Communication Content and Knowledge

Content Matters: Integrating Manipulation and Observation in Studying News and Discussion Learning Effects

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The present study reviews problems in the political learning literature, including ambiguous causality and a lack of specificity in linking communication content to learning outcomes. As a partial solution, our study of media and discussion influence incorporates both manipulated and observed aspects of mass and interpersonal communication. Results indicate that beyond (and often more important than) experimental manipulations, selection processes in news use and variations in the content of political discussions within exposure conditions matter for political knowledge. However, findings vary in predictable ways depending on the form of knowledge—overall factual knowledge, issue-specific knowledge, or knowledge structure density. These results suggest that the process of political learning via communication is more complex than it is often treated empirically.

Keywords: Political Conversation, Deliberation, Political Knowledge, Structural Knowledge, News Use, Diversity, Talk.

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Given that individuals’ direct experience with major political events and policy debates are rather limited, researchers have assumed that news media use is a primary source of political information. Therefore, political communication scholars have devoted substantial research to confirm a positive relationship between news exposure and political knowledge. And very early in the history of research on political communication, studies demonstrated that personal interactions may also be relevant channels of political information. Reviews of the research suggest that news use and political discussion are important predictors of political knowledge.

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Despite the valuable insights provided by prior scholarship on the effects of news use and political discussion on political knowledge, much of the research suffers from multiple limitations related to design and measurement (see Slater, 2004; Southwell & Yzer, 2007). We begin by reviewing the evidence on communication’s relationship with political knowledge, paying particular attention to the methodological limitations of typical political knowledge studies. We then introduce this study, whose design addresses some of the problems with prior research by employing experimental manipulations of news exposure and public affairs discussion in small group settings in which some members have, and some have not, had exposure to relevant news prior to discussion. Just as importantly, the study goes beyond standard experimental and survey procedures by incorporating detailed observational data — content analysis of face-to-face conversation transcripts and computer tracking of online news use — to provide a more precise understanding of the specific aspects of news use and discussion that produce both content and structural aspects of public affairs knowledge. Thus, as advocated by prior research (Southwell & Yzer, 2009), this study permits not only control over news exposure and discussion in general, but also detailed measurement of the content of news media exposure and public affairs discussion. In doing so, it links media and discussion as an interactive system (Scheufele, 2002; Southwell & Yzer, 2007) to factual and structural political knowledge.

**Political knowledge**

Political knowledge is often understood as the “range of factual information about politics that is stored in long-term memory” (Delli Carpini & Keeter, 1996, p. 10). However, scholars have also long noted the importance of considering a second, structural component to knowledge (see McGraw, Pinney, & Neumann, 1991; Neuman, 1981). Factual knowledge measures in communication research are usually constructed in an ad hoc manner, study by study, because they need to reflect the nature of communication content. But Graber (2001, p. 14) argues that “the ability to reason effectively depends on the ability to make connections among ideas,” which is the essence of the concept of structural knowledge. The literature has seen a plethora of measures of structural knowledge, but in recent years one relatively consistent conceptualization and operationalization has relied on perceptions of the interconnections among political issues and actors as a measure of knowledge structure density or KSD (Eveland & Hively, 2009; Eveland, Marton, & Seo, 2004; Hutchens, Hmielowski, & Beam, 2014). Importantly, this research has demonstrated that various aspects of communication appear to be differentially related to factual knowledge and KSD.

**News media exposure and political knowledge**

News media play a key role in political knowledge acquisition by providing information about politics that often cannot be experienced directly by citizens. Research on the relationship between news exposure and political learning has relied, for the most
part, on the results of cross-sectional sample surveys (e.g., Delli Carpini & Keeter, 1996; Scheufele, 2002). The bulk of these studies have reached the general conclusion that news exposure (or attention or some combination) is positively related to knowledge of politics and public affairs. Panel survey data provide additional evidence for potential causal effects of news on political knowledge (Eveland, Hayes, Shah, & Kwak, 2005b).

Despite relatively consistent findings about the relationship between news use and knowledge in these survey studies, the strength of the relationship is less than one might expect given the relative lack of alternative sources for learning about politics. One reason for this relatively weak relationship is probably related to the reliance upon self-reports of news exposure or attention as predictors. Slater (2004) argues that “a primary weakness in the use of global self-report measures is the inevitable uncertainty concerning the exact nature of the relevant content of the media to which respondents report exposure” (p. 169). Others have demonstrated that answering frequency questions in general — of which frequency of media exposure is but one example — relies heavily on guesswork (Prior, 2009) because of the limitations of human memory. Research comparing actual media consumption data with self-reported media exposure has indicated systematic biases (e.g., Prior, 2009; Tewksbury, 2003).

Compared to survey studies, the number of experimental studies of political learning from news media is quite limited. Moreover, most experimental studies have mainly focused on media or modality comparisons (e.g., Neuman, Just, & Crigler, 1992; Tewksbury & Althaus, 2000) or the effects of variation in specific content or structure variables (e.g., Eveland et al., 2004; Lang, Newhagen, & Reeves, 1996) rather than the general relationship between news exposure (or not) and political knowledge. Of course, this omission in experimental research may be expected because some would argue that a simple comparison of those exposed versus not exposed to news information would be too simple, and too obvious, to test. Nonetheless, we begin by predicting: Exposure to news media will be positively related to overall factual knowledge (H1a). Exposure to news media will be positively related to KSD (H1b). Among those experimentally exposed to news, the number of stories read will be positively related to overall factual knowledge (H2a). Among those experimentally exposed to the news, the number of stories read will be positively related to KSD (H2b).

