Old News? Why Measuring Real-World Exposure to Competitive Framing Matters[1]

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Abstract: Competitive framing of public policy issues has gained increased scholarly attention in recent years. Although researchers have made significant progress, one substantial and often overlooked source of potential interference in experimental manipulation comes from real-life variation in prior exposure to competing messages. In this piece, we incorporate measures of prior exposure to messaging on a relatively new policy issue to demonstrate how past, real-world exposure differentially affects opinion in the context of a laboratory experiment. Specifically, we find that online processing respondents are affected by past exposure but that experimental messaging can also be influential if it contains new information. Memory based processors, by contrast, are only affected by current messages imposed by the experiment. We discuss the implications of these findings for experimental research methods and media effects more generally.

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Introduction

Political debates occur in a competitive setting that unfolds over time. Despite widely acknowledging this fact, the literature in political communication has only recently begun to explicitly consider the implications of this dynamic process (e.g., Chong and Druckman 2007; Gaines, Kuklinski, and Quirk 2007). Although scholarship has long acknowledged that congruent competing messages are likely to neutralize each other's impact upon the public (e.g., Zaller 1992; McGuire 1985), more recent examinations argue that due to rapid message decay, many individuals are disproportionately affected by the most recent communication. This makes, the timing of messaging very important in shaping mass opinion (Chong and Druckman 2010).

Recent work has made strides in both theorizing and testing competitive framing including framing effects over time, and in acknowledging pre-treatment exposure, but very little research has accounted for pre-treatment exposure and more importantly, the *variation* in previous message exposure. The few who have taken real-world exposure into account have typically examined low volume prior communication that was one-sided, not competitive. In addition, we expect that individuals will differ in their style of information processing, and that this should be expected to moderate the effects of prior information (Brinol and Petty 2005; Chong and Druckman 2010). To our knowledge, we provide the first experimental analysis that not only takes prior, real-world competitive exposure seriously but also assesses the effects of variations in prior exposure in the face of new information, mediated by processing mode.

Background

Scholars widely acknowledge that elite communication and the media influence public opinion (Zaller 1992). In particular, scholars point to the role of framing, the media's

presentation of different 'interpretive packages' of a particular issue (Gamson and Modigliani 1989), which influence the set of considerations the public draws from in forming their opinions. Classic studies of framing have demonstrated that single-shot exposure to different frames produce differences in public attitudes; for example, discussion of a KKK rally in combination with public order considerations decreased support for the event more than discussion of the rally in the context of free speech considerations (Nelson, Clawson, and Oxley 1997).

However, acknowledging that framing rarely occurs in isolation, researchers are increasingly interested in understanding how framing of political issues occurs in a competitive environment and the effect of multiple frames in competition (Chong and Druckman 2007). Whereas earlier work argued that two-sided messaging was likely to cancel each other out (Zaller 1992; Zaller 1996; McGuire 1985), more recent work argues that competitive influence may depend upon the frames' strength, not just their synchronous repetition (Druckman et al. 2010). Indeed several studies attest to the neutralizing potential of opposing frames of equal strength (Sniderman and Theriault 2004; Jerit 2009).

Competitive messaging does not always happen simultaneously, however. As new issues emerge or old ones are revived in media, it is not uncommon for citizens to encounter a one-sided frame first followed by a competing message at a later point in time. In fact, Miller and Riechert (2001) argue that such back-and-forth should be expected as part of a 'framing cycle' where issues move from initial emergence to conflict (over problem definition) to resonance (where one side becomes ascendant and the other adjusts messaging) to equilibrium/resolution (where one side dominates followed by enactment of policy). Additional research argues that the initial phases of the framing cycle may matter more than later phases given inertia (Schön and

Rein 1995; Linsky 1986) and initial frames may be particularly influential in shaping malleable

opinions (Chong and Druckman 2007).

The content and timing of messages in competition, therefore, are important factors

determining framing effects; however, equally important to understanding who will be affected

by which messages is an individual's style of information processing (Chong and Druckman

2010; Chong and Druckman 2012; Druckman et al. 2010). Studies of information processing

style originated in psychology with the observation that the valence of information an individual

recalls about a topic is often not well correlated with the individual's judgment on the issue.

Initial work argued that the reason for the low correlation between memory and attitude was due

to a difference in the way in which new information was processed, specifically whether

information was incorporated online or stored in memory (see Hastie and Park 1986; Lodge,

McGraw, and Stroh 1989; Brinol and Petty 2005). Online processing involves immediately

integrating new information upon exposure to update beliefs, storing only the summary of their

impression, not the data specific information. Memory-based processing, by contrast, involves

storing the message itself in memory; if individuals are able to recall it, they will draw upon it

when necessary (Bizer et al. 2006).

While early work argued that processing mode was situationally induced (e.g., Hastie and

Park 1986), later research demonstrated that processing style was individually variant as well

(Jarvis and Petty 1996; Tormala and Petty 2001). In other words, individuals differ in their

underlying predisposition to evaluate information, a personality trait called need to evaluate (NE,

Jarvis and Petty 1996). Individuals with a high need to evaluate process information online

while those with low need to evaluate rely more on memory-based processing (Tormala and

Petty 2001). The need to evaluate has been established as distinguishable from other

psychological traits like need for cognition and demographic characteristics and has low correlations with other politically relevant variables like ideology, partisanship, and political interest (Bizer et al. 2004).

