Priming Effects in Complex Information Environments: Reassessing the Impact of News Discourse on Presidential Approval

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This paper revisits the original psychological literature on priming in order to assess new possibilities for research on priming effects stimulated by news discourse. We detail some important theoretical limitations of existing priming research; propose a method for studying the dynamics of priming effects in real-world, complex information environments; and illustrate the usefulness of this approach with a case study of opinion change during the 1990–91 Persian Gulf Crisis. This case study documents for the first time the daily dynamics of priming effects in a complex information environment and confirms that priming effects are not merely a function of changes in the volume of news coverage about a given topic. Our findings suggest that news priming effects can be produced by changes in the applicability of relevant knowledge constructs, rather than merely by their temporary accessibility in long-term memory, and by cumulative as well as recent exposure to news coverage.

Although the mass media were once widely thought to have little impact on people’s political opinions (Klapper 1960), research on priming effects over the past two decades has demonstrated that mass media can influence opinions in profound ways (e.g., Iyengar and Kinder 1987; Krosnick and Brannon 1993; Krosnick and Kinder 1990; Miller and Krosnick 1996, 2000). Priming research has shown that although media coverage by itself is unlikely to change the political attitudes of many people, media coverage can influence which attitudes people use to make political judgments. Because priming can alter the criteria citizens use to evaluate political issues, leaders, and events, priming effects can have important consequences for the outcomes of elections, the emergence of public support for policy initiatives, and the approval ratings of political leaders.1

Although it appears increasingly likely that priming is responsible for a wide range of media effects, priming research conducted by political communication scholars has enjoyed only limited success in drawing connections between observed effects and underlying causes. While the effects of news priming have been most clearly identified in laboratory experiments (following the path breaking work on agenda-setting effects by Iyengar and Kinder 1987; Iyengar et al. 1984; Iyengar, Peters, and Kinder 1982), only a few studies have examined such effects outside the laboratory setting (Iyengar and Simon 1994; Krosnick and Brannon 1993; Krosnick and Kinder 1990; Pan and Kosicki 1997). We argue below that the findings of all of these nonexperimental studies share common features that obscure both the underlying dynamics of news priming and the causal factors that shape

1For example, campaigners in the recent 2004 presidential election seemed less interested in persuading voters so much as priming them by influencing the criteria on which voters would choose between candidates. National surveys conducted during the campaign showed that majorities favored Senator Kerry’s positions on health care and the economy, while majorities also favored President Bush’s leadership style and his handling of the War on Terrorism. The Kerry campaign therefore attempted to focus public attention on the lack of job growth over the president’s first term while the Bush campaign reminded voters of the 9/11 attacks and the need for strong leadership in the face of continued threats. Each campaign attempted to produce priming effects by increasing the salience of attitudes that favored their respective candidates rather than pursue the more difficult task of trying to talk voters out of their established opinions.


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priming effects in realistically complex information environments.

This article attempts to expand our knowledge of news priming effects by addressing these limitations of previous work. We revisit the original psychological literature on priming to assess new possibilities for priming effects research conducted by political scientists. We then propose a method for studying the dynamics of priming effects in real-world, complex information environments and illustrate the usefulness of this approach with a case study of opinion change during the 1990–91 Persian Gulf Crisis. This case study documents for the first time the daily dynamics of priming effects in a complex information environment and confirms that priming effects are not merely a function of changes in the volume of news coverage about a given topic. Priming effects on presidential job approval were influenced not only by recent exposure to news about the Persian Gulf Crisis but also by cumulative exposure to relevant news discourse and changes in the evaluative tone of that discourse. Moreover, our findings suggest that news priming effects can be produced by changes in the applicability of relevant knowledge constructs rather than merely in their temporary accessibility in long-term memory. By expanding the study of news priming to include applicability as well as accessibility effects, we illuminate the dynamic, short-term evolution of news priming effects that has gone unobserved in prior research.

**What We Still Don’t Know about News Priming**

Over the past 25 years the priming literature in social psychology has undergone a theoretical renaissance, but during this same period the basic theoretical orientations and measurement strategies used in the political science literature on priming have remained stable. Empirical research on news priming has tended to focus on replicating the findings of two foundational studies (Iyengar and Kinder 1987; Krosnick and Kinder 1990), with a recent emphasis on identifying moderating variables that condition priming effects. As a consequence, the insights generated by recent social psychological work on priming have yet to be fully incorporated into research on news priming effects conducted by political communication scholars (Price and Tewksbury 1997). Models of news priming effects therefore remain relatively underspecified compared to priming research in such topical domains as aggression and racial stereotyping (e.g., Anderson 1997; Power and Murphy 1996). Some outside observers even suggest that political communication research uses the term “priming” more as a metaphor than a fully specified concept (Roskos-Ewoldesen, Roskos-Ewoldesen, and Dillman Carpentier 2002).

As a consequence of its limited engagement with developments in social psychology, the news priming literature has had difficulty providing satisfactory answers to long-standing questions about the nature of priming effects. First, the political science literature has struggled to explain what causes priming effects stimulated by news coverage, in part because the standard research designs used in this literature obscure the relative contributions of two causal mechanisms known to produce priming effects. Second, the news priming literature tends to measure priming effects at only one or two points in time. As a consequence, it has been unable to adjudicate the sharp disagreement between experimental and survey-based priming studies regarding the duration of priming effects. Laboratory experiments conclude that priming effects tend to be short-lived, largely disappearing within minutes or hours of exposure to the priming stimulus, while survey-based studies using secondary analysis of panel data conclude that priming effects are highly persistent, often lingering months or even years after stimulus exposure. No convincing attempt has yet been made to reconcile these conflicting but consistent findings produced by different strands of the research literature. Third, social psychological research has documented a variety of stimulus attributes known to influence priming effects, but previous news priming studies have reduced the complexity of news discourse into a simple measure of topical prominence within the agenda of news coverage (e.g., Pan and Kosicki 1997; Zaller 1992). Because such “big message” indicators do not control for other features of news content likely to stimulate priming effects, the political communication literature may be drawing misleading inferences about the reasons why news coverage produces priming effects.

