Understanding the Knowledge Gap: The Role of Experts and Journalists

Jennifer Jerit Florida State University

Decades of research attest to the strong positive association between an individual's socioeconomic status (SES) and his or her level of political knowledge. This study shows that differences in how *the media cover political issues influence the distribution of knowledge in society by altering the strength of that relationship. I combine individual-level survey data with media content analysis to examine the variation in knowledge across more than four dozen issues. In a series of three studies, I show that higher levels of expert commentary in news stories reinforce SES-based differences in political knowledge. By contrast, greater levels of contextual coverage diminish those differences. These findings have important implications for how the mass media report on political developments and how they might better encourage citizen engagement with the political world.*

Political knowledge influences a wide array of political behaviors, from the most elemental activities (e.g., information processing, opinion formation) to what some might consider the most consequential (e.g., support for democratic values, participation). Indeed, Delli Carpini and Keeter contend that, "No other single characteristic of an individual affords so reliable a predictor of good citizenship, broadly conceived, as their level of knowledge" (1996, 6). One of the field's more troubling findings, then, is continuing evidence of a "knowledge gap" based on socioeconomic status (SES). This "gap" refers to the difference in the level of political knowledge between high and low SES groups. It has been shown that as media coverage of an issue increases, the knowledge gap on that topic grows (Tichenor, Donohue, and Olien 1970; see Holbrook 2002 for recent evidence). Even though it has been more than 30 years since this phenomenon was first documented, we still do not know what it is about news coverage that intensifies the knowledge gap or if there are any media practices that diminish it. To date, work in this area has tended to focus on the role of individual-level factors, such as the motivation to follow an issue (e.g., McCann and Lawson 2006).

This study will determine if differences in *how* an issue is covered influence the size of the knowledge gap. I focus on two characteristics that often are discussed in terms of their potential to educate the public: the prevalence of expert cues and the amount of background-oriented, contextual coverage (e.g., Graber 2004; Iyengar 1991; Page and Shapiro 1992). It is important to determine whether these particular characteristics influence the size of the knowledge gap because both have become more prevalent in contemporary news coverage (Barnhurst and Mutz 1997).

In the end, the analysis has implications for the quality of public opinion and political representation in the United States. With recent research showing that government policy is more responsive to the preferences of the affluent (e.g., Gilens 2005), it becomes even more important to establish whether the mass media contribute to the class bias of American politics by exacerbating SES-based differences in political knowledge. The time is ripe, in other words, for scholars to reassess the media's place in a democracy. Can reporters and journalists reduce disparities in knowledge as they provide information about important political events? Or do patterns in how the media cover politics perpetuate the unequal distribution of knowledge in society?

The Knowledge Gap and Learning from the News

Researchers have offered a number of explanations for the knowledge gap, but a common thread in this

The Journal of Politics, Vol. 71, No. 2, April 2009, Pp. 442–456 doi:10.1017/S0022381609090380

ISSN 0022-3816

literature is that differences in cognitive ability lead to disparities in knowledge across low and high SES individuals. These cognitive differences are no doubt related to differences in educational opportunity (Delli Carpini and Keeter 1996, 216). The reading and writing skills that high SES people acquire in school enhance their ability to process information appearing in newspapers and on television (Park and Kosicki 1995). Unlike people at the lower end of the socioeconomic scale, those with high SES have an easier time understanding stories with abstract concepts, technical subjects, and infrequently used words.

In addition to imparting cognitive skills, "schools teach *contextual* knowledge about politics, history, economics, geography, and other subjects that make subsequent learning about politics easier" (Delli Carpini and Keeter 1996, 193, emphasis added; also see Converse 1964, 212; Downs 1957, 79). As a result, high SES people have a greater store of existing knowledge, and this helps them fill in the blanks that sometimes exist in "sketchy" news reports (Eveland and Scheufele 2000, 217). The information they have also is better organized, which makes it easier to store, and later retrieve, facts from a news story (Hsu and Price 1993, 673–74). As I argue below, these various aspects of ability interact with stylistic features of media coverage to produce different rates of learning.