Understanding information processing is important to evaluate the effects of communication on attitudes. Because online processors continually update their summary judgments, their opinions should be more stable than those of the memory processors, who are more dependent upon cues or messages salient in the context-specific environment (Brinol and Petty 2005). The extension of this to the context of dynamic and competitive framing suggests that online processors should be more susceptible to early messages while memory-based processors should be more influenced by recent messaging (Chong and Druckman 2010).

The vast majority of competitive framing research—consistent with most other framing research—utilizes experimental methods to assess the effect of messaging dynamics (Chong and Druckman 2007; Chong and Druckman 2010; Chong and Druckman 2012). A small minority of scholarship acknowledges that, as Gaines et al. (2007) put it, "there is inevitably some possibility that respondents enter the experiment having already participated in a similar experiment, albeit one occurring in the real world" (p. 21). In perhaps the first explicit examination of pre-treatment effects, Druckman and Leeper (2012) use two experiments to assess the influence of prior exposure. In the first, they manipulate processing mode, finding that online processors are more resistant to experimental effects but prone to pretreatment exposure influence while memory based processors show no pretreatment effects but are susceptible to experimental framing. The second experiment capitalizes on real-world exposure in which respondents were pre-treated via real-world messaging to one-sided information before entering the experimental treatment conditions, where some receive new messaging consistent with prior exposure, some

receive a different frame and other receive no frame. Their findings suggest that new experimental exposure consistent with pretreatment does little to further influence online processors, while online processors reject a contrary frame in favor of the pretreatment messaging. Clearly both timing of exposure and message processing interact in shaping citizen opinion, but little is known about how variation in both the extent of and the distribution of pretreatment exposure influences different individuals.

In addition to the issues concerning pretreatment, processing and dynamics, there has been little attention to whether the message or the messenger matters most (see especially Bullock 2011; Druckman, Peterson, and Slothuus 2013). Specifically, though we know partisan cues are important (Rahn 1993), very few studies have explicitly tested the influence of party cues (sources) compared to the content of messages (the frame itself). Bullock (2011) varies the availability of sources and message frames, finding that partisan sources matter but also that partisans can be affected by the substance of the message, and in some cases are more influenced by the content than they are by the message source itself. Druckman et al. (2013) build upon Bullock's (2011) work, varying frame strength and party polarization (via cues suggesting either stark partisan division or little partisan division), concluding that in polarized environments party cues trump messages. Research examining framing by non-partisan sources finds mixed results. Some argue that credible sources improve while biased sources weaken frame acceptance (Callaghan and Schnell 2009); others argue that sources may not affect message influence (Joslyn and Haider-Markel 2007).What is less known is how different types of actor cues (partisan compared to non-partisan) influence message effects, especially regarding policy arguments that are not traditionally within the realm of partisan politics.

Building upon the burgeoning literature in competitive framing, we contribute to the existing literature by combining a nationally representative survey experiment assessing different types of competitive message cues with large-scale content analysis of local media discussion to determine how pre-treatment message environment, processing mode, and type of source cue (medical vs. political) matter in shaping opinions. Specifically, we measure the amount of competitive messaging surrounding HPV vaccine policy in all 50 states over a 27 month period and then, using a nationally-representative experiment-embedded survey, we observe and adjust for variation in pre-exposure pretreatment while manipulating exposure to new messages about vaccine legislation. The results provide further support for the theory of differential effects by processing mode and new evidence justifying the assessment of both volume of pretreatment message environment and type of message exposure.

Public Policy over the HPV Vaccine as a Case of Competitive Framing

The emergence of and state public policy attention to the human papillomavirus (HPV) vaccine, a vaccine that protects against the strains of HPV that cause the majority of cervical cancer as well as other cancers, is an exemplar of competitive frames, sources, and dynamics. Although the HPV vaccine itself is largely regarded as a medical breakthrough, legislative action on the vaccine was controversial. Three short months after FDA licensure of the vaccine, Michigan legislators, followed by numerous other states, introduced legislation to require HPV vaccination for all girls entering sixth grade (i.e., a vaccine mandate) (Colgrove, Abiola, and Mello 2010). A total of 24 states introduced similar mandate legislation (two eventually passed

– VA and DC) and 41 states considered some sort of legislation to fund or provide further

education about the vaccine (with 21 passing as of January 2013).[2]

In previous work, we examined the emergence and evolution of controversy over the new

policy in national and local media within and across the 50 states (Fowler et al. 2012). Our

large-scale content analysis of over 2,000 articles in 101 local newspapers demonstrated that

media coverage of HPV legislation was rife with controversy of different types unfolding over

time. We found, for instance, that support for vaccine requirements was most divided among

legislators and medical experts (both medical associations and individual practitioners) and most

unified (in opposition) among parents' groups and conservatives. Articles increasingly

referenced the existence of controversy over vaccine requirements over the course of the two-

year publicized debate, beginning with zero mentions in the phase just after vaccine approval and

culminating in nearly 40 percent of articles identifying that HPV legislative requirements were

controversial.

[Figure 1 about here]

Figure 1 displays the aggregate count of political and medical actors weighing in on the

HPV vaccine mandate for school entry discussion along with the breakdown of their positions

within type for the 21 month period.[3] As is evident by the figure, both political and medical

actors were sharply divided, with the political official actor positions on the mandate (messages

from the governor and state legislators of both parties) occurring most frequently in the media.