**How Are Priming Effects Produced?**

Priming is the activation of knowledge stored in long-term memory following exposure to a stimulus. Priming can produce a variety of judgmental effects, but research conducted by political communication scholars has focused almost exclusively on what are known as accessibility effects. Accessibility can be defined as the potential that knowledge stored in memory will be activated for potential use in a judgmental task (Higgins 1996, 134). The temporary ease
with which a construct may be called up into working memory can increase the likelihood that the activated construct will be used as the basis for making subsequent evaluations of various kinds.

The social psychological literature emphasizes that accessibility alone does not produce knowledge activation and that increasing the accessibility of a construct does not ensure that it will be used as a criterion in subsequent judgments. Rather, accessibility is one of two primary factors moderating the activation of stored knowledge: the other is the degree to which a stimulus and a stored knowledge construct are perceived as applicable to one another. Even if a knowledge construct has a small chance of being activated due to its diminished accessibility, its chances of being activated are increased by its perceived applicability or relevance to a judgmental task (Higgins 1996).

Perceptions of relevance are themselves constructed through priming, for by increasing the accessibility of a construct in the context of a judgment task, priming also increases the odds that the construct will be used again when a person is faced with a similar judgment task. The priming of a construct initially produces accessibility effects, but subsequent primes can produce applicability effects, since each priming episode generates associations between the primed construct and other constructs, stimuli, or judgmental contexts (Higgins 1996; Higgins and King 1981). Applicability effects can also be influenced by the framing of the task (e.g., Trope and Ginossar 1988), the degree of attention to stimuli (e.g., Kim 2005; Martin and Achee 1992), as well as by the motivations (Kruglanski 1989; Thompson et al. 1994), predispositions (Fein and Spencer 1997), prior value commitments (Domke, Shah, and Wackman 1998) and social norms (Mendelberg 2001; Valentino, Hutchings, and White 2002) used by individuals to process information.

Seen in this way, the social psychological literature envisions priming as something like a two-stage process: the priming stimuli should influence the accessibility of some knowledge constructs more than others, but whether people use those primed constructs as evaluative criteria depends on the degree to which they are perceived as applicable to the judgmental task. Against this theoretical background, the tendency for news priming research to focus on accessibility effects alone is a notable limitation.

News priming research has begun to explore some implications of associative network theory (Lodge and Taber 2000; Miller and Krosnick 1996; Valentino 1999), but the dynamic construction of applicability effects has never been directly observed. What little we know of applicability effects in the news priming literature comes from tests of the “gradient hypothesis” (Iyengar and Kinder 1987; see also Miller and Krosnick 1996), which confirmed that news coverage logically irrelevant to target attitudes does not tend to prime those attitudes. But if accessible constructs generate priming effects only when those constructs are relevant to the task, then the standard finding that priming is a function of short-term changes in construct accessibility must be only part of the story. In contrast, the social psychology literature shows how cumulative exposure can generate strong accessibility and applicability effects even in the absence of recent primes (Higgins 1996; Lau 1989). Media priming studies in other domains have likewise demonstrated applicability effects generated by frequent priming (e.g., Shrum and O’Guinn 1993). Since applicability effects are constructed over time as a consequence of accessibility effects, the tendency for news priming research to focus narrowly on short-term changes in construct accessibility stimulated by recent news exposure not only captures just part of the action, but may have led previous research to misspecify the causal mechanisms underlying news priming effects.

How Long Do Priming Effects Last?

Our uncertainty regarding the relative influence of accessibility and applicability for explaining priming effects is heightened by the type of research designs typically employed to study news priming. Experiments tend to study the immediate effects of recent stimulus primes, often within minutes of stimulus exposure. Those using response latency measures assess the effects of priming within milliseconds after exposure. Experimental designs tend to find priming effects that are short-lived, disappearing soon after exposure to the stimulus prime. At the other extreme are survey-based designs, which test for effects in which the stimulus primes occur months or even years before the target attitudes are measured. In contrast to the findings of experimental work, these survey-based studies usually conclude that priming effects are durable and can be surprisingly long-lived.

No attempt has yet been made to reconcile these starkly divergent claims regarding the duration of priming effects. Doing so requires an analysis of the evolving dynamics of priming. The social psychology literature posits that priming effects are produced in two ways: recent primes can temporarily increase the accessibility of a construct, and frequent primes can gradually increase the applicability of a construct in
ways that make the construct chronically accessible long after exposure to the stimulus (e.g., Price and Tewksbury 1997). Only the first mechanism has been directly tested in news priming studies, and these studies have tended to capture the effects of priming at only one point in time: nearly all of the published studies on news priming have employed a standard pre/post treatment design that captures the impact of a single stimulus “treatment.” Since the target attitudes for stimulus primes in these studies were all real-world attitudes about political issues that had been around for a long time, the designs used by these studies are unable to distinguish whether observed effects are produced by the recency or cumulative frequency of primes. Priming effects produced by exposing subjects to stimuli about a familiar issue could be a function of the recent exposure itself. They could also be a function of frequent preexperimental exposure to relevant stimuli that has generated applicability effects which themselves trigger the priming response observed in the laboratory. If frequent exposure before the experiment is really driving priming effects that seem to result from recent exposure in the laboratory, then our inability to control for the frequency of preexperimental priming will lead us to overstate the apparent impact of the experimental manipulation.

Differentiating between recency and frequency as the mechanisms underlying observed effects would require the experimental manipulation of a completely unfamiliar attitude construct over a long period of time, where close controls over cumulative exposure could clarify the relative contribution of recent and frequent exposure to priming stimuli. Our paper is the first to do this, using a quasi-experimental analysis of the evolving dynamics of priming effects in presidential approval caused by the sudden onset of an unexpected and unfamiliar foreign policy crisis.

