) p = 0.041
Pretreatment education approval, control ( $\pi_{C,Ed}$ )	0.014 (0.030)	
Pretreatment education approval, treatment ( $\pi_{T,Ed}$ )	0.079 (0.022)	
<b>Priming effect, education</b> ( $\theta_{Ed} = \pi_{T,Ed} - \pi_{C,Ed}$ )		0.065 (0.030) p = 0.014
Pretreatment approval ( $\rho$ )	0.743 (0.022)	
Observations	1,019	
R <sup>2</sup>	0.716	

Note: Estimates and standard errors (in parentheses) are from ordinary least squares (OLS) regression on overall-approval-measured posttreatment. Difference statistics in the second column provide the basis of unconfounded tests of the priming hypothesis. In the leftmost column, parameters being estimated are in parentheses.

If projection is the root cause of the results in Table 1 (the confounded test), this difference will be positive and significant, signaling that subjects responded to the news items by changing their issue approval so as to remain consistent with their prior opinions about his overall approval.

We use this same approach to estimate the effect of the education treatment story. For subjects in the education arm, we specify the issue weight for overall approval,  $\delta_{T,En}$ , as:

$$x_{Ed,i,t} = \gamma_{T,Ed} + \delta_{T,Ed} y_{i,t-1} + \varphi_{Ed} x_{Ed,i,t-1} + e_i. \quad (14)$$

Similarly, we specify the issue weight for those not in the education arm,  $\delta_{C,En}$ , as:

$$x_{Ed,i,t} = \gamma_{C,Ed} + \delta_{C,Ed} y_{i,t-1} + \varphi_{Ed} x_{Ed,i,t-1} + e_i. \quad (15)$$

Finally, the projection effect for education equals the difference in issue weights:

$$\Delta_{Ed} = \delta_{T,Ed} - \delta_{C,Ed}. \quad (16)$$

The OLS estimates of these models along with the post hoc tests of significance for the projection effects specified in Equations (13) and (16) are presented in Table 3. The test of projection for the environmental issue fails to achieve statistical significance ( $\hat{\Delta}_{En} = -0.057, p = 0.9225$ , one-tailed), and the sign on the estimated effect is actually opposite the direction predicted by the hypothesis. The results from the education analysis lead to a similar conclusion. While the relationship between prior overall approval and education approval is slightly stronger among

treatment subjects ( $\hat{\delta}_{T,Ed} = 0.520$ ) than among control subjects ( $\hat{\delta}_{C,Ed} = 0.497$ ), the difference fails to achieve statistical significance ( $\hat{\Delta}_{Ed} = 0.023, p = 0.2895$ , one-tailed). Our data, therefore, provide no evidence that issue news induced a projection effect.<sup>20</sup>

## Discussion

Together, these results demonstrate the capacity of news coverage to change individual-level evaluations of the president through priming. For the two issues we tested, exposure to news caused voters to align their overall approval with their prior issue approval. Alternatively, we found no evidence of the reverse—that treatment news stories caused voters to shift their issue approval to reflect their prior overall approval. This is consistent with the predictions of priming theory and, notably, is the first unconfounded experimental evidence of media priming.

<sup>20</sup>Coefficients on pretreatment overall approval in Table 3 are large. In fact, they appear to dwarf the coefficients on pretreatment issue approval. This might lead to the counterintuitive interpretation that pretreatment overall approval is a better predictor of issue approval than pretreatment issue approval. However, this disparity is driven by different scaling: pretreatment issue approval is binary while pretreatment overall approval is ordinal (see appendix). When overall approval is dichotomized, the disparity disappears. However, we cannot rule out the possibility that the observed correspondence is a result of projection that occurred before our experiment. Our contention is simply that we find no evidence that projection occurred as a result of exposure to our treatments.

TABLE 3 Unconfounded Test of the Projection Hypothesis

Parameters	Environment		Education	
	Estimates	Difference	Estimates	Difference
Intercept, control arm ( $\gamma_{C,I}$ )	-0.087 (0.015)		-0.039 (0.016)	
Intercept, environment or education arm ( $\gamma_{T,I}$ )	-0.079 (0.021)		-0.108 (0.022)	
Pretreatment overall approval, control ( $\delta_{C,I}$ )	0.563 (0.028)		0.497 (0.028)	
Pretreatment overall approval, treatment ( $\delta_{T,I}$ )	0.506 (0.036)		0.520 (0.036)	
<b>Projection effect</b> ( $\Delta_I = \delta_{T,I} - \delta_{C,I}$ )		-0.057 (0.040) p=0.9225		0.023 (0.041) p=0.2895
Pretreatment issue approval ( $\phi_I$ )	0.097 (0.015)		0.109 (0.016)	
Observations	1,066		1,066	
R <sup>2</sup>	0.560		0.516	

Note: “I” subscripts refer to either the Environment or Education issue conditions. Estimates and standard errors (in parentheses) are from ordinary least squares (OLS) regression on environment or education approval-measured posttreatment. Difference statistics in the second and fourth columns provide the basis of unconfounded tests of the projection hypothesis. In the leftmost column, parameters being estimated are in parentheses.

What do these results mean for the extant media priming literature? One could conclude that our findings validate those of past studies and that we need not worry that estimates from prior studies are biased by reverse causality. Yet, Lenz’s (2009, 2012) findings complicate this interpretation. Lenz’s studies provide credible evidence that there are instances in which exposure to news induces projection-like effects and not priming. Since projection seems to occur in at least some contexts, it seems unwise to rule it out as a possible factor in past, confounded, studies, at least until the research community has a better understanding of the critical contextual factors. Instead, a new wave of experiments that avoid the same methodological mistakes would help to adjudicate the meaning of past studies.