Republican legislators and those of unidentified partisan affiliation were more publicly opposed

to a vaccine mandate than Democratic legislators and governors, but each of the four categories

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[2] National Conference of State Legislatures, http://www.ncsl.org/issues-research/health/hpv-vaccine-state-legislation-and-statutes.aspx.
[3] Not shown on the graph are other ideological, religious and parental actors who weighed in on the debate. We concentrate here on the political and medical controversy.

of political actors registered both a large number of messages concerning vaccination requirements for school entry and division within and among themselves.

Medical actor positions on vaccine legislation requirements for school entry – those emanating from the State Health Departments (who might be thoughts of as a cross-over medical and political actor), medical associations, individual practitioners and academia (public health positions) – were not as prominent as elected official positions, but interestingly they too registered dissent among each category with some arguing in favor and some arguing against. Due to the lower volume of medical actor positions, which emerged primarily in the later phases of the discussion, and to the fact that political conflict is more or less expected on political issues surrounding legislation, medical actor conflict may represent a newer type of message cue, which could have differential effects pertinent to opinion formation than those of politicians. In fact, we observe that the frequency of opposition to vaccine mandates based on medical arguments rose from just 0.3 percent of coverage before September 2006 to 8.2 percent of coverage by February 2007 and 15 percent of coverage by the end of 2008. The more anticipated argument type in opposition to mandates, political arguments involving the role of government, rose from 9 percent of coverage to 19.7 percent by the time Michigan introduced legislation and did not significantly vary (22.2 percent) until the end of the observed time period (Fowler et al. 2012).

Perhaps even more important than understanding the different types of arguments emanating from different actors is recognizing the vast amount of variation in volume and controversy across the states. States that introduced legislation to require the vaccine for school entry had a much larger number of articles mentioning controversy (34.1 percent) compared to

those that did not introduce similar legislation (18.6 percent). The overall volume of articles was also highly variable, with 146 articles in Texas and only 2 in Hawaii.

Expectations

In this study, we randomly expose respondents to different types of messages about HPV vaccine legislation that vary in the existence of and type of controversy depicted: political conflict, medical conflict, or both types of conflict. We compare that to a message that describes uniform support by political and medical actors of the legislation to require the vaccine for middle-school girls. In addition, we match respondents to a measure of the availability of controversial information about vaccine legislation available in their state prior to experimental treatment. We expect both the pre-treatment environment and the new experimental exposure to differing types of conflict to reduce support for mandates relative to the uniform support control condition. In short,

H1: The availability of pre-treatment controversy and conflict-oriented experimental exposure should independently reduce support for mandates.

However, there are good reasons to anticipate that both the effects of the pre-treatment environment and the effects of differing conflict frames will differ by processing style. The expectations for memory-based processors are more straightforward as they are moved primarily by recent messaging, which leads to the following hypothesis:

H2: Memory-based processors should be influenced more by experimental exposure to conflict than by pre-treatment availability of controversial messages.

Online processors, by contrast, should be influenced primarily by early messaging and increased exposure to messages in the pre-treatment environment should serve to further solidify

their opinions such that they may be immune to new experimental stimuli that are similar. In our particular case, this should translate into smaller influence of any of the controversy frames given online processors may be familiar with both dimensions of conflict.

H3: Online processors should reduce their support for mandates as a function of the volume of controversial messages they received, and they should be less susceptible to new experimental exposure.

We have less clear expectations about the role of partisan versus medical conflict dimensions in shaping support for mandates. To the extent that both types of conflict amplify the controversy cue, we expect the dual conflict condition to reduce support the most, but how effects may differ by processing mode is an open question. Political controversy was the most common frame mentioned in real-world coverage of the vaccine legislation discussion (Fowler et al. 2012), so to the extent that online processors noticed conflict dimension, political controversy may be the most familiar cue. On the other hand, political conflict--though expected in a legislative domain--may be unexpected on a non-traditionally political topic (like the HPV vaccine). Medical conflict was present (as evidenced by Figure 1), but in lower volume than political conflict, and when it occurred (in varying amounts across the states), it was more likely to occur in the later phase of the debate. As such, a medical conflict frame may include new information even for some online processors. Given the lack of attention in the previous literature to different types of cues, however, we leave the comparisons of the effects of sources of conflict as research questions.

RQ1: How does type of conflict affect support for mandates?

RQ2: How does processing moderate type of controversy cue in affecting support for mandates?

Data and Sample

Study participants were recruited by Knowledge Networks (now GfK), a survey firm that maintains a panel of eligible respondents. Unlike most Internet panels, the Knowledge Networks panel is designed to be representative of the United States population, since panel members are recruited via probability sampling (random-digit dialing), and then households are provided with access to Internet and hardware if needed. Given our experimental study design (described below), we requested that KN recruit a sample of at least 1,200 adults (over age 18) so we would have sufficient power to detect effects. Participants completed the Internet-based survey between June 19 and July 2, 2009. Out of 2,235 sampled cases, 1,216 completed the survey, for a completion rate of 54.4%.