How News Coverage Matters

Aside from the claim that greater media publicity leads to a larger knowledge gap, we know remarkably little about *why* news coverage has the effect that it does. Past research has focused almost exclusively on the narrower question of whether knowledge gaps exist (Gaziano 1997), looking for knowledge differentials on particular issues or elections (e.g., Bonfadelli 2005; Eveland and Scheufele 2000; Kwak 1999; Rhine, Bennett, and Flickinger 2001). Recent work by Jerit, Barabas, and Bolsen (2006) is more comprehensive in that it documents knowledge gaps across a range of domestic issues, but it too fails to explain why we see variation in the *size* of the gap across topics. Given what we know about the mechanism underlying the knowledge gap, however, two characteristics in particular should have an influence on this phenomenon.

Expert Commentary in News Stories

In a large, modern democracy such as the United States, experts at universities, research organizations, and elsewhere play an essential role in disseminating policy-relevant information.

As Page and Shapiro observe, "Much of what people learn about politics, through popular books and articles and discussions with friends as well as through media reports originates in scholarly research or expert commentary" (1992, 358; also see Page 1996; Paletz 2002; Zaller 1992). Naturally, the identity of these experts varies across issues, with think tanks and academics playing a visible role in some areas (e.g., economic and social policy) and doctors and scientists more vocal in other realms (e.g., stem cell research, AIDS). Past research has shown that experts have a powerful effect on public opinion. In particular, they have a level of credibility other political actors do not enjoy because of their objectivity, experience, and nonpartisan status (Page, Shapiro, and Dempsey 1987; also see Druckman 2001).

This credibility comes at a cost, however, if the media are not able to disseminate information from experts in an understandable way (e.g., Jamieson and Cappella 1998). Experts think—and speak—about policy problems differently than lay people (Covello 1991; Margolis 1996; also see Quirk and Hinchliffe 1998, 3). Moreover, the tendency for journalists to strive for balance (Bennett 2005) may lead them to provide the views of competing experts. While high status people are able to digest this information, the use of technical terms, scientific jargon, and complicated explanations likely remains out of reach for those with low socioeconomic status (Graber 2001, 141; also see Darmofal 2005). This implies that greater prominence of experts in media coverage of an issue may very well exacerbate the gap in knowledge between low and high SES people.

Evidence from one study hints at such a relationship, but the results are far from conclusive. Moore (1987) shows that the knowledge gap between the least and most educated was larger for a complex issue (nuclear power) and that it grew over the course of an election campaign, while the gap for a simpler issue (taxes) was smaller and remained constant over time. Moore speculates that this pattern is due to differences in how the two issues were covered, with stories about nuclear power being more complicated and technical. He also observes that nuclear power was a "new" issue, and one that was hard to explain, while the tax issue had long been on the agenda and often was discussed in symbolic terms. Clearly, there was something about how these two issues were presented to the public that had an influence on the level of knowledge across SES groups. While it seems plausible that stories about nuclear power were more likely to feature experts, it is impossible to know whether this factor played a role because Moore's

study does not examine media coverage of either issue. The question of whether the amount of expert commentary has an influence on the size of the knowledge gap thus remains unanswered.[1]

Contextual Coverage

Another feature of the news that bears upon learning is the level of contextual coverage. By historical standards, today's news provides more background information and analysis than earlier eras (Barnhurst and Mutz 1997). Nevertheless, scholars often decry the mass media for failing to provide the necessary contextual information that is required to understand current political issues (Graber 2004; Patterson and Seib 2005). On this view, contemporary news coverage consists of dramatic stories that focus on individual players in the American political system, such as the president, his adversaries, or the people affected by government programs (Bennett 2005; Iyengar 1991). What this kind of coverage lacks, many argue, is a discussion of the larger social, historical, and political context—information about "*why* and *how*" (Graber 2001, 145, emphasis original). Such contextual information gives meaning to what otherwise might seem like disconnected events and helps people understand why issues and problems deserve their attention.[2] Contextual coverage also would seem to have implications for the formation of knowledge gaps. If it is the preexisting knowledge of high SES individuals that helps them make sense of current events, then contextual coverage may serve as a stand-in for people who lack such background information. A greater prominence of contextual information in media coverage of an issue should reduce the gap in knowledge between low and high SES people.[3]