In addition to the total number of stories, diversity of exposure across topics should have a positive impact on KSD, although not necessarily on factual knowledge (Eveland & Hively, 2009). By sampling and moving between stories that focus on different topics, the interconnections between those topics should become more apparent to readers either by cross-references or simply by the pattern of exposure in which salient aspects of an issue covered in one article are still highly accessible in memory at the time a story on a different topic is read. Thus, we predict: Diversity in topics read will be positively related to KSD (H3).
Moving beyond overall factual knowledge to issue-specific factual knowledge could be valuable in understanding the effects of selective exposure on learning (Iyengar, 1990), as people tend to select media sources and content that complements their pre-existing perspectives and interests. Thus, McLeod and McDonald (1985) found that exposure to specific news content was a better predictor of learning than exposure to general news content. Others have argued that, unlike general measures of political knowledge such as those developed by Delli Carpini and Keeter (1996), knowledge measures in media effects studies must align with available news content (e.g., Eveland, Hayes, Shah, & Kwak, 2005a; Price, 1999). Given the greater ability of modern online media forms—and traditional newspapers—to permit topical selectivity compared to television news (Tewksbury & Althaus, 2000), we predict: The number of stories read on a given issue will be positively related to factual knowledge about that issue (H4).

**Political discussion and political knowledge**

Existing survey research suggests that political discussion has a positive relationship with multiple forms of political knowledge (Schmitt-Beck & Lup, 2013). However, most studies suffer from several limitations in assessing the nature of this relationship. First, the typical survey item measuring political discussion asks how often the respondent discusses politics with others (e.g., Eveland, 2004; Feldman & Price, 2008; Scheufele, 2002), but the meaning of the term politics has been shown to be highly variable across respondents (Fitzgerald, 2013). Second, the same concern that has been raised for media exposure measures (Prior, 2009) also applies for discussion frequency: Self-reported frequency measures may be unreliable because they are a product of guesswork.

As with news learning research, the other major limitation of survey research on learning and discussion is the lack of solid panel data to infer causality. At best, most survey studies can only demonstrate a significant, positive relationship rather than causality due to their inability to establish time order (for a rare exception employing panel data, see Eveland et al., 2005b). Interestingly, experimental research assessing the effects of political discussion on political knowledge—which could make causal inferences more appropriate—is quite rare. Even including field experiments assessing the effects of deliberative forums, the number of experiments assessing discussion effects on political knowledge is fairly limited, and many designs confound discussion with (a) exposure to mediated information in the experimental design and (b) the effects of anticipation of discussion (e.g., Luskin, Fishkin, & Jowell, 2002). One exception to the former limitation is the work of Lenart (1994), who found that group discussion provided new information about political candidates and thus could enhance knowledge beyond that which was covered in presidential debates. But, in some cases discussion actually reduced knowledge among those who had been exposed to media content beforehand. Ahn and Ryan (2014) similarly found that in some cases (when ego and alter supported different candidates) social sharing of information can mislead rather than enlighten individuals, causing them to choose the wrong candidate
relative to their preferences. Thus, experimental evidence appears to be equivocal regarding the causal impact of political discussion on political knowledge. Nonetheless, we make the common general predictions: Participation in discussion of news will be positively related to overall factual knowledge (H5a). Participation in discussion of news will be positively related to KSD (H5b).

There is some evidence suggesting a statistical interaction between news exposure and discussion, which means we must integrate studies of news effects and discussion effects on knowledge (Southwell & Yzer, 2007). Scheufele (2002) argues that news effects on knowledge are stronger in the presence of discussion as part of his differential gains model, although Lenart (1994) finds that discussion can actually dampen the effects of learning from presidential debates. Hardy and Scheufele (2009) also find that, although interaction size and statistical significance vary by campaign events, any tendency toward interactions is in the direction of news effects being weaker (not greater) in the presence of discussion. We therefore ask: Is the effect of news use on factual knowledge and KSD moderated by discussion of the news (RQ1)?

The content of discussion and the nature of the interpersonal interaction may be at least as important as the existence or frequency of discussion itself (Eveland, Morey, & Hutchens, 2011; Southwell & Yzer, 2007), and group-level factors are important in understanding discussion effects (Bonito, 2001; Pavitt & Johnson, 1999). Unfortunately, most current experimental research is limited by a lack of information about the nature of political discussion that takes place. Most existing studies of deliberation have failed to examine the conversational or group-level variables that may be relevant in understanding the effects of actual political discussion on political knowledge (e.g., Farrar et al., 2010; List, Luskin, Fishkin, & McLean, 2013), instead treating discussion practices as a sort of black box. It is not surprising, then, that in concluding their study of deliberation effects, Gastil and Dillard (1999, p. 21) argue that one of the most valuable contributions to this area of research “would be attempts to measure variations in the nature and quality of the deliberative process itself.”

One mechanism of discussion effects may be that discussions are able to provide information that individual members did not know before (Hinsz, Tindale, & Vollrath, 1997). During a political discussion group members may supply each other with an extra portion of exposure to political news, or what Eveland (2004) refers to as the exposure explanation. Group knowledge increases as a consequence of the individual discussants’ contributions of information (Bonito, 2001). As a result of this, collaboration can enhance individual memory (Rajaram & Pereira-Pasarin, 2007; Weldon & Bellinger, 1997). Moreover, discussion provides an opportunity for repetition and rehearsal of information from memory. As individuals engage in discussion of news, they practice retrieval, verbally repeat the information, and hear others do the same (Hirst & Echterhoff, 2012; Rajaram & Pereira-Pasarin, 2007). In other words, the repetition of information in the course of a discussion can enhance retention, assuming that listeners are attentive (Pasupathi, Stallworth, & Murdoch, 1998) and/or motivated to discuss (Scholten, van Knippenberg, Nijstad, & De Dreu, 2007). With that said, information exchange in conversations is able to consolidate the corresponding
information in long-term memory and to foster knowledge-building processes (Hirst & Echterhoff, 2012; Kellogg, 2003).