**Is Priming Merely A “Big Message” Effect?**

Political communication researchers have long presumed that priming effects are produced by the relative salience of a topic in news coverage. Priming studies conducted by political scientists have assumed that news exposure inclines audiences to use the dominant agenda carried in the news as an evaluative criterion. Such claims are justified in the case of experimental studies with strict controls to rule out other possible influences, but cannot be presumed in studies using naturally occurring news exposure. Surprisingly, no studies of priming conducted outside the laboratory have examined directly the content and tone of media messages about a given topic as factors that might moderate priming effects. The way most studies of real-world priming operationalize media content is merely by identifying the total amount of news coverage given to a topic without regard to content variation within that topical coverage (e.g., Krosnick and Brannon 1993; Krosnick and Kinder 1990; Pan and Kosicki 1997). In research on priming effects stimulated by the 1991 Gulf War, for instance, the rich complexity and dynamic changes in media content about the Iraqi invasion of Kuwait and its aftermath were reduced to a single, one-dimensional catchall category—“coverage about the war”—which was then operationalized as simple counts of stories or lines of coverage about the war appearing in newspapers or on television.

This notion of a “big message” effect (Pan and Kosicki 1997; Zaller 1992) imposes important restrictions on priming research. While the “big message” approach can capture the effect of a dominant, one-sided flow of information (i.e., Zaller’s “mainstream effect”), it is of questionable value in explaining priming effects stimulated by complex information environments, where conflicting ideas compete with one another in discourse. The rare studies to analyze media effects in complex information environments (Druckman 2004; Druckman and Nelson 2003; Sniderman and Theriault 2004) have concluded that such effects tend to disappear once strict controls on exposure to one-sided information flows are relaxed. Aside from raising the possibility that news priming effects may be a phenomenon of the laboratory rather than of the everyday world, the results of these studies suggest that the presumption of “big message” effects needs to be reconsidered.

Recent developments in the social psychological literature suggest that the “big message” approach could lead researchers to miss important effects of news priming, as well as to misspecify the mechanisms by which such effects are produced. For instance, the “big message” approach is at odds with the possibility of applicability effects brought about by cumulative exposure, since it presumes that priming is influenced only by the temporary dominance of a particular topic in the overall news agenda. Moreover, research on applicability effects tends to conclude that constructs in memory with a similar evaluative tone—as good is to nice, or happy is to joy—are more likely to activate one another than constructs with a dissimilar evaluative tone, as good is to evil or happy is to sad. Research by social psychologists has confirmed that priming is more likely to occur when the evaluative tone between stimulus primes and target evaluations are consistent with one another (e.g., Anderson 1983). Such findings
suggest that news priming effects might vary as a function of the evaluative tone of news discourse, such as when news about a given subject is lopsidedly critical of the president. Recent theoretical studies have suggested that the evaluative tone of media content should have a bearing on the ways in which that content primes subjects (Lodge and Taber 2000; Price and Tewksbury 1997), but such relationships never have been tested in news priming research. This omission is especially glaring given the long line of persuasion research (e.g., Fan 1988; Zaller 1992) that finds evaluative tone to be a major influence on other types of media effects.

**A New Approach**

As a consequence of these three limitations in previous research, we know surprisingly little about the nature of news priming in realistically complex and dynamic information environments. Because the standard methodological approaches used in this research obscure the temporal dynamics of priming effects—dynamics that have important theoretical implications for clarifying how priming effects work—the literature has been unable to settle the conflicting claims made by experimental and survey-based priming studies and is likely to have overstated the apparent impact of recent exposure to relevant information.

To address these limitations, we adopt a quasi-experimental approach that allows us to track daily changes in priming effects on presidential job approval stimulated by an unanticipated but highly visible foreign policy crisis. On August 2, 1990, Iraqi forces launched a surprise invasion of oil-rich Kuwait, an event that precipitated an immediate series of high-profile responses by President George H. W. Bush that led to the Persian Gulf War of 1991. By August 9, just one week after the invasion, the Gallup Organization was in the field with the first of 20 national surveys eventually covering the crisis period that asked respondents about their exposure to news about the crisis, their overall approval of the president, and their support for the president’s handling of the crisis. The Gallup data allow us to estimate crisis-induced priming effects in presidential approval for 74 of the 206 days of the crisis period.² Coupled with a detailed content analysis of nightly news coverage given to the crisis, these data allow us to track the unique influence of recent and cumulative exposure to news about the Persian Gulf on daily changes in the relative weight of foreign policy attitudes in the president’s overall job approval rating.

**Data and Methods**

**News Content Data**

Measures of news coverage during the Gulf Crisis come from content analysis data collected for every nightly news broadcast on each of the three major networks that appeared during the period of interest. Compiled from full-text transcripts, the data set includes every news story relevant to the crisis with Iraq that appeared on ABC’s *World News Tonight*, CBS’s *Evening News*, and NBC’s *Nightly News* (\(N = 3,854\) stories).

An unusually detailed coding protocol for these data was designed to capture not only the substance of the policy debate among government officials, journalists, and other sources appearing on the nightly news, but also the supporting arguments and frames of reference used by those sources to lend credibility to their policy positions. The coding scheme for this study follows prior studies (e.g., Gamson and Modigliani 1989; Pan and Kosicki 1993) that identify discrete thematic elements in discourse corresponding to available policy opinions, the rationales for implementing policies or the goals to be achieved by those policies (Mermin 1996, 1999; Nelson 1999), and context discourse suggesting core problems or frames in which the policies might be located (Dorman and Livingston 1994; Kirton 1993; Lang and Lang 1994).

Despite the complexity of this coding scheme (for additional details and a complete listing of themes, see Althaus 2003), the resulting measures of news content are highly reliable. Intercoder reliability tests were performed on a sample of 101 randomly selected ABC *World News Tonight* stories for all discourse themes taken together, which produced intercoder agreement on the presence of specific themes in 88% of cases (Cohen’s \(kappa = .875\); Brennan and Prediger’s \(kappa = .877\)).