Indeed, in one of the most extensive examinations to date, Holbrook (2002) reports that the gap in knowledge between the least and most educated shrinks immediately after televised candidate debates. The most plausible explanation, he argues, is the type of coverage that surrounds these events: predebate stories that outline the differences between candidates and the stakes of the contest, along with postdebate analysis and interpretation. If political news typically comes to citizens in "disconnected snippets" (Graber 2002, 218), debate coverage provides an unusual level of political and historical context. It seems as if this difference in coverage is what provides an opportunity for low SES individuals to "catch up" to their high SES counterparts (Holbrook 2002, 449). We can only speculate because the Holbrook study, like other research in this area, does not include media content analysis. Once again, we remain one step removed from knowing what it is about the news that affects the size of knowledge gaps.

The preceding discussion implies the following two hypotheses regarding the effect of news coverage on the knowledge gap:

H1: Greater prominence of expert commentary in media coverage of an issue increases the gap in knowledge between low and high SES people.

H2: Greater prominence of contextual information in media coverage of an issue reduces the gap in knowledge between low and high SES people.

Taken together, H1 and H2 predict that different characteristics of media coverage influence the size of the difference in political knowledge between low and high SES individuals. These effects occur because the impact of an individual's SES on her political knowledge varies in strength across media contexts—that is, because media coverage *moderates* the relationship between education and knowledge, making it stronger in some contexts and weaker in others.[4] In a series of three studies, this paper will look for evidence in support of these hypotheses by combining individual-level data regarding the public's knowledge of current events with a content analysis of the news surrounding those events. In doing so, this study is the first to directly examine the relationship between the content of media coverage and the size of the knowledge gap across issues.

Operationalizing Concepts

I operationalize knowledge as a correct response to survey questions about recent political developments. Table A-1 in an online, supplemental appendix at http://journalofpolitics.org/ provides the complete list of issues, but the topics ranged from actions taken by

[1]By contrast, we know more about the role of expertise in persuasion (Fiske and Taylor 1993).

[2]See Kuklinski et al. (2001) or Iyengar (1991) for related discussions.

[3]Delli Carpini and Keeter observe that, "[because] of the overwhelming amount of *contextless* information available to citizens, sorting through it requires skills... not equally distributed among citizens" (1996, 114, emphasis added).

[4]Just as information flows interact with individual-level factors to produce differential rates of opinion change (e.g., Zaller 1992), here I argue that different kinds of media coverage interact with ability to affect the rate of learning among high and low SES people (Gilens 2001, 387–88, n. 12).

elected officials (e.g., the passage of an important bill, a decision to stockpile smallpox vaccine, or the release of a government report on AIDS) to newsworthy events at home and abroad (e.g., the bombing of an abortion clinic, a Supreme Court ruling, or military action in another country). Usage of such issue- or event-specific questions has become common in recent years (e.g., Gilens 2001; Price and Zaller 1993). Here, the topical nature of the questions provides analytical leverage. It was precisely because the questions asked respondents about specific, recent political developments that I expected to observe a relationship between characteristics of media coverage and performance on the knowledge questions (see Druckman 2005 for a similar approach).

Data for the study come from the archive at the Roper Center for Public Opinion Research, as well as an original panel survey that will be described in greater depth later. When collecting questions from the Roper archive, I looked for surveys conducted by a single organization that contained knowledge questions about current events as well as a measure of how closely respondents were following those items in the news. The search yielded 53 cross-sectional surveys, all of which were administered by Princeton Survey Research Associates (PSRA) from 1992 to 2004. The dependent variable in the first two studies is a dichotomous measure coded "1" if the respondent answered the question correctly and "0" otherwise. Study 3 uses a trichotomous measure that will be described in greater detail below.