Study Design

The study design consists of four experimental groups, each receiving different stimuli. Before viewing the stimuli, participants answered questions about their current awareness of HPV and the cervical cancer vaccine. Respondents then viewed one of four different news briefs about legislative action surrounding the HPV vaccine. The short news briefs were identical except with respect to whether and what type of (political and/or medical) controversy was present in both the headline and concluding sentences. See Appendix 1 for the specific wording of the manipulation in the news briefs. Participants in the Reference Group (Group 1) were exposed to an article that discussed the HPV vaccine and recent legislative activity, but stated that politicians and medical experts were in support of the legislation and identified no controversy or conflict. In the Political Conflict Group (2), participants were exposed to the same basic article as the Reference Group; however, the article presented conflict on the political

dimension. In the Medical Conflict Group (3), participants were exposed to the same original article; however, the article presented conflict on the medical dimension. Finally, participants in the Dual Conflict Group (4) viewed the same content as the previous groups, but the article presented conflict on both dimensions. In each of groups 2 through 4, in addition to presenting the specific actor groups (political or medical) in which conflict existed, each of the articles also included the sentence: "However, controversy surrounding the proposal requiring young girls to be vaccinated emerged shortly after introduction of the bill."

We compared the proportions of participants across the four groups in terms of their age, gender, race/ethnicity, political orientation, political ideology, educational attainment, previous awareness of HPV, and number of daughters in the household (using one-way ANOVA or Chi-square tests) and found no statistically significant ($p<0.05$) differences across the groups, indicating balanced randomization to treatment groups. All demographic information except for previous awareness of HPV was obtained from the Knowledge Networks panel data. We also compared the proportions of participants in the four groups in terms of their need to evaluate (measure described below), and do not find any statistically significant differences across groups. Availability of pretreatment controversy information comes from our large-scale content analysis described in detail elsewhere (see especially Fowler et al. 2012). One large concern for studies that do not incorporate measures of real-world pretreatment exposure is that there is no way to ensure that randomization to current experimental treatment worked. We can test this directly with our count of state-specific news stories mentioning controversy (described in detail below) and can confidently conclude for this study that there are no statistically significant differences ($p<0.05$) between any of the treatment groups and the control on this dimension.

Before moving to measures, it is important to acknowledge what our experimental design does and does not do. Our extensive content analysis confirmed that controversy occurred on both political and medical dimensions in two distinct but interrelated ways: (1) in the actors featured (e.g., among politicians and among the medical community) and (2) in the messages or arguments presented (e.g., should government have the authority, concerns about encouraging promiscuity, versus medical advantages and disadvantages of the vaccine). Although we think determining whether the source cue or the argument matters more is a substantively interesting and important question, we chose to limit our experimental manipulation to presence or absence of controversy along with brief source cues indicating from which expert group controversy emanated rather than provide specific arguments or more substantial framing on either dimension for several reasons. First, we believe that controversy among experts (i.e., among politicians and among the medical community) matters, and we wanted a clean estimate of whether elite conflict influences opinion. Certainly, the arguments used by different types of elites also matter, and we hope to follow up on these effects in future work. Second, we believe our current manipulation represents a conservative test of framing effects. If we can demonstrate that presence or absence of mentions of controversy along with mild source cues indicating from whom controversy emanates, we believe manipulations incorporating some of the more contentious arguments from either side would be even more powerful.

Measures

Dependent variable. The key dependent variable is support for requiring 11- and 12-year old girls to get the HPV vaccine. We measured support for HPV vaccination through a measure adapted from the National Poll on Children's Health (NPCH 2007): "Do you support, oppose, or

neither support nor oppose a state law that requires girls to get the HPV vaccine (that prevents cervical cancer) before entering 9th grade? [If favor or oppose]: Do you (favor/oppose) that a great deal, moderately, or a little?" We re-coded this variable into a 7-point scale.

   Other key variables. Our main hypothesized moderator involves cognitive processing style, measured through the extent to which an individual possesses strong need-to-evaluate cognitive desires on a two-item index, similar to Bizer et al. (2004).[4] One asks, "Some people have opinions about almost everything; other people have opinions about just some things; and still other people have very few opinions. What about you? Would you say you have opinions about almost everything, about many things, about some things, or about very few things?" The other asks, "Some people say that it is important to have definite opinions about lots of things, while other people think that it is better to remain neutral on most issues. What about you? Do you think it is better to have definite opinions about lots of things or to remain neutral on most issues?" We recode each from 0 to 1 and average the two to create a need-to-evaluate index. We split the index at the median, assigning individuals above the median to the high need-to-evaluate category (our measure of online processors) and those below to low need-to-evaluate (our measure of memory based processors). Need to evaluate is only weakly correlated with standard demographic variables and trust in government and doctors. Table 1 shows both the correlations between the index (findings are similar if we use the median split) and other demographics along with a coefficients from a regression model predicting the personality trait. As noted in column 1, none of the correlations between the variables exceed 0.2 with trust in doctors, ideological strength and education being most highly correlated (at -0.19, 0.18, and 0.15

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[4] Bizer et al. (2004) took Jarvis and Petty's (1996) original 16 item index, reduced it to three items and showed the two measurements to be strongly correlated. Due to time restrictions on TESS, we chose two of the three items that represent to two key characteristics: volume of opinions and valence or neutrality of opinions.

respectively). These three factors remain most associated in the multivariate model (column 2) controlling for other factors.