The news content data used in the analysis were aggregated to produce daily measures of news coverage relevant to the Gulf Crisis. The measures used below include the average daily number of Gulf Crisis stories appearing on a network newscast, the average daily amount of policy discourse about the Gulf Crisis contained in a nightly newscast, and the average daily evaluative tone of news discourse about

²As we define it, the Persian Gulf Crisis extended from the Iraqi invasion until the start of the U.S.-led ground war that drove Iraqi forces out of Kuwait.
the Gulf Crisis relative to the Bush administration’s stated positions.3

Opinion Data

Opinion data for this study come from national surveys administered by the Gallup Organization between August 9, 1990 and February 10, 1991. Twenty surveys containing relevant variables were in the field between the Iraqi invasion of Kuwait and the start of the ground war in late February, administered over a total of 74 days. Since our analysis is concerned with daily changes in attitude structures corresponding to shifts in news content, we divide respondents in these multiday surveys by date of interview. It is important to point out that the daily survey data analyzed below are therefore not daily random samples, but rather come from random samples in which interviews were conducted over a period of three or four days. Strictly speaking, data for each of these days are not representative of the American population as a whole. To help compensate for this limitation, all analyses reported below include controls for party identification (dummy variables for Republican and Democratic identifiers, leaving independents as the reference category), gender (males = 1, females = 0), race (non-whites = 1, whites = 0), and age (in years).

Several questions asked in identical or nearly identical form in each of these surveys allow us to track the changing attitudinal structure of President Bush’s job approval ratings. Our measure of job approval comes from the standard question, “Do you approve or disapprove of the way George Bush is handling his job as president?” Approving respondents were assigned a value of one, and all others were assigned a value of zero. Three independent variables are used to predict job approval:

• Support for troop deployment, from the question “In view of the developments since we first sent our troops to Saudi Arabia, do you think the United States made a mistake in sending troops to Saudi Arabia or not?” Respondents saying the troop deployment was not a mistake were assigned a value of one, while all others were assigned a value of zero.

• Support for offensive force, from responses to two similar questions asking respondents whether they approved of the use of military force to drive Iraqi forces out of Kuwait.4 Respondents favoring offensive military action were assigned a value of one, while all others were assigned a value of zero.

• Gulf Crisis approval, from the question “Do you approve or disapprove of the way George Bush is handling this current situation in the Middle East involving Iraq and Kuwait?”5 Approving respondents were assigned a value of one, and all others were assigned a value of zero.

Exposure to news coverage is an additional control variable commonly used in priming studies. These studies typically treat news exposure as a moderating factor, since news exposure in one form or another must be a necessary condition for news to influence attitude structures. Our analysis shares this standard expectation, but the nature of our case requires us to operationalize news exposure somewhat differently than other studies because public attention to news about the Gulf Crisis was unusually widespread throughout the time period that these surveys were being administered. All of the Gallup surveys used in the analysis include a measure of self-reported news exposure that asks, “How closely have you followed news about the situation involving the invasion of Kuwait by Iraq and the sending of U.S. troops to Saudi Arabia? Would you say you have followed it very closely, fairly closely, not too closely, or not at all closely?” Averaging across the 74 days of Gallup data, 89% of respondents reported paying either “very close” or “fairly close” attention to news coverage of the Gulf Crisis (daily max = 98%, daily min = 74%). The level of popular engagement with the Gulf Crisis was so high that the daily numbers of inattentive respondents are too few to analyze with any confidence. Our solution is to analyze only those respondents who reported paying very or fairly close attention to news about the crisis, omitting all others from the analyses that follow. This leaves us with a mean of 248 attentive respondents per day (max = 700, min = 43).6

3These measures all take the form of averages across the three nightly newscasts because occasional missing transcripts for one or two networks makes it inappropriate to simply sum the total number of news elements across the broadcasts.

4Before the start of the air war on January 16, the question read “If the current situation in the Middle East involving Iraq and Kuwait does not change by January (15, 1991), would you favor or oppose the United States going to war with Iraq in order to drive the Iraqis out of Kuwait?” The question asked in the surveys conducted after the start of the air war read “Do you approve or disapprove of the United States’ decision to go to war with Iraq in order to drive the Iraqis out of Kuwait?”

5In two of the 20 surveys, this question was phrased slightly differently as “Do you approve or disapprove of the way George Bush is handling this current situation in the Persian Gulf region?”

6Only 21 days contained fewer than 100 respondents after filtering away inattentive citizens. See the tables in the web appendix (http://www.journalofpolitics.org) for daily counts of valid cases used in the first-stage regressions.
During this period, the most common source of news was the nightly network newscasts. Nielsen viewership ratings for this period reveal a combined direct audience for the three evening news broadcasts of between a quarter and a third of American households, split fairly evenly among the three networks (Althaus 2002). This direct audience for the network broadcasts was substantially larger than for any other national news source. Moreover, the content of these broadcasts should accurately reflect the daily agenda and tone of other national news sources during this period (e.g., Danielian and Reese 1989; Entman 2003; Gans 1979; McCombs and Shaw 1972; Sparrow 1999).

Thus, we use network news broadcasts as a proxy for the daily news coverage about the 1990–91 Gulf Crisis that may have influenced Americans paying attention to news about the crisis.

Our analytical strategy for estimating daily priming effects brought about by news coverage proceeds in two stages. In the first stage, we estimate daily changes in the size of individual-level priming effects. Our basic model takes the following form:

\[
\text{prob}(Y_i = 1) = \alpha + \beta_S S_i + \sum \beta_k C_{ik} + \sum \beta_l D_{il} + \sum \delta_l (S_i \times D_{il}) + \epsilon_i
\]

where \(Y_i\) is respondent \(i\)'s presidential approval rating, \(S_i\) is respondent \(i\)'s support for the president’s Gulf Crisis policies, \(C_{ik}\) is respondent \(i\)'s score on the \(k\)th control variable, \(D_{il}\) is a dummy variable taking a value of 1 on date \(d\) (0 otherwise), \(S_i \times D_{il}\) is the product of respondent \(i\)'s support for the president’s Gulf Crisis policies multiplied by the dummy variable for the respondent’s date of interview \(d\), and \(\epsilon_i\) is the error term for the \(i\)th observation. In this equation, \(\beta_k\) is the coefficient for the support variable, \(\beta_l\) is the coefficient for the \(k\)th control variable, \(\beta_l\) is the coefficient for the \(l\)th date, and \(\delta_l\) is the coefficient for the \(l\)th interaction term. This model was used on a pooled data set consisting of all attentive Gallup respondents in the 20 national surveys conducted during the period of interest. The design of this model estimates a main effect for each of the control variables over the entire time period, but allows the effects of the model’s Gulf Crisis support variable to vary by date of interview. Since the job approval variable used in this analysis is dichotomous, logistic regression was used to estimate this model.