Individual-Level Determinants of Knowledge

The key individual-level variable in this analysis is a person's level of education. Not only is education the most important predictor of a person's level of political knowledge (Delli Carpini and Keeter 1996), but it also is the most commonly used indicator of a person's socioeconomic status in studies of the knowledge gap (Gaziano 1997). Based on past research on political knowledge, I also included measures of a person's income, age, race, and gender (e.g., Delli Carpini and Keeter 1996; Neuman 1986).[5] Finally, several studies have documented that following politics in the news is associated with higher levels of political knowledge (Delli Carpini and Keeter 1996; Luskin 1990). Such measures are thought to convey information about exposure to the media (e.g., Dalton, Beck, and Huckfeldt 1998). The "follows" variable used here improves upon the typical measure because it is specific to the issue mentioned in the knowledge question (i.e., it asks respondents how closely they have been following stories about a particular news event, not politics more generally).[6]

Environmental-Level Determinants of Knowledge

According to the argument advanced here, the *type* of media coverage an issue receives influences the size of the knowledge gap. Each of the three studies draws upon a different collection of media sources, so here I simply describe the general parameters of the content analysis. For Studies 1 and 2 (both of which analyze knowledge levels in the PSRA data), I conducted a content analysis of the full text transcripts of particular media sources during the six weeks prior to the first day of each survey. The choice of a six-week coding period was deliberate. The sponsors of the PSRA surveys designed the knowledge questions in response to political events occurring during this period of time (Brodie et al. 2003). Study 3 makes use of a panel survey that bracketed a public announcement about the financial status of the Medicare and Social Security trust funds. In this case, coders content analyzed all available print and television news stories during the one-week period when coverage of this event was at its peak.

Once the relevant sample of news stories was identified for each issue, coders tallied the total number of stories mentioning the correct answer to the knowledge item.[7] The amount of coverage (*Volume*) is represented by a simple story count. Among articles containing the correct answer, coders noted when expert sources were paraphrased or quoted. In addition to academics and scientists, this category includes statements from think tanks and nonpartisan entities such as the Congressional Budget Office (CBO),

[5]The range and coding for the variables are as follows: education (0–1; 1 = post graduate), income (0–1; 1 = $100,000+), age (0–1; 1 = 97 years old), white (0–1; 1 = nonblack), male (0–1; 1 = male). Using the *Amelia* software program (King et al. 2001) missing demographic responses were imputed to avoid listwise deletion of roughly 20% of the cases.

[6]Coding categories are: 0 = not at all closely; .33 = not too closely; .67 = fairly closely; 1 = very closely.

[7]A story was considered relevant if it discussed the issue underlying the knowledge question. Intercoder reliability analyses indicate high levels of agreement for detecting relevant articles (kappa = .71) and identifying articles with the correct answer (kappa = .84). Values of kappa above .60 are "good" (Cicchetti and Sparrow 1981). Transcripts come from Lexis-Nexis and were read by multiple coders.

the Federal Reserve, and the General Accounting Office (GAO). The variable *Expert Commentary* refers to the proportion of articles that quoted or paraphrased an expert source talking about the topic. Thus, a value of .5 indicates that for the particular issue, half of the stories mentioned an expert source. The variable ranges from 0 (no stories mentioning experts) to 1 (every story has at least one expert mention).[8]

Finally, each article was coded for its level of contextual information (none versus some). From there, each issue was assigned a score that indicated the proportion of stories that provided at least "some" contextual information. Naturally, what counts as contextual information varies according to the issue. Coders were instructed to look for the presence of expository information, such as historical background, definitions, or the discussion of causes and consequences (see Neuman, Just, and Crigler 1992 for a similar coding scheme).[9] This variable (*Contextual Coverage*) also ranges from 0 to 1. The use of proportions for the expert and context measures (as opposed to raw counts) facilitates the comparison across issues receiving different amounts of coverage. Among the 53 PSRA surveys, the correlation between these two variables was negligible ($r = -.035$; $p = .802$), indicating that experts were not more prominent in stories providing contextual coverage. A similar pattern is observed in the media data for Study 3.

