CyberPsychology & Behavior
Volume 11, Number 4, 2008

DOI: 10.1089/cpb.2007.0033

Frames and Knowledge in Mixed Media: How Activation Changes Information Intake

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ABSTRACT

Many people consider strategic framing, the journalistic tendency to reduce politics to a game or competition focused on the tactical maneuvers of political actors, to be harmful to democracy because it erodes citizen interest in the democratic process. Our results demonstrate that this is not always the case. Testing the effects of textual strategic frames and video processing in a digital environment, we show that strategic frames may also provide a context that is more conducive to learning in mixed media news environments than that provided by value frames, those focused on the value conflict between principled policy opponents. Further analysis reveals that this effect is most clearly seen among people who read political blogs (i.e., those who are already active and interested in politics). Our data suggest that for individuals with cognitive networks built around ideological concerns, such as blog readers, value-framed messages provide cues to stop encoding new information, while strategically framed messages lead people to continue absorbing and learning in mixed media environments.

INTRODUCTION

The steep rise in online news use in recent years reflects a sea change in the manner in which public affairs information is consumed. The experience of news online has changed dramatically in that time: Visitors to news sites increasingly encounter news in ways that combine text and video elements. This phenomenon is a feature not just of major television news sites but also of the online content of major newspapers, increasingly popular "video blogs" such as crooksandliars.com, and video distribution sites such as YouTube.

The blending of text and video should provoke questions among scholars interested in the psychological effects of communication technology: How do news consumers respond to the combination of text and video? Do individuals learn more when they can get both? Are news consumers better able to digest and recall such news when it is framed in certain ways? To address these questions, we conducted an online survey experiment concerning stem cell research that manipulated both the textual frame and whether respondents saw a frame-neutral video. Given the rapid shifts in the presentation of online news, the question of whether these modifications are aiding or hindering learning is of prime importance.

LITERATURE REVIEW

Framing

Citizens' political judgments are often influenced by heuristics triggered in response to news frames—

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different ways of selecting, organizing, and presenting information within a news story.[1] In communication research, scholars have examined how framing "generally implies a policy direction or implicit answer to what should be done about the issue."[2]

To advance issue positions and simplify news presentations, elites and journalists often construct issue controversies as a clash of principles, with opposing perspectives drawing upon the same democratic values of life, liberty, equality, and justice.[3] This "value framing" has been found to have powerful effects on individuals' voting decisions and candidate attributions.[4]

Yet political conflict is also often framed in terms of the "game" or "strategy" of governance, with particular attention to the motives of political actors. In contrast with framing issues in value terms, strategic framing is thought to provoke cynical reactions, reduce citizens' motivation to attend to politics, and discourage engagement in public life.[5,6,7]

Most of the research on value and strategy framing has tested their effects in isolation, contrasting them with their less prevalent "material" and "policy" alternatives respectively.[8] Little attention has been paid to the effects of such frames on cognitive mechanisms or on how shifts in message frames interact with and influence the processing of more dynamic content such as video or audio news reports, as increasingly occurs online.[9]

Effects of value and strategic frames

Value frames provide the public with easily accessible heuristics with which to understand complex issues. Such frames have been shown to resonate with people's preexisting schema, reinforcing existing beliefs and allowing quick access to information. For example, Shah et al.[4] find value framing induces the spread of activation to related issue schemas, influencing conceptions of other issues, judgments about candidate character, and vote choice processes.

Core values may be chronically accessible, rendering them easily activated by media frames.[10] Thus, it is safe to assume that values will be available during attitude construction because they function to reinforce core values and bolster self-image.[11] Therefore, we can expect people to process value-framed information in a way that relies primarily on existing knowledge and beliefs rather than on new information being introduced within the frame.