Of course, group discussion effectiveness varies as a function of what information is shared and the degree to which information is shared (Hinsz et al., 1997). Owing to their diversity of memories and experiences, group members can profit from other discussants’ expertise and acquired knowledge (Hirst & Echterhoff, 2012). But, evidence suggests that often the unique information owned by any individual is, for a number of reasons, less likely to be communicated in discussion compared to shared information (Bonito, 2007). From this perspective, it is not the mere presence of a discussion, but the content of a discussion that should produce learning effects. Therefore, we predicted: Discussion of a specific issue by group members other than the ego will be positively related to factual knowledge of that issue (H6).

Eveland (2004) offered another explanation for discussion effects, arguing that anticipation of political discussion could motivate individuals to produce certain information-processing behaviors such as elaboration that in turn determine the extent of one’s learning (see also Pingree, 2007). People, anticipating discussion, consume news with the aim of preparing their reasoning for the subsequent task of interpersonal political communication — what Eveland (2004) refers to as the anticipatory elaboration explanation. Being more attentive to news content, they are able to learn better from the news (Chaffee & Schleuder, 1986). By this logic, discussion is not even necessary for discussion effects to appear because the mere anticipation of a discussion could produce effects on both factual knowledge and KSD. Therefore, we predict: Anticipation of discussion of news prior to news exposure will be positively related to overall factual knowledge (H7a). Anticipation of discussion of news prior to news exposure will be positively related to KSD (H7b).

Finally, political discussion offers initial exposure to news information for those without prior exposure, and an opportunity to experience repeated exposure for those with prior exposure. Unfortunately such processes may be just as likely to introduce confusion or misinformation as they are to bring accurate information or clarity (Lenart, 1994) because misremembered news information can be socially shared just as easily as can accurate information. It seems to be obvious that the presence of accurate restatements of news information during a discussion should be a key determinant of accurate learning from discussion. Indeed, this is the logic upon which the previously discussed exposure explanation (Eveland, 2004) is based. Moreover, the introduction of inaccurate information was central to Lenart’s (1994) explanation for why discussion negatively impacted knowledge in his experiment (see also Ahn & Ryan, 2014; Hirst & Echterhoff, 2012). However, structural knowledge, which is generally not tested for matters of accuracy, should be unrelated to the number of factually accurate or inaccurate statements. We predict: The number of accurate utterances about news by group members other than the ego will be positively related to overall factual knowledge (H8). The number of inaccurate utterances about news by group members other than the ego will be negatively related to overall factual knowledge (H9).
Finally, as with diversity in exposure to various news topics, diversity in the topics addressed in discussion should lead to more integrated knowledge structures. It does so by providing opportunities to think about multiple related issues in close temporal proximity to one another, which can lead to the creation of mental associations. For example, talking about crime in the same conversation during which education is mentioned should prompt participants to consider how those two issues may be related, and presumably to identify areas of intersection that would lead them to be stored together in memory as being related. Therefore, we predict: Diversity of topics discussed by group members other than the ego will be positively related to KSD (H10).

Method

Participants

Participants for this study (N = 151) were recruited through three different sources: a temporary employment agency (66.9%), e-mail solicitations to university staff (14.6%), and undergraduate students (18.5%) (the latter two from a large university in the Midwestern United States). Students were compensated with extra course credit whereas the others were paid $50 for their time. The participants’ age ranged from 17 to 63 years (M = 31.44, SD = 11.41), with slightly more women (60%) than men. The sample included 54% Caucasian, 38% African American, 1% Asian American, 2% Hispanic, and 6% “other.” The majority of participants had completed either “some college” (25%) or had graduated college (25%) or attended graduate school (7%). One-quarter indicated no education beyond high school (25%). An additional 18% attended some form of business or trade school. Most (68%) participants had a household income of less than $30,000. Party identification, measured using a 7-point scale from 1 (very strong Democrat) to 7 (very strong Republican) was biased toward Democrats with 54% on the Democratic side of the scale, 16% on the Republican side, and 30% Independent.

Procedure

Data were collected in spring 2002. We employed a 3 (no news exposure vs. news exposure without discussion notification vs. news exposure with discussion notification) × 2 (no discussion vs. discussion) design. Upon arrival for the experiment, participants were randomly assigned to conditions. Once in place, all participants completed the consent form and a pretest questionnaire assessing various demographic variables. All participants were then given a task appropriate for their respective conditions. The two news exposure groups (notified vs. not notified of discussion; combined n = 102) spent 20 minutes browsing a news website constructed by the researchers to appear to be the site of the local daily newspaper. A random half of these participants—the discussion notification group—were told the following before news exposure: “Once you have looked over the information on this site you will be asked to discuss what you read with a group of people” but that they should
refrain from discussion during the exposure part of the study. The no-news-exposure group (n = 50) spent 20 minutes solving crossword and word search puzzles. Puzzles were chosen as a corresponding task because they are cognitively engaging without presenting participants with new political information.