Empirical Results

The knowledge gap refers to the difference in political knowledge between high and low SES groups. When it comes to understanding this phenomenon, however, Eveland and Scheufele state:

> the important issue is not the existence of a gap. Instead, gaps should be tested as multivariate phenomena, that is, as differences in the relationship between variables X (e.g., education) and Y (e.g., knowledge) across levels of variable Z (e.g., time, news media publicity, or news media use). (2000, 216)

In the first of three studies, I will examine how the education-knowledge relationship varies across media contexts with different amounts of expert commentary and contextual coverage.

Study 1

Study 1 examines knowledge questions appearing in the 53 PSRA surveys (again, see Table A-1). The media source in this part of the analysis is the *Associated Press*. Although other studies have relied upon the *AP* as an indicator of national media coverage (e.g., Fan 1988; Jacobs and Shapiro 2000), the use of this source merits some justification. As the major newswire service in the United States, the *AP* serves 5,000 radio and television stations (www.ap.org) and nearly all of the nation's daily newspapers (Graber 2002, 44). State and regional papers regularly rely on the *AP* to cover national politics because they lack the staff and financial resources of prestige papers such as the *New York Times* (Shaw and Sparrow 1999, 340). In this respect, the *AP* influences news coverage widely and provides a good picture of the information appearing on TV and in newspapers around the county (e.g., Bennett 2005, 96–97).[10]

To recap, Hypotheses 1 and 2 predict that different characteristics of media coverage influence the size of the knowledge gap between low and high SES individuals—or to use Eveland and Scheufele's (2000) formulation, H1 and H2 state that the strength of the relationship between education and knowledge will vary according to the amount of expert commentary and contextual coverage. These hypotheses will be tested using a multilevel model (Goldstein 2003; Raudenbush and Bryk 2002) in which there are two levels of analysis: the individual survey respondent and the media environment corresponding to a particular

[8]I explored alternate ways of operationalizing expert commentary (e.g., the average number of expert mentions for a topic) and obtained results that are similar to the ones I report below.

[9]Kappa scores for the context and source codes were 0.74 and 0.72, respectively. Context was originally scored using a three-point scale (none, some, a lot). Here I collapse the "some" and "a lot" categories (see the online appendix for more details on coding).

[10]Or as the Washington bureau chief of the *Associated Press* put it, "The major newspapers all pay attention to us and publish our work even alongside their own... The broadcast outlets are also regularly watching the wire. The broadcast networks and CNN see our material and react and follow up and simply use our material every day... We work for newspapers and broadcast, a.m. newspapers, p.m. newspapers, morning drive time, afternoon and evening newscasts" (cited in Shaw and Sparrow 1999, 340). If this account seems self-serving, consider the following evidence from Study 3: on the day that the Board of Trustees for Social Security and Medicare released their annual report, a story by an *AP* staff writer appeared verbatim in the online versions of the *Oregonian, State Journal Register, USA Today, Houston Chronicle,* and *Los Angeles Times.* Substantial portions of the AP writer's original story also appeared in the print versions of the *Tampa Tribune* and *Seattle Times.*

issue. Hypothesis 1 predicts that higher levels of expert commentary will widen the gap in knowledge between low and high SES people. This implies a positive and significant "cross-level" interaction between *Education* and *Expert Commentary*. According to Hypothesis 2, greater prominence of contextual coverage leads to a smaller knowledge gap. Thus, the interaction between *Education* and *Contextual Coverage* should be negative and significant.[11]