In science news, value frames have often come to dominate coverage of new and controversial biotechnologies.[12] Priest identified a shift in the framing of biotech to include explicitly ethical frames after the 1997 cloning of Dolly the sheep.[13] Similarly, Nisbet and his colleagues found a marked increase in value framing in coverage of stem cell research beginning in 1998, accompanied by an even steeper increase in strategically framed coverage.[14]

Strategic frames have mostly been studied in relation to campaigns and voting, often in terms of normative concern about the deleterious effects of journalistic emphasis on political gamesmanship as opposed to substantive problems.[15] The resulting criticisms of media coverage have raised concern that such frames foster cynicism. However, Cappella and Jamieson note:

> News stories, even those strategically framed, often carry substantive information about issues, albeit set in the context of self-interested manipulation. Attentive exposure can alter political knowledge by increasing the accessibility of information, changing the associations among constructs, and cuing and strengthening existing localized networks of concepts.[15]

Accordingly, the reception of a strategically framed story should lead to greater intake of strategic information from that story. This follows from their theory; that is, strategic nodes are activated by the frame, and thus strategic information in the story becomes more salient.

Synthesizing these insights, the interconnections of core values to other mental constructs should result in value-framed information being processed more readily than strategically framed information. The spreading activation that results from exposure to value framed news reduces the need for people to rely on the source message for information. Consistent with the idea of satisficing, people use cognitive shortcuts to achieve mental goals that are "good enough."[16] Value framing likely allows such a shortcut, giving people quick access to activated information.

Such implicational relations are less likely to be as numerous or as available in response to strategic frames. Thus, individuals exposed to strategic frames may have to process information more deeply in order to satisfice because fewer existing constructs are activated. Under such conditions, the dismissal of partisan cues may actually encourage greater processing of contemporary information, potentially prompting learning when additional information is encountered.

Learning from the media

The differential effects of media on knowledge gain have typically compared TV news and news-

papers[17,18] or Internet and print news formats.[19,20] Few consider the possibility of media working in concert. One recent exception is Holbert,[21] who tests the notion of "intramedia mediation," learning effects that stem from relationships among various forms of media use. Here we develop the related notion of *intramedium interaction*, through which messages in a mixed media environment may work in combination to create learning effects.

Particularly relevant to the development of this idea is research that focuses on learning from different categories of content conveyed in the same medium, such as learning from TV ads compared to TV news,[22] learning from hard news compared to soft news,[23,24] or learning from other program types such as late-night entertainment programs.[25] Although these studies do not explicitly consider intramedium effects, this work provides relevant medium-specific insights.

More relevant to this research, several studies have considered the implications of framing effects for learning. De Vreese[26] looked at the effects of TV ad frames on interpretation and salience of issues. Likewise, Valkenburg et al.[27] found differential effects of human-interest frames on story recall compared to the conflict, attribution of responsibility, and economic consequences frames. Thus, frames can influence learning and recall.

This is particularly important in light of the rise of the Internet. Mixed media environments are increasingly popular as text and video are combined to create more vivid news. The framing of the textual elements that often lead into video reports is an understudied aspect of media effects, especially on video processing and learning.

HYPOTHESES

In learning situations where the source material is framed, the extent to which the frame activates existing schema will determine how motivated and likely a person is to take in new information. Since value frames tend to activate not only an individual's value considerations but also the many nodes connected to them, and strategic frames tend to foster less dependence on ideological heuristics and thus more need to gain new information, it is our contention that those exposed to a strategic frame will have more motivation to absorb new knowledge in order to satisfice. Thus:

H1. Among individuals who view a video news clip, those who first encounter strategic framing of stem cell research will show a greater increase in knowledge than those who first encounter value framing of stem cell research.

Nonetheless, the memory nodes activated by media will provide access to information that was unavailable during the initial knowledge test. Due to the centrality of values to self-schema and in long-term memory, the value frame should activate more nodes than the strategic frame. We contend that this secondary recall of information will occur to a greater extent in people who are exposed to a value frame than in those exposed to the strategic frame when no other information is available. Accordingly:

H2. Among individuals who do not view a video news clip, those who encounter strategic framing of stem cell research will show lesser secondary recall of information than those who encounter value framing of stem cell research.

METHODS

Experimental design

Data were collected using an experiment embedded in a Web-based survey of undergraduate students at a large Midwestern university. Their instructors offered extra credit for participating in this study. All potential participants were contacted by e-mail and given the Web site of the online survey. The survey was completed by 601 students, a response rate of 46%.

We extracted a 2×2 experimental design from the larger set of manipulations embedded within the online survey, which used a subset of 311 respondents. No other experimental factors crossed into this design. In addition to a standard battery of pre- and posttest questions, respondents were randomly assigned using a stratification algorithm to two experimentally manipulated factors that were fully crossed.