Once this phase of the study was completed, participants in the discussion condition (n = 75) were moved to a separate room with three tables arranged in a semicircle with a professional microphone in the middle. Chairs faced a clearly visible video camera. The assignment procedure was designed so that every discussion group had at least one person who was not and at least one person who was exposed to news (on average two-thirds of each group had exposure to news). The number of participants in each discussion ranged from three to five (M = 3.96, SD = 0.76). Participants were asked to discuss news “about and affecting the [local city] area” and were told they could employ any or all of the following as conversational goals: (a) seek information from others to learn or better understand something; (b) seek information from others to help in forming an opinion; (c) share information with others or help others understand something; (d) express an opinion to others; (e) learn about the opinions held by others and why they hold them; and (f) try to persuade others to hold the same opinion as you do. A moderator was present for the discussion to keep participants on topic, but rarely intervened.

Participants in the no discussion condition (n = 76) were moved to a room with separate desks facing the walls of the room to work individually on solving a series of word puzzles. Again, this task was chosen to provide cognitive engagement on a topic irrelevant to local public affairs but to delay the posttest knowledge assessment to equate with the necessary lag for the discussion condition. After 20 minutes, the moderator ended the discussion and all participants were given a posttest questionnaire appropriate to their condition.

**Stimulus**

Content for the news site consisted of recent local news articles in the areas of crime, urban growth, transportation, taxes, education, and economy. We collected five stories for each topic area from Lexis/Nexis archives of the local daily newspaper and created our own letter to the editor concerning the death penalty. Therefore, crime had six stories associated with it, whereas the five other topics had five stories. The site design consisted of a home page from which participants could choose to read about any of the six topics and six secondary home pages from which each of the stories for a particular topic could be accessed.

The layout of the home page was similar to the home page of the local metro newspaper with a logo at the top of the page. A lead story was presented from one of the six topics, consisting of one paragraph with a “read more” link to the full story. The six topic categories were listed below the lead story. Three links were provided under each topic heading; two were hyperlinked story titles leading to the full article related to each title, and one was a “more stories” link that connected to the secondary home page (and additional stories) for that particular topic. Once on a secondary home page...
page, users were presented with a list of story headlines, each of which was linked to the full story. The site also contained a leftside navigation bar listing each topic and allowing direct access to their secondary home pages.

**Measures**

*Survey-based measures*

We assessed factual knowledge by testing cued recall using multiple-choice questions derived from the news articles. We created 30 questions, one for each news story presented on the site. Correct responses were coded as “1,” with incorrect or blank responses coded as “0.” One question proved to be ambiguously worded and was removed from further analysis. The average score across the remaining 29 questions served as a measure of the overall factual knowledge ($M = 0.40, SD = 0.12$). Furthermore, we constructed individual knowledge scores for each topic in the study. Each issue-specific knowledge score consisted of five questions (education, $M = 0.46, SD = 0.21$; urban growth, $M = 0.41, SD = 0.24$; economy, $M = 0.46, SD = 0.24$; transportation, $M = 0.33, SD = 0.23$; taxes, $M = 0.32, SD = 0.21$), except for crime, which consisted of four questions ($M = 0.45, SD = 0.29$).

Following Eveland et al. (2004), we measured knowledge structure density via responses to a series of questions asking respondents how related they perceived each pairing of the six topics covered in the news content to be. The items employed a 6-point scale in which 0 was *unrelated*, 1 was *only weakly related*, and 5 was *very closely related*. KSD was then calculated as the mean assessment of relatedness among the concepts ($M = 3.35, SD = 0.75$).

*Observational measures of news use*

In order to determine exposure more precisely than using self-reports or employing the gross measure of exposure created by our experimental manipulation, participant actions while viewing the news site were recorded using a server-side program that tracked browser activities on each computer. The program recorded each page visited. The number of news stories viewed by participants (excluding home pages and repeated views of individual pages) of the 31 possible stories ranged from 0 to 29 ($M = 8.60, SD = 4.81$). Participants viewed an average of 2.52 ($SD = 1.79$) crime stories, 1.18 ($SD = 1.26$) transportation stories, 1.55 ($SD = 1.32$) education stories, 1.45 ($SD = 1.31$) urban growth stories, 0.78 ($SD = 1.04$) taxes stories, and 1.12 ($SD = 1.17$) economy stories. To measure diversity of topics read, we calculated Simpson’s $D$ (see Eveland & Hively, 2009; $M = 0.68, SD = 0.15$).

*Observational measures of discussion*

A number of variables in this study were measured via a quantitative content analysis of the transcripts. Transcripts were unitized into utterances (of which there were over 12,000), which were operationalized as words or series of words conveying a thought or partial thought without interruption by others (McNeilis, 2001). Utterances were coded for topic and classified as to whether or not they were accurate utterances of
facts from the news site (among other classifications). To assess coding reliability, we randomly selected five pages of transcript (roughly 100 speaker turns) to be coded by two independent coders. Coders unitized each speaker turn into utterances, counted total number of utterances in a speaker turn, then classified each utterance into categories. Krippendorff’s alpha was .90 for unitizing, .92 for topic categorization, and .75 for the broader measure of utterance classification that was collapsed to serve as our measure of accurate/inaccurate utterances of fact.

Given that conceptually most discussion measures in the present study operate at the individual or group level, we aggregated the codes at the utterance level up to the individual level and group level. It is important to note that for our discussion measures we excluded the ego’s contribution when examining effects. This allows us to separate the impact of an individual’s expressions—which may in fact be a function of that ego’s exposure to the news stimulus—on himself or herself and focus on the impact of the interactive communication process. To retain an individual’s contribution to the discussion in the effects on that individual would, in part, potentially confound the discussion effects with the secondary effects of exposure via news.