[Table 1 about here]

Pre-treatment message environment is measured by the number of stories mentioning controversy surrounding mandate legislation published in the two papers selected for our sample from each respondent's state of residence.[5] Newspapers were selected through the following sampling criteria. First, they had to be available electronically in either LexisNexis or NewsBank databases for the full time period of study (from January 1, 2006 through March 31, 2008). Then we selected the largest circulating paper from the capital city of each state available in either database. The second paper was either the highest circulating paper available in the state or the second highest circulating paper if the capital city paper was the largest. We do not use a simple count of articles appearing in the individuals' state because we anticipate that the relevant pre-exposure effect relates to the *content* of the messages, not just the frequency of the messages. In particular, since the key experimental effect concerned the effect of controversy, we measure the volume of articles that *mentioned controversy* (see Fowler et al. 2012 for more detail on the content analysis, in which we describe several dimensions of controversy presented in news coverage over this issue).

Control variables. Although we randomize the treatment and we find no statistical differences across treatment groups in need to evaluate, we are not manipulating processing mode, and therefore, to be extra cautious in our interpretations, we control for additional demographics and attitudes. Specifically, we incorporate measures of gender, age, education (measured in years), race (non-white versus white), household income (split into five categories

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[5] Delaware and Hawaii are the only two states for which only one newspaper was obtained. Delaware did not have a capital city paper available in either database, and only one paper was available for Hawaii.

from <$20,000 to ≥$125,000), having a teenage girl in the household, ideology (on a seven point scale toward extremely liberal), partisanship (on a seven point scale toward strong Democrat), and two trust measures: trust in government and trust in doctors (both measured on a four point scale from "almost never" to "just about always").

Analysis and Results

We first compare differences across the four treatment groups controlling for the logged volume of pre-treatment controversy in the respondent's state using survey weighted linear (OLS) regression estimation omitting the Reference Group (i.e., the unified support group). See column one and two of Table 2 (estimates using ordered logit do not change the results; the Appendix displays the full model results with controls). To test for moderators, we subdivide the sample by processing mode and estimate the same regression for the memory-based processors and the online processors (columns three through six).

As indicated in column one, the overall model provides support for H1, suggesting that both current conflict frames and pre-treatment conflict coverage decrease support for vaccine mandates. (The political and medical conflict conditions are marginally significant in the one-tailed test for a suppression effect.) When we include additional multivariate controls (column two), all three conflict conditions become significant while the pre-treatment conflict measure is marginally significant in a one-tailed test.

When we stratify the models by high and low need to evaluate, however, we better understand how pre-treatment and experimental conflict differently affect individuals with different processing modes. Figures 2 and 3 display the treatment and pre-treatment effects by high and low need to evaluate. Those with low need to evaluate (the ones who typically process

via memory, recalling what they can and then making an assessment; see columns three and four of Table 2) were unaffected by pre-treatment controversy, supporting H2. This makes sense, especially knowing that the survey manipulation occurred nearly two years after the height of controversy surrounding the vaccine. Memory-based processors would be much less likely to recall this information and therefore are more reliant on cues in the immediate environment. Indeed, we find that low need to evaluate individuals were only affected by the condition with the clearest signal, the dual conflict treatment, not by either of the political or medical conflict conditions.

[Figures 2 and 3 about here]

Those high in need to evaluate by contrast (columns five and six of Table 2) were less likely to support mandates as a function of the volume of pre-treatment conflict available prior to receiving the experimental stimuli, supporting H3.[6] To the extent that they responded to the experimental treatment, we find they were less supportive in the political and medical conflict condition relative to the dual conflict condition. The reason for this is not entirely clear, but we might speculate that these online processors may have just noted originally that there was controversy surrounding HPV legislative action, not that controversy varied among different types of actors. As such, they may have been inoculated against the dual conflict condition as it simply confirmed controversy in general. The medical and political conflict conditions, however, may have made salient something that may have been more implicit in media coverage: that doctors and politicians did not always agree amongst themselves *and* that they did not always agree across type (i.e., when doctors were divided, politicians were supportive and when politicians disagreed, doctors were supportive). To the extent to these may have been new

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[6] We also statistically test for moderation by running the models on the full sample and estimating interaction terms with need-to-evaluate. Results are not shown but confirm the interactive effect of processing and pre-treatment as the coefficient on the interaction is both negative and statistically significant.

cues, even to online processors, it appears that they lowered support above and beyond the pre-treatment environment.

Discussion

In this analysis, we utilized an extensive content analysis of local newspaper coverage across 50 states and 27 months to better operationalize and control for variation in possible availability of controversial messages about public policy prior to participation in a messaging experiment. The results indicate, as hypothesized, that memory based processors are most susceptible to new messages while online processors tend to be influenced by early arguments in the environment. However, our results may also suggest that to the extent that newly received messages contain additional considerations not available or salient in pre-treatment, online processors may continue to be susceptible to influence from new messages in the environment. The results are largely consistent with Druckman and Leeper (2012); however, our analysis provides not only further confirmation of the role of processing style in moderating pre-treatment and experimental effects, but it also does so by incorporating large-scale measures of variation in the pre-treatment environment, demonstrating that the volume of prior messages matter.

Our research has several limitations. First, the measure of pre-treatment coverage – though variable due to an individual's state of residence – is not individualized based on any sort of self-reported media consumption or health policy attention, and furthermore, because we include the total count of controversial messages (albeit, in only two newspapers), the measure is best thought of as an rough estimate of the availability of information to which any individual might have been exposed. Due to known issues in self-reported consumption habits and the fact that we only measured two papers per state, which may or may not correspond with an

individual's city of residence, and the fact that individuals could have encountered messages through a variety of venues (not just newspapers), we refrain from attempting to incorporate more individualized measures of consumption here, but future research should follow up to better operationalize prior exposure.