In the second stage of the analysis, we calculate the daily priming effect of support for Gulf Crisis policies on presidential approval as the change in the probability \(Y_i = 1\) that comes from shifting the value of the support variable from opposing to favoring the president’s policies. We then use these daily estimates of priming effects in an OLS model that regresses the size of the priming effect among respondents interviewed in day \(d\) on the amount of particular types of news content appearing in evening newscasts on day \(d\). If particular types of news content are influencing the size of a priming effect during the period of interest, this OLS model should return statistically significant coefficients for those news content variables.

This approach is obviously cruder than experimental designs for assessing priming effects, since different types of individuals surely respond in different ways to the same news content. But our approach is superior in several respects to the standard survey-based strategies for assessing priming effects. Multiple measures of key independent variables allow us to shed additional light on the question of whether priming is mainly an accessibility or applicability effect, since accessibility should tend to prime related attitudes in similar ways. If news coverage of the Gulf Crisis produces similar priming effects across our multiple measures of policy support, this would be strong evidence that accessibility rather than applicability was driving observed effects. We also estimate priming effects in time periods that coincide with daily news cycles, which is the naturally occurring duration of headline news in the United States. No previous survey-based study has studied priming effects at such a fine level of detail regarding the time sequencing of stimulus and attitudinal measures.

**Findings**

Figure 1 displays opinion trends from Gallup polls that document a gradual decline in public support for the president following a rally that came immediately after the Iraqi invasion of Kuwait. Four months of declining support for the president were then followed by almost immediate surges in support after the start of the bombing campaign. While some accounts using monthly summaries of aggregate opinion (e.g.,

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7We experimented with a number of alternative lag specifications before concluding that news data from the date of interview provided the best fit. Most interviews appeared to have been conducted after the day’s nightly network newscasts, further supporting our decision to model priming effects as a function of news content that was broadcast on the date of interview. In addition, the high degree of similarity between nightly news content and the agenda of other national news sources appearing on the same day provides a strong theoretical rationale for structuring the model in this way.
Krosnick and Brannon (1993) incorrectly attribute President Bush’s widely noted jump in popularity to the successful prosecution of the ground war in late February, we see in this figure that the largest jump in Bush’s approval rating is an immediate and direct consequence of the start of the air war in mid-January. A population that had been deeply divided about the wisdom of going to war became, immediately following its onset, a public galvanized for action.

Although the opinion trends in Figure 1 follow relatively stable declines until they are simultaneously raised and reset by the start of the air war, the attitude structures underlying the president’s approval ratings are quite volatile during this time period. Figure 2 shows daily changes in the size of priming effects influencing the president’s job approval rating. (Coefficients from the complete regression models are provided in a separate appendix available from this journal’s web site.) The size of each priming effect was calculated as the absolute change in the predicted probability of approving the president’s handling of his job when the value of the priming variable is

Note: Points within each trend indicate the size of daily priming effects, defined as the change in the probability of approving the president’s job when the support variable is changed from oppose to support, holding all other variables constant. Trend lines represent a moving average of the current day’s effect, the effect from the previous point in the trend line, and the effect from the next point in the trend line.
changed from opposition to support while holding the value of all other variables constant. The larger the change in the predicted probability of approving the president’s handling of his job, the greater the weight that the priming variable has in the attitude structure for job approval.8 For instance, black triangles in Figure 2 represent changes in the probability that a person would approve of how the president is handling his job when Gulf Crisis approval changes from disapprove to approve. On August 9, the first day of the series, switching from disapproving to approving President Bush’s handling of the Gulf Crisis increases the probability of approving his overall job as president by .45. Recalling that probabilities range from 0 to 1, this is a substantial impact.

To clarify the trends in these daily priming effects, Figure 2 includes trend lines showing the size of one day’s priming effect averaged with the size of the effect immediately preceding and following it. The largest priming effects tended to come from approval of how the president was handling the Gulf Crisis, followed in relative magnitude by support for the deployment of American military forces to Saudi Arabia, and support for using those military forces to drive Iraqi forces out of Kuwait.9 An exception to this general pattern came around the start of the air war, when support for offensive force briefly became a more important component of President Bush’s job approval than support for troop deployment.

Figure 2 sheds light on two lingering questions in the priming literature. First, on the question of whether priming effects are of short or long duration, Figure 2 shows that the magnitude of daily priming effects is highly variable within each of the three trends. This pattern is consistent with the typical findings from experimental studies, which suggest that recent exposure to relevant stimuli tends to produce immediate priming effects of relatively short duration. At first glance, this pattern is more difficult to square with the findings of previous survey-based priming studies that report lingering effects lasting several months after exposure to the news coverage of interest. If news priming effects were so durable, we might expect to see far less day-to-day variation in effect sizes. Some of this day-to-day variance is surely random, a consequence in part of the sometimes smallish numbers of respondents surveyed on a particular day. But even though the size of priming effects can change dramatically from day to day, these effects are not merely random: there are clear central tendencies in the effect trends that evolve in meaningful ways over time. The general pattern is for priming effects to increase in size over time for all three variables, although each trend also seems to be influenced by idiosyncratic factors.