The first manipulation was a quote from a fictional expert on stem cells, purportedly the author of a book titled *Stem Cells and Society*. This quote described the nature of the debate over stem cells, noting reasons both for and against federal funding of embryonic stem cell research. (We varied the order of presentation of arguments for and against and found no order effects on a variety of outcome variables, including change in expressed knowledge.) The two quotes had the same length and structure but framed the stem cell debate differently. Half of the respondents saw a quote describing the debate as one of value conflict, while the other half saw a quote indicating that the debate is a political game.

Table 1. OLS Regressions of Framing Effects on Change in Reported Knowledge

	News learning (video)	*Secondary recall (no video)*
Strategic frame	**0.17****	**−0.14***
Attention to video	**0.19****	n/a
Ideology	−0.14	0.04
Personally affected	0.11	**0.13***
Stem cell media	0.00	0.01
Stem cell talk	−0.15	0.02
Government trust	0.13	0.01
Science trust	0.04	0.01

*$p < 0.1$; **$p < 0.05$ (one-tailed).

Next, half of the respondents were randomly selected to view a montage of CNN coverage of the stem cell controversy, while the other half saw no video at all. The video clips were chosen from several hours of coverage on the day of a presidential address about stem cell research funding. The clips were chosen to convey scientific information and not to repeat the textual frames present in the prior manipulation of value or strategic framing of the stem cell issue. This design mimics the construction of numerous news sites and blogs that introduce video segments with a brief quote or comment preparing the viewer for what he or she is about to see.

Measurement construction

The survey included a repeated battery of six true/false knowledge questions in both the pre- and posttests. One way to assess change in expressed knowledge would be to use the pretest and posttest items to create an index of "learning" based on the net increase in correct responses. However, our data exhibited a distinct ceiling effect. Zaller[28] offers a strategy for dealing with the situation. In the example he details, attitude change was being measured on a dove–hawk scale between two observation points. If people were already very hawkish, their attitude did not have much room to shift. To compensate, Zaller weighted shifts on the basis of how much room people had to move. For instance, a move between observations from 4 to 6 on a 7-point scale would be scored 0.67 for a 2-point shift out of a possible 3.

In our study, the ceiling effect is confirmed by the strong negative correlation between pretest knowledge and raw knowledge gained ($r = -0.45$, $p < 0.001$). Thus, we used Zaller's formula to convert an individual's change over time on a bounded measure into a ratio, revealing how much a respondent increased relative to the amount of room he or she had to improve:

$$\text{Change} = \frac{\text{Time}_2 - \text{Time}_1}{6 - \text{Time}_1}$$

However, the logic of Zaller's formula works with knowledge measures only if one assumes that the change in expressed knowledge does not reflect some "backtracking"—that is, a question answered correctly the first time, but incorrectly the second time, mutes the change observed in answering another question correctly when retested. His equation is problematic in this respect, since backtracking muddies the use of the score to illustrate knowledge gained versus total possible improvement. Thus, we employ a refined formula that includes only the specific questions each respondent answered incorrectly at time 1:

$$\text{Change} = \frac{\text{IncorrectQ1}_{T2} + \text{Incorrect Q2}_{T2} + \ldots \text{IncorrectQN}_{T2}}{6 - \text{IncorrectTotal}_{T1}}$$

This ratio looks at learning on a question-by-question basis, revealing what percentage of initially incorrect answers each respondent answered correctly when retested. Scores for this ratio run from 0 to 1 ($M = 0.42$, $SD = 0.39$).

Notably, we do not believe this measure simply reflects learning from the media. Indeed, only half our respondents had an opportunity to learn about stem cell research during the manipulation. Any increase in knowledge that occurred in the no-video group cannot be attributed to learning, per se, but instead to secondary recall—that is, the recall of information that respondents were not able to access during the first knowledge test but subsequently retrieved.