Second, despite the vast improvement in pre-treatment message measurement and advance in looking at different types of actor cues, this paper utilizes a rather blunt operationalization of both prior messaging and new message cue. That is, 1) we simply count articles containing reference to controversy about mandating the HPV vaccine for school entry, not the source or actual content of such messages, and 2) our experimental manipulation simply references controversy within different types of actor groups, not the actual substance of the disagreement. For reasons discussed earlier, we believe that this paper represents a necessary first and conservative test of competitive framing upon which future designs can improve.

Finally, although we incorporate an exceptionally long period of content analysis (27 months) into our design, we do not have access to *all* prior messages appearing prior to our survey experiment even in the 101 papers analyzed. Specifically, real-world article data were coded through March 31, 2008 not through June 2009 when the survey actually fielded. We did collect the total article counts during from April 1, 2008 until May 31, 2009, and found that only 350 total articles appeared in the 101 newspapers we tracked over this year compared to 2,181 identified in the search from January 1, 2006 to March 31, 2008. Based on knowledge regarding the types of legislation introduced during this later period (only 5 total school mandates were introduced in the legislative sessions 2007-2008 and 2009-2010 compared to 24 in the 2006-2007 season), we believe that policy efforts and any subsequent media coverage would have been more likely to focus on legislation focused on providing education about the vaccine or

funding of the vaccine by insurance providers rather than legislation about school entry, which would suggest a less controversial tone in the limited available articles and that the content of those articles was unlikely to concern mandate legislation, the specific content of the experimental manipulation. Nevertheless, we cannot be confident that we have completely measured all controversy surrounding school entry requirements in the pre-treatment environment. Despite this limitation, we believe that the findings for online processors are even more impressive evidence of the influence of pre-treatment information, given the bulk of the messaging to which these individuals were exposed occurred long before they entered our experiment.

Conclusion

Our analysis incorporating large-scale pre-treatment environmental messaging into a study of competitive framing reveals further support for the notion that individual processing mode moderates the extent to which individuals will be affected by new information. Specifically, memory based processors are more susceptible to cues and information readily available in current messaging than are online processors. However, the content of pre-treatment messaging may also affect the extent to which online processors may be influenced by recent messages. In particular, even controlling for large amounts of pre-treatment information, individuals who have high need to evaluate who receive new information about older issues may still be influenced by new cues.

In a world where we know communication about policy issues do not occur in a vacuum, knowing and understanding how competing messages, timing of information and individual differences interact to shape who may be affected when and by which messages is very

important. Our analysis reveals not only that variation in pre-treatment exposure matters but also that it interacts with individual-level factors in shaping susceptibility to new information. Furthermore, the findings suggest further reasons why competitive messaging, especially if it corresponds well to previous messages available in the information environment, may not necessarily appear to influence opinions uniformly.

Figure 1. Volume and Type of Argument Presented by Actor Group
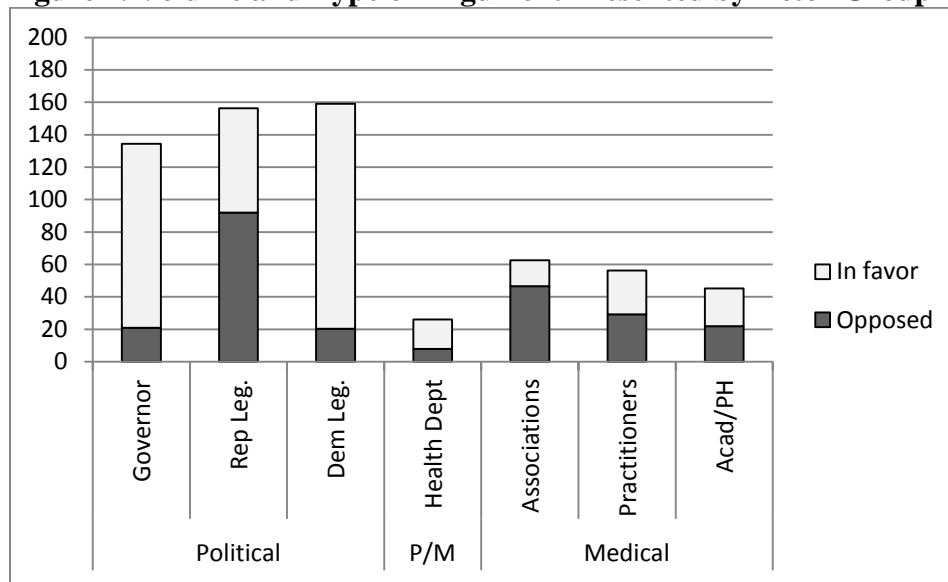
Table 1. Correlation and Predictors of Need to Evaluate Index