These trends shed light on the question of whether priming effects derive more from increased accessibility or increased applicability. If accessibility alone were driving changes in the size of these priming effects, we would expect news coverage about the Gulf Crisis to influence these three closely related support variables in similar ways: the size of the priming effects should be fairly similar for each of the three trends. Furthermore, any movement in the size of priming effects should occur in parallel if such movement were being produced merely by differences in the accessibility of these constructs, presuming for the moment—as previous work has done—that accessibility is a function of the overall amount of recent news coverage about the Gulf Crisis. Yet the size of effects differs across the three variables—generally largest with Gulf Crisis approval and smallest with support for offensive force—despite the fact that the accessibility of all of them should be stimulated in similar ways by Gulf Crisis news coverage. Moreover, the three trends do not always move in tandem: the correlation in the size of priming effects between Gulf Crisis approval and support for offensive force is a healthy .60 (p < .01, n = 27), while that between support for offensive force and support for troop deployment is a more modest .43 (p < .05, n = 23), and that between Gulf crisis approval and support for troop deployment is just .25.

8Because of the complexity of the regression model used to estimate daily priming effects, and because the key independent variables are not always available in the same surveys, separate regression models are run for each of the three independent variables. This means that the effects shown in Figure 2 do not control for the simultaneous impact of all three variables. To test whether including all three variables simultaneously might change the patterns shown in Figure 2, the authors conducted separate regression analyses for each survey in which more than one of these variables were available. A total of 18 surveys contained the Gulf Crisis approval variable along with the support for troop deployment variable, and six surveys contained both of those plus the support for offensive force variable. The priming effect trends produced by this analysis followed the same patterns as Figure 2, except that the size of priming effects was relatively smaller for the troop deployment and offensive force variables. This is to be expected, because these variables simultaneously influence job approval and Gulf Crisis approval, and entering all three into a single model estimates only their direct effects on the dependent variable. Since these variables also have significant indirect effects on job approval through Gulf Crisis approval, the trends shown in Figure 2 should be understood as presenting the total effects of each variable on job approval.

9Gulf crisis approval influenced the probability of approving the president’s job performance by an average of .60 (s.d. = .10, min = .38, max = .86), while support for troop deployment had an average daily effect of .45 (s.d. = .12, min = .23, max = .77) and support for offensive force had an average daily effect of .39 (s.d. = .17, min = .12, max = .74).
In addition, the movement of effects across the three trends varies considerably from day to day, which suggests that some of these variables are being primed differently than others. All of this points to the conclusion, consistent with recent experimental work on priming effects (e.g., Miller and Krosnick 2000; although see Valentino, Hutchings, and White 2002), that accessibility alone is unlikely to be the main engine driving these effects.

The tendency for priming effects in all three trends to increase in size over time likely represents a cumulative effect of exposure to Gulf Crisis news. The longer the crisis continued, the greater the cumulative exposure to news about the crisis, and the larger the priming effects tended to become regardless of whether news of the day was giving much current attention to the crisis. An alternative explanation is that the central tendencies of the Figure 3 trends reflect little more than recency effects, produced by the ebb and flow of daily news coverage of the Gulf Crisis. If so, we should find that news coverage about the Gulf Crisis rose steadily in volume over the period of interest.

However, Figure 3 shows a different pattern in two “big message” indicators capturing the daily amounts of relevant news coverage over the crisis period. The first trend (diamonds with a black line tracing a five-day moving average) shows the mean number of Gulf Crisis stories broadcast on nightly news programs for each day. This is a fairly broad measure of news attention, since it includes stories that have little or no policy-relevant content (e.g., descriptive stories about troop readiness or life in the Saudi desert). The other trend (squares with a gray line) shows the average number of discourse elements about the Bush administration’s Gulf Crisis policies appearing each day in nightly news programs. This more refined “big message” indicator is positively correlated with the first trend ($r = .66$), but they clearly run different courses. The average number of Gulf Crisis stories per broadcast peaks in the month following the Iraqi invasion of Kuwait, then declines rapidly into a low-coverage period from October through December. In January the number of daily stories increases rapidly with the nearing of the January 15th United Nations deadline for Iraqi withdrawal, then again reaches August 1990 levels in a second peak after the start of the air war. In contrast, the average number of policy discourse elements in a broadcast took a relatively smaller decline before rebounding to August levels in late November and early December. Toward the end of December policy discourse increases steadily to peak right before the start of the air war, after which it declines rapidly before rebounding again in the weeks leading up to the start of the ground war.

The evaluative tone of this policy discourse also evolves over time. Figure 4 shows the number of discourse elements in an average nightly newscast that were favorable (diamonds and a black line showing a five-day moving average) and unfavorable (squares and a gray line) toward the Bush administration’s...
A moderate positive correlation between these trends \((p = .59)\) comes from the tendency for both types of discourse to increase as the overall amount of news coverage goes up, but the balance of favorable to unfavorable discourse changes considerably over time. The flow of favorable discourse follows generally the “big message” trends from Figure 3, with the highest levels of favorable coverage immediately after the Iraqi invasion, during the period from late November to early December, and around the start of the air war. Unfavorable discourse is muted through most of the crisis until the second week of January, when a divided Congress and growing public opposition to the impending war produce news coverage that is relatively balanced between positive and negative perspectives. After the start of the air war, unfavorable discourse tapers off at a faster rate than favorable discourse, before leveling out over the month of February.

Comparing changes in the size of priming effects over time (Figure 2) to the news discourse trends (Figures 3 and 4) reveals a more nuanced relationship between stimulus material and priming effects than has been suggested by previous research. News attention to the Gulf Crisis varied over the period in which priming effects tended to grow in size, suggesting that recent exposure to the news was unlikely to be responsible for the steadily increasing effect sizes. Yet the day-to-day variance in the effect trends is quite pronounced, suggesting that daily changes in news coverage might be driving much of the observed variance. Moreover, the effect trends run different courses which suggest that news coverage was stimulating them in different ways, or stimulating some trends more than others.

To clarify which elements of news content might be influencing the priming effects in Figure 2, we regressed each of the daily impact trends from Figure 2 on the four measures of news content in Figures 3 and 4 along with additional measures capturing the cumulative count of stories and discourse elements that appeared between August 2 and the date of interview. Comparing the size and significance of bivariate regression coefficients for different types of news content reveals clear patterns of priming effects in this complex information environment. Several patterns stand out in Table 1.