Of particular interest for this study was the diversity of topics discussed by group members other than the ego (measured using Simpson’s D, following Eveland & Hively, 2009) within a given group (M = 0.57, SD = 0.21). We also constructed a measure of the number of accurate factual statements drawn from a given ego’s alters, which is basically an observational measure akin to Kwak, Williams, Wang, and Lee’s (2005) self-report “integrative discussion” measure (M = 50.77, SD = 40.60). We also measured the number of inaccurate statements made by the alters (M = 1.73, SD = 2.51). Finally, we measured the number of utterances made on each topic by the alters (crime: M = 26.48, SD = 33.16; taxes: M = 3.99, SD = 8.72; urban growth: M = 13.60, SD = 24.08; economy: M = 14.48, SD = 28.12; transportation: M = 25.71, SD = 40.33; and education: M = 27.00, SD = 39.12).

Results

A summary of the hypothesis tests can be found in Table 1. The first series of hypotheses concerned the effects of news use on overall factual knowledge (H1–H4). First, the effect of the experimental manipulation of news exposure versus no news exposure was tested against the measure of overall factual knowledge (H1a) F(1, 148) = 21.02, p < .01 and KSD (H1b) F(1, 148) = 0.68, p = .21. Further analyses (H2–H4) addressed the nature of content effects on factual knowledge. Consistent with our expectations (H2a and H2b), among those in the exposure condition there was a significant positive relationship between the number of stories viewed and overall factual knowledge (r = .58, p < .01, n = 101) and KSD (r = .30, p < .01, n = 101). There was also a significant relationship between KSD and the diversity of story topics viewed (H3; r = .31, p < .01, n = 99). And, although not formally predicted, a similar but weaker relationship existed between story diversity and overall factual knowledge (r = .21, p < .05 two-tailed, n = 99). Each of the six correlations between topic-specific
Table 1  Summary of Hypothesis Tests

<table>
<thead>
<tr>
<th>H#</th>
<th>Independent Variable</th>
<th>Factual Knowledge</th>
<th>KSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Exposure manipulation</td>
<td>**</td>
<td>NS</td>
</tr>
<tr>
<td>2</td>
<td>Number stories read</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>3</td>
<td>Diversity of topics read</td>
<td>—</td>
<td>**</td>
</tr>
<tr>
<td>4</td>
<td>Issue-specific reading on topic knowledge</td>
<td>6/6</td>
<td>—</td>
</tr>
<tr>
<td>5</td>
<td>Discussion manipulation</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>RQ</td>
<td>News × discussion manipulation interaction</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>6</td>
<td>Issue-specific discussion on topic knowledge</td>
<td>4/6</td>
<td>—</td>
</tr>
<tr>
<td>7</td>
<td>Anticipation of discussion manipulation</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>8</td>
<td>Number of accurate utterances</td>
<td>NS</td>
<td>—</td>
</tr>
<tr>
<td>9</td>
<td>Number of inaccurate utterances</td>
<td>NS</td>
<td>—</td>
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<tr>
<td>10</td>
<td>Diversity of topics discussed</td>
<td>—</td>
<td>*</td>
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</table>

Note: KSD = knowledge structure density; NS = nonsignificant; 6/6 = six of six topic-specific exposure measures correlate significantly and in the expected direction with their respective topic-specific factual knowledge measures; 4/6 = four of six measures of the number of utterances on each specific topic and correlated statistically significant with their respective topic-specific factual knowledge; — = not hypothesized.  
* p < .05 one-tailed in predicted direction. ** p < .01 one-tailed in predicted direction.

exposure and topic knowledge (H4) were significant at p < .01 and in the expected direction (ranging from .34 for education and urban growth to .63 for crime).

The next series of hypotheses (H5 to H10 and RQ1) concerned the relationship between public affairs discussion and factual knowledge. We first tested whether the manipulation of discussion produced a significant effect on overall factual knowledge (H5a) and KSD (H5b). This relationship was not statistically significant in either case, $F(1, 148) = 1.01, p = .16$ for overall factual knowledge and $F(1, 148) = 0.82, p = .18$ for KSD. Moreover, our results testing RQ1 suggest no statistically significant interaction between the news exposure and discussion exposure manipulations for either factual knowledge $F(1, 146) = 1.23, p = .27$ two-tailed or KSD $F(1, 146) = 2.31, p = .13$ two-tailed. However, the trend in the means for overall factual knowledge suggests that there is no added value to discussion in the presence of news exposure ($M = 0.43$ for no discussion vs. $M = 0.44$ for discussion) but a slight benefit of discussion in the absence of news exposure ($M = 0.32$ for no discussion vs. $M = 0.37$ for discussion). In fact, the effect of discussion on factual knowledge among those in the no-news-exposure condition is statistically significant, $F(1, 47) = 2.79, p = .05$ one-tailed.\(^{11}\)

The number of utterances made by group members other than the ego on each specific topic (H6) was positively correlated ($n = 74$) with knowledge of crime ($r = .25, p < .05$), taxes ($r = .29, p < .01$), urban growth ($r = .19, p = .05$), and transportation
(r = .20, p < .05). The remaining two topics produced nonsignificant findings (education r = −.09, economy r = .03). The manipulation of anticipation of discussion on overall factual knowledge; H7a, $F(1, 99) = 0.84, p = .18$, and KSD; H7b, $F(1, 99) = 0.01, p = .45$, among those exposed to the news content also was not a significant predictor of factual knowledge. Moreover, the number of factually accurate (H8; r = .03, $p = .41, N = 74$) and inaccurate (H9; r = .04, $p = .37, n = 74$) utterances about the news in the ego’s group were also not related to overall factual knowledge as predicted (nor KSD). Finally, the diversity of topics in the group discussion excluding the ego was related to KSD as predicted in H10 (r = .20, $p < .05, n = 74$). The unpredicted relationship between discussion diversity and overall factual knowledge was nonsignificant (r = .04, $p = .75$ two-tailed, $n = 74$).