VARIABLES	(1) Correlations	(2) Multi- variate
Liberal	-0.079	-0.00951
		(0.0104)
Democrat	-0.1008	-0.00740
		(0.00723)
Ideological Strength	0.1795	0.0281**
		(0.0130)
Partisan Strength	0.1228	0.0214*
		(0.0130)
Trust in Govt	-0.0175	0.0142
		(0.0197)
Trust in Doctors	-0.1893	-0.0896***
		(0.0201)
Female	-0.0108	-0.0404*
		(0.0240)
Education (Years)	0.1462	0.0181***
		(0.00521)
Age	-0.0039	-0.000604
		(0.000704)
Income 2	-0.0514	-0.0577
		(0.0431)
Income 3	-0.004	-0.0514
		(0.0399)
Income 4	0.0852	-0.0528
		(0.0427)
Income 5	-0.0315	-0.103**
		(0.0504)
Nonwhite	-0.0089	0.00177
		(0.0309)
Constant		0.605***
		(0.107)
Observations		1,203

Standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 2. Treatment and Pre-Treatment Effects by Processing Mode

| VARIABLES	OVERALL		Low Need to Evaluate		High Need to Evaluate	
Political Conflict	-0.297	-0.394**	-0.208	-0.163	-0.332	-0.587**
	(0.212)	(0.187)	(0.254)	(0.240)	(0.335)	(0.272)
Medical Conflict	-0.291	-0.453**	-0.0962	-0.201	-0.446	-0.683**
	(0.208)	(0.193)	(0.262)	(0.246)	(0.321)	(0.279)
Dual Conflict	-0.524***	-0.621***	-0.715***	-0.797***	-0.260	-0.399
	(0.202)	(0.188)	(0.248)	(0.236)	(0.320)	(0.262)
t-1 Conflict	-0.390***	-0.210	-0.213	-0.0477	-0.616***	-0.469**
	(0.144)	(0.138)	(0.182)	(0.172)	(0.226)	(0.200)
Includes additional controls?	NO	YES	NO	YES	NO	YES
Observations	1,212	1,199	605	597	607	602
R-squared	0.017	0.158	0.027	0.086	0.024	0.281

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Figure 2. Treatment Effects for Low versus High Need to Evaluate
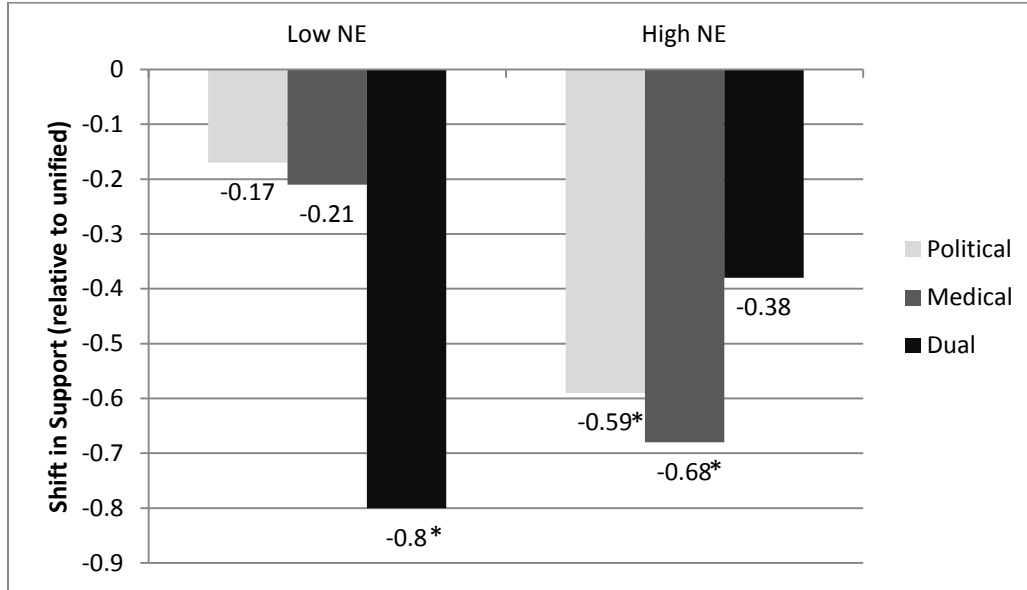
Figure 3. Pre-Treatment Effects by Processing Mode
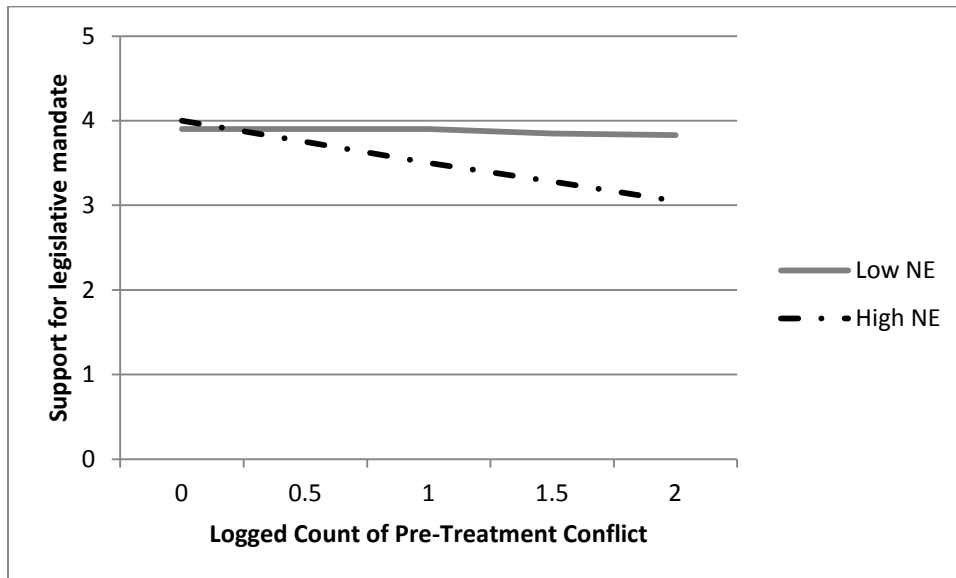
APPENDIX 1: Questions and Description of Stimuli

Note: Respondents were randomly assigned to a value of variable "Profession" (1 or 2), which dictated whether doctors or politicians were mentioned first in both the unified and dual conflict groups.