First, nearly all of the news content variables are positively related at conventional significance levels to the size of priming effects for Gulf Crisis approval and support for offensive force, but only one of them had even a marginally significant relationship with the size of priming effects attributed to support for troop deployment. If the priming effects in Figure 2 were being driven merely by the accessibility of relevant attitudes, then we would expect to find significant and positive coefficients in the support for troop deployment series as well. The dearth of such relationships suggests that accessibility alone is unlikely to be the

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Note: Points within each trend indicate the average daily number of discourse elements per broadcast. Trend lines represent a five-day moving average across these points.
main mechanism driving the observed priming effects in Figure 2.11

Second, the recency of stimulus exposure seems to matter more for some trends than for others. The top two rows of Table 1 show that daily changes in news attention and news discourse about the Persian Gulf Crisis increased the size of priming effects from support for offensive force more than from Gulf Crisis approval. To properly interpret the coefficients in Table 1, recall that we define a priming effect as the change in the weight assigned to an independent variable among the factors predicting a dependent variable, where impact is measured as the absolute difference in predicted probabilities when moving from opposition to support in the independent variable. Each news story on the Gulf Crisis in an average newscast increased by three points the daily probability that support for offensive force predicts approval of how President Bush was handling his job, but only increased the predictive power of Gulf Crisis approval by three-quarters of a point. A similar pattern holds for daily changes in the amount of policy-relevant discourse about the Gulf Crisis. In contrast, recent news exposure has no significant effects on the weight of support for troop deployment in the attitude structure of presidential job approval.

Third, the cumulative frequency of stimulus exposure was generally a more important factor than recent exposure in determining the size of priming effects. Five of the six beta weights for the measures of cumulative news exposure are larger than those for recent news exposure, and one of them reaches marginal levels of significance in raising the weight of support for troop deployment in the attitude structure of presidential approval. For every hundred news stories focusing on the Gulf Crisis, the predicted priming effect of support for offensive force on presidential approval rose by 7.5 points, while that of Gulf Crisis approval rose by 1.5 points, and the effect of support for troop deployment rose by a statistically negligible .8 points. Since the average nightly news program had broadcast 993 Gulf Crisis stories prior to

11Another possibility is that the priming effects in this trend are being influenced by an artifact of data collection. Since survey respondents contacted on the first day of interviewing might be somehow different from respondents contacted in later days (if, for instance, later interviews came from respondents who were harder to contact), we tested whether the size of priming effects varied systematically by the day of interview in each of the 20 surveys. We found no evidence of systematic bias in priming effects for the offensive force trend \( F [3, 23] = .45, p = .72 \) or the Gulf Crisis approval trend \( F [3, 70] = .36, p = .78 \). However, there was a significant difference in the troop deployment trend \( F [3, 62] = 3.22, p = .03 \) caused by a higher average effect size for the fourth day of interviewing \( (M = .55, \text{compared to means of between } .42 \text{ and } .44 \text{ for the first three days of interviewing}) \). It is unlikely that this date of interview artifact is alone responsible for a lack of significant news coverage effects, since Figure 2 shows that the dynamics of priming effects in this trend took a different path relative to the other two independent variables, quite apart from any systematic error associated with the final day of interviewing. Yet this artifact undoubtedly contributes to the lack of significant relationships between news coverage and the size of priming effects for the troop deployment measure.

12In addition, the coefficient for cumulative stories approached marginal levels of significance \( (p = .105) \) in predicting the size of priming effects from support for troop deployment.
the start of the air war, as the crisis unfolded the predicted impact of cumulative news exposure soon became much larger than that of recent news exposure. For instance, at the start of the air war the predicted impact of cumulative news stories was to increase the priming effect of Gulf Crisis approval by nearly 15 points. By comparison, the average number of Gulf Crisis stories per newscast was 6.7 per day over the entire crisis period, which predicts a 5.2 point increase in the size of that same priming effect as a result of recent news exposure.

Fourth, the evaluative tone of Gulf Crisis news coverage was an important factor in producing priming effects. Unfavorable policy discourse significantly primed support for offensive force and Gulf crisis approval, while favorable policy discourse was only marginally significant in priming Gulf crisis approval. Support for offensive force and Gulf Crisis approval had substantially greater weight in predicting job approval on days in which the news contained higher levels of unfavorable policy discourse. Moreover, in every case the impact of unfavorable discourse was nearly twice as large as that for favorable discourse. This is another piece of evidence inconsistent with the idea that accessibility alone is the main engine driving priming effects.

The bivariate coefficients in Table 1 challenge a good deal of conventional wisdom about priming effects. Yet these coefficients are also ambiguous because they represent the total effects of each support variable on job approval, rather than their unique effects when simultaneously controlling for the influence of the other support variables. Because the Gallup surveys rarely included all three support measures in their surveys at once, our ability to parcel out the unique effects of each variable is quite limited (see note 8). A second source of ambiguity is that multiple dimensions of news coverage are likely to be shaping priming effects at the same time, but up to this point we have considered each in isolation from the others. We therefore ran multiple regression models that simultaneously estimated the effects of recent and cumulative news exposure, as well as the tone of Gulf Crisis discourse. To minimize collinearity as well as the number of coefficients needing to be estimated from small numbers of cases, this multivariate analysis uses a differenced measure of discourse tone (favorable discourse minus unfavorable discourse appearing in each day’s average newscast).

The multivariate results in Table 2 generally support the findings from the bivariate analysis in Table 1. Compared to recent exposure, cumulative news exposure remains a stronger predictor of the size of priming effects in five of the six equations, generally having nearly twice the impact of recent news exposure. But these relationships are robust across models only when predicting the size of priming effects from Gulf Crisis approval: in these models, recent and cumulative exposure were both significant predictors of priming effects regardless of whether they were operationalized as discourse elements or discrete numbers of relevant news stories. By contrast, in the equations predicting the size of priming effects from support for offensive force, cumulative exposure drives priming effects when news exposure is measured as the amount of policy-related discourse in the news, but recent exposure drives those effects when news exposure is measured as numbers of stories about the Gulf Crisis. This difference is likely an artifact of when the offensive force series began: the other two support variables were measured over a longer period with more variance in daily news coverage, but the offensive force variable was measured only late in the crisis when both cumulative and daily amounts of news coverage were rising in tandem. This unfortunate coincidence makes it difficult to sort out whether priming effects for offensive force support were produced more by cumulative or recent news exposure, but the R-squared values for both equations show that news exposure of whatever origin explained around half of the variance in the size of priming effects for this variable. As was the case with Table 1, none of the news variables turns out to be a significant predictor of priming effects from the support for troop deployment variable.