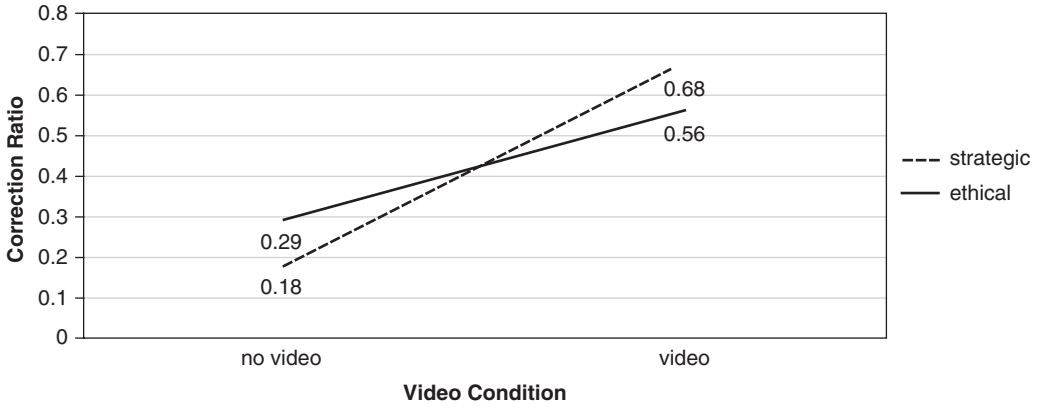

FIG. 1. Effects of frame and video manipulations on answer correction.

When testing the effects of these frames on change in expressed knowledge, seven other variables were included in the analyses for blocking purposes.[29] Five were single-item measures: attention paid to the video, personal connection to the issue due to disease or injury, frequency of talk about stem cell research, trust in government, and belief that science can solve health problems. In addition, an index of political ideology was constructed from items tapping social policy and economic policy ideology ($r = 0.65$). Finally, stem cell news consumption was constructed from measures of exposure and attention to news about stem cell research ($r = 0.71$).

RESULTS

The hypotheses were tested using linear regression; separate analyses were conducted for the video and no-video conditions in order to isolate tests of our hypotheses. In both regressions, the blocking variables were entered into the model simultaneously with the frame manipulation.

In the video condition, respondents exposed to the value frame corrected, on average, 56% of their incorrect answers from the pretest; the strategic frame group averaged 68%. As seen in Table 1, this difference is significant ($\beta = 0.17$, $p < 0.05$), supporting hypothesis H1.

The same blocking variables were included in the analysis of the no-video condition, except for attention paid to the video. Respondents who were exposed to the value frame averaged 29% success in correcting their incorrect answers. For those in the strategic frame condition, the average was only 18%. Table 1 shows that this hypothesis received some support as well ($\beta = 0.14$, $p < 0.1$). A full factorial ANOVA of the text and video manipulations revealed a significant interaction between the two factors (F [1, 29] = 8.344; $p < 0.01$) above and beyond a significant main effect of "knowledge gain" for the video condition (F [1, 29] = 99.951; $p < 0.001$).

The relationships observed in this analysis are plotted in Figure 1. The findings raise the question of whether one frame condition produces a significantly stronger interaction with the video. To answer it, we employed a test of the significance of the difference between independent betas described by Cohen and Cohen[30] to test the predictive power of exposure to the video within each frame condition, including our previously used set of control variables. In the strategic frame condition, exposure to the video had a regression coefficient of 0.64, compared with 0.37 in the value frame condition. This difference in the predictive power of exposure to the video between conditions is significant ($t = 2.8$, $p < 0.01$).

Additional analysis

To further explore our findings, we divided the respondents in our video exposure conditions by whether or not they said they read political blogs. (Respondents were asked how frequently they read "political commentary blogs" on a 0 (never) to 10 (very frequently) scale. Those who answered from 1 to 10 were coded as blog readers; those who answered 0 were coded as nonreaders.) Blog readers should be more familiar and comfortable with the mixed media structure of our manipulations, since it is a relatively common practice in many video blogs. Further, blog readers are, by and large, highly politically engaged and partisan.[31] The cognitive connections between their core values and their other political policy schema should be denser,