Article Text (Reference Group; i.e., Unified Support):

Bill Requiring HPV Vaccine Gains Support from Doctors and Politicians

Lawmakers are considering a bill that would require school-age girls to get vaccinated against the virus that causes cervical cancer.

The vaccine was approved in 2006 by the Food and Drug Administration. It is the first vaccine developed to prevent cancer. It works by targeting the human papillomavirus, or HPV, a sexually transmitted virus that causes most cases of cervical cancer. The Center for Disease Control's Advisory Committee of Immunization Practices said middle school-age girls should be vaccinated.

The proposed legislation has gained widespread support from politicians on both sides of the aisle.

In addition, it is widely supported by both medical practitioners and public health experts.

Modified Headline and Concluding Sentences (Political Conflict Group):

Bill Requiring HPV Vaccine Gains Support from Doctors, But Politicians are Divided

The proposed legislation has gained widespread support among medical practitioners and public health experts.

However, controversy surrounding the proposal requiring young girls to be vaccinated emerged shortly after introduction of the bill.

Politicians on both sides of the aisle disagree over whether a mandate requiring the vaccine is the right thing to do.

<u>Modified Headline and Concluding Sentences (Medical Conflict Group):</u>

Bill Requiring HPV Vaccine Gains Support from Politicians, But Doctors are Divided

> The proposed legislation has gained widespread support from politicians on both sides of the aisle.

> However, controversy surrounding the proposal requiring young girls to be vaccinated emerged shortly after introduction of the bill.

> Medical practitioners and public health experts disagree over whether a mandate requiring the vaccine is the right thing to do.

<u>Modified Headline and Concluding Sentences (Dual Conflict Group):</u>

Politicians and Doctors Are Divided Over Bill Requiring HPV Vaccine <Rotate Groups>

> The proposed legislation has gained support in some circles; however, controversy surrounding the legislative proposal requiring young girls to be vaccinated emerged shortly after introduction of the bill.

> Politicians on both sides of the aisle disagree over whether a mandate requiring the vaccine is the right thing to do.

> In addition, medical practitioners and public health experts are also divided over the requirement.

Appendix Table. Treatment and Pre-Treatment Effects by Processing Mode

VARIABLES	OVERALL		Low Need to Evaluate		High Need to Evaluate	
Political Conflict	-0.297	-0.394**	-0.208	-0.163	-0.332	-0.587**
	(0.212)	(0.187)	(0.254)	(0.240)	(0.335)	(0.272)
Medical Conflict	-0.291	-0.453**	-0.0962	-0.201	-0.446	-0.683**
	(0.208)	(0.193)	(0.262)	(0.246)	(0.321)	(0.279)
Dual Conflict	-0.524***	-0.621***	-0.715***	-0.797***	-0.260	-0.399
	(0.202)	(0.188)	(0.248)	(0.236)	(0.320)	(0.262)
t-1 Conflict	-0.390***	-0.210	-0.213	-0.0477	-0.616***	-0.469**
	(0.144)	(0.138)	(0.182)	(0.172)	(0.226)	(0.200)
Liberal		0.197***		0.0149		0.370***
		(0.0607)		(0.0712)		(0.0929)
Partisanship		0.104**		0.0815*		0.0817
		(0.0410)		(0.0488)		(0.0662)
Trust Gov		-0.638***		-0.446***		-0.749***
		(0.114)		(0.145)		(0.169)
Trust Docs		-0.223**		-0.0920		-0.471***
		(0.112)		(0.138)		(0.163)
Female		-0.265**		-0.220		-0.248
		(0.133)		(0.176)		(0.193)
Teenage girl		-0.0888		-0.0711		-0.215
		(0.260)		(0.377)		(0.297)
Education		-0.0775**		-0.0698*		-0.0742
		(0.0323)		(0.0386)		(0.0475)
Age		-0.00802**		-0.00563		-0.0126**
		(0.00388)		(0.00492)		(0.00604)
Income (<$20K)		-0.164		0.243		-0.415
		(0.244)		(0.319)		(0.359)
Income ($20-$39.9K)		-0.342		-0.0293		-0.603*
		(0.249)		(0.319)		(0.363)
Income ($40-$74.9K)		-0.243		-0.0341		-0.382
		(0.266)		(0.359)		(0.375)
Income ($75-$124.9K)		0.0279		0.0484		-0.0252
		(0.342)		(0.435)		(0.495)
Constant	4.443***	7.256***	4.398***	6.621***	4.491***	8.077***
	(0.191)	(0.685)	(0.237)	(0.926)	(0.295)	(0.920)
Observations	1,212	1,199	605	597	607	602
R-squared	0.017	0.158	0.027	0.086	0.024	0.281

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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