However, it is worth speculating how one might reconcile our results in light of Lenz’s, apparently contradictory, finding in favor of projection-like effects. Under what circumstances are we likely to observe projection instead of priming? One possibility is that exposure to issue news induces priming for only a subset of issues and induces projection for another. In support of this contingency, Lenz argues that priming may be most likely on valence issues, which are “generally easier for citizens to understand” (2009, 834), as opposed to policy positions. For the policy issues he studied, for example, voters may lack sophisticated preferences over the policy options, so they may be more prone to take cues from party elites. By contrast, citizens, through their everyday experiences, may have a relatively fixed opinion about presidential performance on the

issues we tested.<sup>21</sup> Lenz (2012) provides initial support for this claim. Specifically, while he finds evidence of projection for seven salient policy issues, his analyses of panel data in three elections suggests that the economy (a valence issue) was primed.<sup>22</sup>

Another possibility is that the likelihood of observing media priming rather than projection depends not on the type of issue attitude but on the attitude object (i.e., the president or a member of the city council). Notably, Iyengar and Kinder speculate that projection effects occur only in studies in which individuals already possess well-developed evaluations of the candidate or official in question. Priming is more likely when the candidates are less visible because “respondents’ motivation to project their general attitude onto the issue specific attitude [is] considerably weaker. In these cases, projection is an implausible explanation for the increased convergence between issue-specific and overall evaluations” (2012, 10).

Of course, if the priming literature is built largely on studies of well-known attitude objects, the case for projection (and against priming as a generalizable

<sup>21</sup>In this way, our choice of issues (education and environment) may increase the likelihood of observing priming effects while our construction of the treatment stories makes projection more likely.

<sup>22</sup>However, Lenz fails to find evidence of economic priming in his experimental tests (2012, 271–74). Moreover, one might wonder how similar these issues are to retrospective economic evaluations. While the latter taps into respondents’ evaluations of the nation’s economic performance in the past year, the former taps into their approval of the president’s handling of an issue, not the state of the issue.

substantive effect) is strengthened. A cursory tabulation of priming studies published in top political science journals reveals that 76% of prior research focuses on highly visible candidates.<sup>23</sup> To the extent that this is representative of the broader media-priming literature, we have to wonder again what we can learn from the past 25 years of research. Alternatively, this possible contingency also makes the findings from our study (which focused on evaluations of President Obama in a highly polarized electorate) even more striking.

What is the substantive significance of these findings? How sensitive is presidential approval to changing news coverage? We find that exposure to a single news story changed approval ratings by about .05 points on a scale from -1 to 1. Again, in a highly polarized electorate, this seems noteworthy. We might wonder, however, how this would translate into a more realistic setting where individuals are exposed to multiple stories over an extended period.

One way to speculate about the effect of repeated exposures is to compare our results with those from Iyengar and Kinder's (1987) seminal study, which attempted to create a realistic setting. Iyengar and Kinder assembled half-hour evening news programs, commercials and all, and presented them as if they were the usual (unaltered) evening news. They also presented subjects with evening news for up to five days. The effects from these studies were much larger than those presented here, possibly due to the naturalistic setting and the repetition of exposure.<sup>24</sup>

We are left to conclude that we still have much to learn about how voters will respond to particular changes in news coverage. By unequivocally demonstrating the existence of media priming in an experimental setting, our results represent a significant step towards an accurate understanding of the indirect effect of media exposure. Yet the need for additional analyses of the priming and projection hypotheses is immediately evident by the contradiction between these findings and those of Lenz (2009). Equally evident is the necessity of collecting pretreatment

measures of both issue approval and overall approval in all future studies of priming and projection. Regrettably, this requires a more complicated and more costly method of data collection. However, further reliance on (or replications of) the original, flawed methodology will not advance scholarship in a meaningful way.

## Conclusion

This study reevaluated the classic media priming hypothesis. Past studies of priming failed to rule out projection as an alternative explanation of their results. Our survey experiment corrected this limitation by obtaining pretreatment measures of our key independent and dependent variables: overall presidential approval and approval of the president's handling of specific issues. Results provide strong support for the priming hypothesis. We found no evidence that exposure to news stories induces projection.

Although we present the first unconfounded experimental evidence of media priming, we do not take our results to be the final word in the priming versus projection debate. Nor do we take them to be a validation of conclusions drawn in prior, confounded tests of media priming. Instead, our results demonstrate that the mass media, at least in some cases, systematically alters support for elected officials through priming. They also highlight the necessity of collecting pretreatment measures of both issue approval and overall approval in future priming studies.

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<sup>23</sup>We searched JSTOR for articles published in (alphabetically) the *American Journal of Political Science*, *American Political Science Review*, *British Journal of Political Science*, *Canadian Journal of Political Science*, and the *Journal of Politics* that include the terms "priming" or "prime" (but not "prime minister") in the title or abstract. Of 21 articles that satisfied the criteria, 16 focused on evaluations of visible figures (i.e., the president, presidential candidates, or parties in national parliament).

<sup>24</sup>Anticipating smaller effect sizes, our study included over two thousand subjects while studies in *News that Matters* ranged from 28 to 140 subjects.

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