**Supplementary analyses and discussion**

The purpose of this study was to move beyond self-reports of exposure to news and discussion—and to acknowledge limitations in gross contrasts between treatment and control in experimental studies—in order to understand what aspects of news use and public affairs discussion are related to public affairs knowledge. Our findings point to the importance of moving beyond simplistic notions of the effects of overall frequency of news use or discussion as predictors of public affairs knowledge. The news exposure manipulation was an important determinant of overall factual knowledge, as we expected. But, this is not the end of the story.

Among those exposed to news information, there was considerable variance in the amount of information gained from exposure. For instance, the number of stories viewed by an individual and the diversity of topics viewed were both significant predictors of overall factual knowledge. However, number and diversity for news exposure are correlated at $r = .47$, and so the question arises about independent influence. When controlling for one another, the number of stories predicted factual knowledge (partial $r = .54, p < .01, n = 96$) but diversity did not (partial $r = −.09, p = .20, n = 96$). On the other hand, our predicted relationship between KSD and exposure diversity did remain after control for number of stories (partial $r = .22, p < .05, n = 96$). Together, these findings suggest that the effect of news diversity on factual knowledge is either spurious due to number of stories, or that number of stories mediates the impact of news diversity; we expect the best theoretical interpretation is the former. However, news diversity has an effect on KSD independent of the number of stories read, which makes clear theoretical sense.

As anticipated, exposure to stories in each of the six topic areas was a strong and significant predictor of knowledge of the respective issues. This finding held up even when controlling for the total number of stories read across all issues (partial correlations ranging from .25 for education to .65 for crime, all $p < .01$). Moreover, partial correlations of exposure to other topics (controlling total stories read) on a given form of knowledge (e.g., impact of exposure to crime stories on urban growth knowledge, controlling overall exposure) were in all but one of 30 tests either
nonsignificant or significant but negative. So, it is not just simply reading the news, but how many stories one reads and in what topic domains that make a difference for learning. This lends strong support to the notion that selective exposure to news stories produces selective learning (Iyengar, 1990). Although this has been acknowledged in survey research employing exposure questions such as “how often do you read stories about …,” our ability to unobtrusively measure selective exposure and relate it to knowledge from the specific stories viewed lends more credence to the survey research. It also helps to explain the relatively weak relationships between measures of overall (or even public affairs-specific) news use and knowledge in the survey literature. This reinforces Slater’s (2004) concerns about global self-report measures as well as Eveland et al.’s (2005a) concerns about the use of Delli Carpini and Keeter’s (1996) measure of general political knowledge as an outcome of communication. If measures of exposure could be more closely tied to the specific content expected to produce learning of specific facts—through computer tracking or some other technique—and knowledge measures more closely tied to news content, we believe assessments of the effects of news media use would be much more consistent and much more powerful.

Moving to discussion effects, there were no significant effects of the overall discussion manipulation or the anticipation of discussion on factual knowledge or KSD. This raises questions about generic claims for the benefits of political discussion as well as Eveland’s (2004) more specific anticipatory elaboration explanation of discussion effects, although problems of contamination across treatments may have played some role in these findings.

Recall that some members of the discussion group had been exposed to news prior to discussion and others had not—a component of the design intended to (a) offer opportunities for purely discussion-based learning (unlike most deliberation experiments) and also to match real world variation of news exposure among political discussants. Our findings regarding differential gains (Scheufele, 2002) suggest that news use and discussion are partly redundant and potentially “competitive” with one another in producing learning effects, as the discussion manipulation had an effect on factual knowledge only in the absence of news exposure. This supports the Downsian argument that citizens can rely on discussion as a suitable replacement for close attention to public affairs in the news media (Downs, 1957). However, neither accurate nor inaccurate statements made by the other members of the group predicted factual knowledge as anticipated, suggesting that a simple two-step flow of factual information—or misinformation—from one group member to others was not taking place. This finding is consistent with Eveland’s (2004) analysis of ANES survey data that revealed the perceived expertise of a given discussant does not moderate the effect of frequency of political discussion on political knowledge. In short, the amount of precise and factually accurate knowledge conveyed by one’s discussion partner seems irrelevant to factual knowledge gains from discussion, which would seem to raise questions about a Downsian interpretation of our findings.
Unlike issue-specific news exposure for which there were clear and consistent findings, only two-thirds of the issue-specific discussion measures were significantly correlated with their respective issue-specific knowledge measures. But, this impact of issue-specific discussion stands in strong contrast to the complete lack of effects of the overall discussion treatment, at least in the presence of news exposure. It seems that while selective exposure to news clearly produces selective learning, selective exposure to discussion of topics apparently only increases domain-specific knowledge in some cases. As our measures for exposure to topic-specific discussion excludes each subject’s own contribution to those topics, it is not clear that this represents motivated selectivity as it does for news. Although it is true that a given individual might raise a topic, which then produces discussion of it, it is just as possible that the topic arises without any given ego’s prompt. This interesting relative lack of individual control of the content of discussion, and its implication for selective learning, is worthy of further research. It suggests that by purging most of the selective control over content via our topic-specific discussion measures, we are getting at a closer representation of discussion effects independent of self-selection, which we are less able to do in the case of topic-specific news learning effects.