The main difference between the bivariate and multivariate results is that tone of policy discourse fails to become a significant predictor of priming effects in any of the six multiple regression equations. Nonetheless, the negative signs on these coefficients are in the expected direction: the more negative the news on a particular day, the larger the priming effect from the support variables even after controlling for the effects of recent and cumulative news exposure. Although our analysis produces mixed results on the impact of news tone on priming effects, we believe that these findings are sufficiently promising to merit

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In addition, the coefficient for unfavorable policy discourse in predicting the size of priming effects for support for troop deployment was significant at the \( p = .12 \) level.

In the support for the offensive force model, the coefficient for cumulative stories nearly reaches conventional levels of significance (\( p = .108 \)).
further research on the relationship between tone of news discourse and the size of priming effects.

**Conclusion**

Taken together, the findings in Tables 1 and 2 suggest a pattern of nuanced influences on priming effects rather than a mechanistic and determinative relationship between construct accessibility and construct weight in relevant attitude structures. We confirm that “big message” accessibility effects can influence priming in complex information environments, but in more subtle ways than previous studies have identified. Recent exposure to relevant news content can generate priming effects, but cumulative exposure to relevant news tended to be a more important factor influencing the size of priming effects in the case considered here. The greater the cumulative exposure to relevant stimuli, the greater the likelihood that “mere mention” of relevant stimuli triggered priming of applicable attitudes, regardless of the amount of recent coverage in the news.

These findings help to clarify why experiments and surveys have tended to draw such different conclusions about the duration of priming effects: naturally occurring priming effects seem to have both short-term and long-term components. Experiments are likely to have captured a mix of short-term effects stimulated by recent exposure in the laboratory plus whatever cumulative exposure subjects brought with them to the lab. In contrast, survey-based priming studies are likely to have captured long-term effects from the cumulative frequency of exposure purged of recency effects. Our study, the first to document the separate effects of recent and cumulative news exposure, suggests that apparently contradictory conclusions from experimental and survey-based research on the duration of priming are both correct. The apparent contradiction arises because they are capturing different components of priming effects.

Our findings also suggest that priming in complex information environments seems to be a function of applicability effects as well as construct accessibility. Contrary to the claim that priming is driven by accessibility alone, no measured aspect of the information environment was significantly and consistently related to changes in the size of priming effects across the board. To the contrary, the pattern of findings makes more sense when we consider how construct accessibility appears to be moderated by applicability effects. The impact of factors other than construct accessibility took five different forms in our findings: in the different dynamic courses taken by priming effects.
from the three support variables; in the tendency for Gulf Crisis approval effects to be consistently larger than effects of support for troop deployment, which in turn were consistently larger than the effects of support for offensive force; in the tendency for news discourse to have larger effects on the size of priming effects from Gulf Crisis approval than on those from support for offensive force; in the tendency for unfavorable discourse to produce larger priming effects than favorable discourse; and in the finding that news discourse had no consistently significant effects on the weight of support for troop deployment in the attitude structure of presidential job approval. Data limitations in the Gallup surveys preclude us from testing specific psychological mechanisms that might be contributing to these observed patterns, but the important point is that these patterns cannot be explained by accessibility effects alone.

These findings, coming as they do from a case study of a unique event, are unlikely to be universal or definitive. Moreover, each of the observed relationships between news primes and observed effects, while plausible, would be difficult to predict in advance given the current state of the literature. Thus, the value of this analysis lies less in the light that it sheds on the changing structure of job approval attitudes than in the challenge it presents for the conventional wisdom regarding the causes and cognitive mechanisms underlying priming effects stimulated by news coverage. This conventional wisdom has developed largely without reference to a broad range of empirical research conducted by social psychologists, research that is entirely consistent with the findings reported here.

Our approach naturally has its share of limitations relative to the standard methods of assessing priming effects outside the laboratory. While theoretical considerations guided the particular choices we made in operationalizing assumptions about priming effects from the social psychological literature, the limited availability of survey data allowed us to test only rudimentary attitude structures. We are also fully aware that our choice to analyze priming effects within the fairly unique context of the Gulf Crisis reduces our confidence in generalizing to other cases from the patterns revealed in our analysis. However, since so much of the research on news-induced priming effects has been conducted on the Gulf Crisis, our choice of cases seems appropriate for a study aiming to reassess the standard approaches to studying priming effects.

While we observe patterns that are consistent with expectations about applicability effects, our study cannot provide strong evidence of applicability effects because the Gallup data used in this analysis contain no direct means of measuring construct applicability. The presumed applicability effects that we observe could be influenced by the nature of the news stimulus, by the ways that individual motivations and predispositions affect judgmental processes, or by a combination of both. Future research on news priming will need to grapple with the challenge of sorting out which of various kinds of applicability effects might be moderating priming processes. Finally, our approach to modeling the daily dynamics of priming effects using survey data invites any number of possible confounds or spurious relationships to obscure the precise mechanisms that produce observed effects. In particular, replacing the notion of a “big message” effect with one that allows for the dynamic flow of multiple dimensions to news discourse makes it difficult to pin down precisely which elements of news content might be responsible for observed changes in the structure of attitudes. We modeled three such dynamics—recency, cumulative frequency, and evaluative tone—and found effects for each, but our study might have produced different results had we chosen to model different dimensions of news coverage.

We believe that the methodological approach developed in this paper, suitably refined, holds promise for future work in priming effects. We are hopeful that replications of this method in other cases and other contexts will clarify the ways that accessibility and applicability moderate the impact of priming effects produced by exposure to news content, as well as the features of news content most likely to moderate these effects.

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