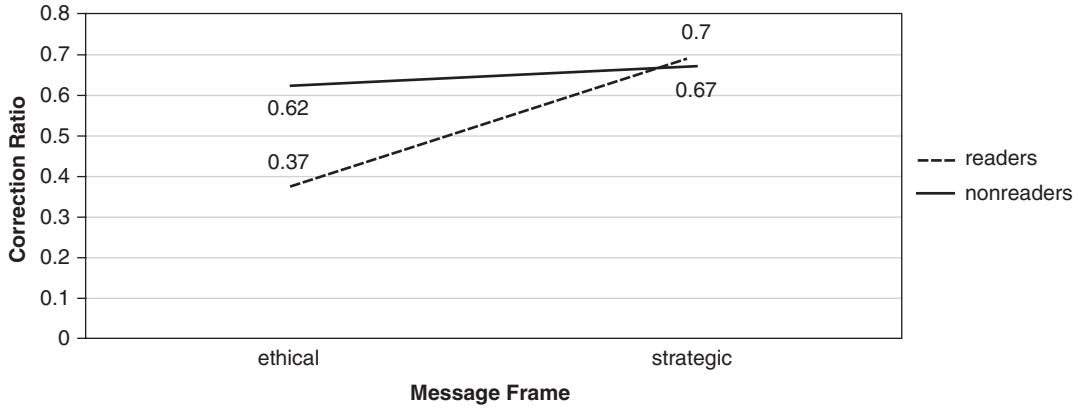

FIG. 2. Effects of frame manipulation (video condition only) and blog readership on answer correction.

making them more likely than nonreaders to exhibit the effects seen in our initial analyses.

Analysis of blog readership in our model bears out this suspicion. A full factorial ANOVA of the text frame and blog readership revealed an interaction approaching significance between the two factors (F [1, 140] = 3.772; $p < 0.1$) above and beyond a significant main effect of the frame manipulations among those who encountered the video (F [1, 140] = 6.698; $p < 0.05$). This interaction can be seen in Figure 2.

DISCUSSION

Our examination of a mixed text–video environment yields some surprising results for students of political communication and communication technology. First, the commonly held perspective on strategic framing holds that it is harmful to democracy because it erodes citizen interest in the democratic process. Although chronic exposure to strategic frames may foster cynical attitudes toward government and politicians, they may also provide a context that is better for learning from news. As counterintuitive as this may seem, it fits with the effects of negative political advertising on knowledge. Even though some people claim political anomie as a result of negative advertising, citizens learn more from negative ads than from positive ones.[32,33] Our results show a similar pattern outside the context of political advertising or campaigns in general.

It may be that the strategically prompted respondents are motivated to pull more information from the video because of the processes described by Cappella and Jamieson. The same response that causes people to become chilly toward the political process may also make their own political biases and partisan beliefs less accessible. Because they can't use their usual heuristics, they fall back on the nearest available source of decision-making material in order to satisfice—in this case, the video they encountered.

Notably, in the absence of the video, respondents who encountered the value frame appear to have experienced a greater degree of secondary recall from these activated cognitions. Strategic frames, on the other hand, appear to dampen a reliance on existing schema. The failure of this activation to spread to nodes that contain helpful information or other ready-made decision-making tools helps to explain why the strategic frame prompts greater information intake when the video is available for processing but reduces the potential for secondary recall.

The results of separating blog readers from nonreaders indicate that the differences are concentrated among the politically interested and engaged. Future research should include measures of political interest, self-efficacy, or strength of partisanship to sort out the source of this effect. (Neither ideology nor strength of ideology was predicted by blog readership.) These findings also raise the question of whether blogs tend toward value or strategic framing of news and public affairs. If this research is any indication, it would surely benefit the field for more scholars to undertake research in this vein.

This potential effect of value framing is especially important as more people go online to seek news from like-minded sources, since sources that activate a reader's ideological or partisan nodes may hamper the ability to learn new information. The nature of online communities as trusted gathering places for like-minded individuals might enhance this effect on information intake.[34] However, if po-

litical blogs tend to focus on strategic information along with their policy analysis, readers may find themselves better able to take in and consider new information that they might have otherwise ignored.

The common negative perception of strategic framing is drawn into question by these results and may be further challenged by future studies. As a scholarly community, we may need to reconsider our pessimistic view of strategic framing in news media. This may be particularly true in light of the convergence of various media in online environments. The ability of even a brief textual frame to reshape how a lengthy video clip was processed and encoded into memory provides direct evidence of the importance of understanding how framing operates in these dynamic media environments. If the results presented here are any indication, scholars may be surprised by what they find and citizens may be surprised by what they learn.

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