Finally, our results make clear that diversity in the content raised during discussion is a meaningful predictor of structural but not factual knowledge. These results, in conjunction with other contrasts between the predictors of factual and structural knowledge, reinforce the importance of moving beyond simple factual knowledge measures when studying both media and interpersonal communication effects (Eveland & Hively, 2009; Eveland et al., 2004).

In the end, it is likely that some aspect of the discussion that we were unable to measure can account for our mixed findings. Despite these mixed experimental results concerning the influence of political discussion on factual public affairs knowledge, further research should seek to replicate our findings with different topics and study populations.

We must of course address the limitations of our study. First among these is our small sample size—exacerbated by the need to analyze subgroups of only those exposed to news for the specific news use variables and only those in the discussion condition for the variables coded from the discussion. This small sample size limits our power to detect small effect sizes and discourages us from conducting more complex multivariate analyses or multilevel modeling that are common in survey-based studies. With a larger sample size some of the nonsignificant findings reported here may have been significant and could have altered some of our conclusions. Moreover, with a larger sample size we could have potentially offered and tested predictions about the relative strength of effects, for instance, news versus discussion or effects on factual knowledge versus KSD or general versus issue-specific discussion/exposure. Unfortunately, the expense (in time and money) of our more representative and highly detailed observational analysis limited our ability to collect data from a larger pool of nonstudent participants. Thus the observational advantages of our study, compared to most other experimental studies of group discussion
effects, bring with them the drawback of a relatively small sample. Thus, we must look to future research to provide data with greater statistical power to detect smaller relationships.

The nature of the discussions may also have limited their potential effects. In studies of deliberative forums, researchers have often found what appear to be discussion effects from deliberations that were hours or even days long (e.g., Gastil & Dillard, 1999). It is certainly possible that a 20-minute discussion is simply not a sufficiently strong manipulation to produce the sorts of effects for which we were looking. On the other hand, some evidence suggests the typical political conversation is roughly 22 minutes (Eveland, Morey, Tchernev, & Landreville, 2010), suggesting that even if their effects are not confounded by nondiscussion variables, maybe deliberative forum effects cannot be generalized to typical informal political conversations. On the other hand, typical informal political conversations tend to be dyadic rather than small group (Eveland et al., 2010), which would place greater pressure on participants to contribute both verbally and attentionally, and thus possibly amplify discussion effects compared to this study. Future research should focus upon dyadic political conversations in the laboratory.

It is also possible that some of the deliberative forum effects identified in prior research can be attributed to the effects not of discussion, but of information conveyed to respondents through means other than discussion. For instance, most such studies have participants read extensive information packets before the discussion, but the study designs often are unable to distinguish the separate effects as all participants receive both discussion and other information between the pretest and posttest (for an exception, see Farrar et al., 2010). Luskin et al. (2002, p. 459) acknowledge, “The one grand treatment consists of everything that happens from the moment of recruitment, immediately following the pre-deliberation questionnaire, to the post-deliberation questionnaire at the end.” This is not to downplay the value of the deliberative polls or the research findings associated with them, but to make clear that their effects are not simply attributable to the small group deliberations themselves (see Goodin & Niemeyer, 2003, for a similar argument), and thus to not directly infer discussion effects from effects identified in deliberative polling experiments. This is why our manipulation of news exposure prior to discussion is essential to future study designs that do employ prediscussion information exposure as part of the “grand treatment.”

Our study is also limited by speaking only to the effects of face-to-face discussion rather than the various forms of online interaction regarding news and politics that exist in the modern communication environment. Today individuals can discuss news stories in the comment sections of news articles, via social media, and on blogs that often link to and highlight news stories. Our research cannot directly generalize to these newer forms of public affairs discussion.

Our adult sample was beneficial because of its overall diversity. However, because most participants were recruited from a temporary employment agency, they were relatively low in income and education. So, although our participants were more diverse
than the standard undergraduate students, an even more representative group of participants would have been desirable. Moreover, more educated participants may have benefited more from news use and discussion, as would be predicted by the knowledge gap hypothesis (Tichenor, Donohue, & Olien, 1970) and in fact demonstrated in post hoc analyses of our data.¹⁸

Finally, we must acknowledge that the experience of engaging in a recorded discussion with strangers or acquaintances is not high in ecological validity. Most political conversation takes place with family and friends rather than strangers or mere acquaintances (Eveland et al., 2010). However, our approach was generally consistent with experimental research on the effects of discussion and/or deliberation (Gastil & Dillard, 1999; List et al., 2013) and in some ways follows the democratic ideal of citizens coming together with dissimilar others to debate the merits of public policy in a formal setting. Our experimental discussions, then, are closer to the democratic talk described by Schudson (1997) than the casual political conversation of Wyatt, Katz, and Kim (2000). Both are valuable, however, and thus future research designs should attempt to bring intact small groups (Gamson, 1992; Walsh, 2004) into the laboratory for research, and should stage the conversation in a more natural and realistic manner. This will provide the external validity necessary to generalize our findings to more typical effects of public affairs discussion.

Despite these limitations, this study had a number of distinct advantages over much of the existing research on this topic. Possibly the greatest advantage of this study was our ability to unobtrusively record exposure to specific stories on the online news site and link this information to learning outcomes. The related benefit of actually staging a public affairs discussion—including having some members of the discussion privy to news content and some not, just as in reality—and then recording it and coding it for numerous interaction-based variables allows us to more precisely tap the aspects of discussion that produce knowledge. This is an important complement to and potentially even a benefit over the measures of frequency of discussion that are used in most survey research. And, by linking the study of news effects and discussion effects in experimental research, we are able to test the independent and possibility of synergistic effects of these two forms of communication. Finally, our inclusion of multiple measures of learning, including topic-specific factual knowledge and knowledge structure density, allows us to provide a more content valid representation of learning about public affairs. These knowledge measures also help us to understand how different aspects of the exposure and discussion process can impact different types of learning.

In conclusion, this study has demonstrated that in addition to just exposure to news and participation in discussions, the specific nature of exposure and discussion must be tapped to fully appreciate the process of learning from mass mediated and interpersonal communication. We hope that more research on political learning will move beyond cross-sectional survey data to study more closely the process of learning from news and political discussion.
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Notes

1 It was our intention to sample only adults aged 18 and over. However, the temporary agency used for subject recruitment inadvertently sent one 17-year-old participant to us, which we did not discover until after data were gathered. This participant was retained because the nature of the study required intact groups. The remaining participants were 18 and older.

2 The larger study from which the current data are drawn included two discussion conditions—one via face-to-face discussion and one via online chat. The online chat condition is not reported here.

3 Owing to one subject in the no exposure condition dropping out of the study just prior to the discussion, one group inadvertently was composed of only participants who had been exposed to the news.

4 These reflect some of the pragmatic goals individuals report for political discussion, but do not include social and entertainment goals that are at least as common in everyday political discussion (see Eveland et al., 2011).

5 The order of the topics on the home page, as well as which topic the lead story represented, were rotated randomly among six orders via a computer algorithm.

6 No individual knowledge question had more than six missing responses, and the average was less than three (or less than 2% of respondents). We follow Luskin and Bullock (2011) in not randomly assigning missing responses across answer options.

7 Simpson’s D theoretically ranges from 0 to 1 and captures a combination of the number of possible categories (in our case, fixed at six) and the distribution of proportions across them. Thus, the highest levels of diversity in reading stories would be when equal proportions of stories were selected from each of the six groups; the lowest level of diversity would be if all stories were selected from only a single topic area.

8 For instance, the measure of exposure to utterances regarding transportation is calculated by subtracting the ego’s contribution to the group sum rather than looking at the group sum itself.

9 This measure only reflects statements that explicitly contradict the content of news stories in the experiment.

10 This and all subsequent reported p-values in the results section are one-tailed unless otherwise noted because of the directional predictions offered in the hypotheses. Tests that were explicitly not predicted are evaluated with two-tailed tests.

11 For KSD, in the exposure condition there seems to be a slight benefit to discussion, \( M = 3.20 \) for no discussion versus 3.44 with discussion, but discussion seems to have a slightly negative effect in the no-exposure condition, \( M = 3.50 \) for no discussion versus \( M = 3.35 \) with discussion. However, none of these subgroup effects are statistically significant for KSD.

12 A manipulation check for the anticipation of discussion took place to confirm that no “imitation of treatments” took place. As the last question on the posttest survey, we asked...
participants if they had been aware of a discussion component of the study prior to arrival. Among those in the exposure conditions, approximately 25% reported that they knew there would be a discussion component to the study before the study began. Sixteen of the participants in the “no notification” condition were among those reporting at the end of the study that they knew before beginning the study that there would be discussion. Assuming that these reports were honest, we reran the analysis reclassifying “no notification” participants reporting foreknowledge of the discussion into the “notification” condition (n = 66). The nonsignificant results based on the original manipulation were replicated with this revised measure for both overall factual knowledge $F(1, 99) = 0.04$, $p = .42$ and KSD $F(1, 99) = 0.60$, $p = .22$.

13 The one significant positive finding was the number of stories read about the economy. It was correlated with knowledge of education topics, $r = .18$, $p = .04$ (one-tailed). Given that this effect would not have been predicted and a two-tailed test would have been nonsignificant, we do not find this single correlation to be relevant.

14 This finding holds even when controlling the total number of utterances made in the group (excluding the ego), partial $r = .21$, $p < .05$, $n = 71$.

15 The reasoning behind this is simple. Among those not in the exposure condition, there are no valid values for variables such as number of stories read, diversity of topics, etc. Without valid values, these individuals are excluded from any analysis that employs these variables. The same logic applies for those not in the discussion condition—they have no values for variables such as diversity of topics discussed, number of accurate utterances, etc. It was for this reason that our analyses are conducted separately for discussion-related variables and exposure-related variables. To do otherwise would limit our analyses only to those participants who were in both the exposure and discussion conditions, and the size of that subgroup is only $n = 50$.

16 Power analyses conducted with the program GPower (Faul & Erdfelder, 1992) indicate sufficient power (.80 or above) to detect moderate or larger effect sizes ($f = .25$) in one-tailed tests of all of the experimental manipulations (sample sizes ranging from 100 to 150). Similarly, for correlational analyses among subgroups (with sample sizes from 75 to 100) we had sufficient power (.80 or above) to detect moderate or larger effect sizes ($r = .30$) using one-tailed tests.

17 We have only 20 discussion groups, and each group has five or fewer participants. Most multilevel analyses are conducted with much larger sample sizes at both the macro and micro levels.

18 A significant (one-tailed) interaction emerged between education and the exposure manipulation in predicting factual knowledge, but not for KSD. The impact of the exposure manipulation on factual knowledge was greater among those in our sample with higher levels of education, a finding consistent with the knowledge gap hypothesis. This suggests that our findings with regard to news media effects on factual knowledge may have been suppressed compared to the effects in the larger population. No such significant interaction was found with the discussion manipulation for either factual knowledge or KSD.

References