The statistical model expresses knowledge as an interactive function of individual- and environmental-level variables (where $Knowledge_{ij}$ refers to person i's knowledge about issue j):

$$\begin{aligned}\Pr(Knowledge_{ij} = 1) = \\ &\gamma_{00} + \gamma_{10}Education_{ij} + \gamma_{20}Income_{ij} + \gamma_{30}Age_{ij} \\ &+ \gamma_{40}Male_{ij} + \gamma_{50}White_{ij} + \gamma_{60}Follows_{ij} \\ &+ \gamma_{01}Volume_j + \gamma_{02}Expert_j + \gamma_{03}Context_j \\ &+ \gamma_{04}Difficulty_j + \gamma_{11}Education_{ij} \times Volume_j \\ &+ \gamma_{12}Education_{ij} \times Expert_j + \gamma_{13}Education_{ij} \\ &\times Context_j + u_{0j} + u_{1j}Education_{ij} + \varepsilon_{ij}\end{aligned}$$

According to the original knowledge gap argument, the coefficient on the *Education* × *Volume* term (γ_{11}) should be positive and significant. This implies that the education-knowledge relationship becomes stronger in high volume environments and, thus, that the gap (or difference) in knowledge between the least and most educated becomes larger (e.g., Jerit, Barabas, and Bolsen 2006). Hypothesis 1 predicts that greater prominence of expert commentary will strengthen the education-knowledge relationship and increase the size of the gap in knowledge between the least and most educated (i.e., γ_{12} will be positive and significant). By contrast, Hypothesis 2 states that higher levels of contextual coverage will result in smaller differences between low- and high-education groups (i.e., γ_{13} will be negative and significant). Although it is not the central focus of this study, the model also will estimate the effect of the level of expert commentary and contextual coverage on the average level of knowledge among a group of survey respondents (γ_{02} and γ_{03}, respectively).[12]

Study 1 Results

To understand what exactly is at stake when scholars speak of the knowledge gap, first consider some of the general patterns in the data. Across the 53 issues in Study 1, the average size of the knowledge gap between the least and most educated is 14 percentage points (s.d. = 10).[13] There is considerable variation around that mean, however. Sometimes the difference in knowledge between the least and most educated is modest, on the order of 6 percentage points. For other issues the disparities are more dramatic, in excess of 20 points. While most research has centered on establishing whether knowledge gaps exist (e.g., Rhine, Bennett, and Flickinger 2001), explaining the variation in the size of these gaps is an important, yet unresolved, puzzle. The analysis below will determine if patterns in *how* the media cover political events influences the size of the knowledge gap.

The first column of Table 1 serves as a starting point and presents the results of the multilevel model described in the previous section.[14] Before turning to Hypotheses 1 and 2, it is worth noting that the coefficients for the individual-level fixed effects are consistent with past research on political knowledge (e.g., Delli Carpini and Keeter 1996), confirming that white, wealthy, male, and older people tend to be more politically knowledgeable. Interest also has a strong positive association with knowledge. Continuing down the table, the next series of coefficients indicate how the aggregate level of knowledge (i.e., the intercept in each survey) changes along with characteristics of the media environment and the issues themselves. We see, for example, that knowledge is negatively related to *Item Difficulty* ($p < .01$), but positively related to *Volume* ($p < .05$). Neither *Expert*

[11]Study 1 combines 53 cross-sectional surveys, which means that differences in survey topics or question wording might affect levels of knowledge. I use an item response model (Hambleton and Swaminathan 1985) to create a measure of question difficulty and then use this variable to control for differences across surveys. *Item Difficulty* is scored so that higher values indicate a more difficult question. Other measures of difficulty (e.g., the number of response options or words in the question) were insignificant in the analyses below.

[12]The model also can be represented in hierarchical form, as a series of three equations (see the online appendix).

[13]The least educated category represents people with a high school diploma, and the most educated category represents those with schooling after college.

[14]Statistical estimates were generated using MLwiN 2.02 (Rasbash et al. 2000). The dependent variable is dichotomous, so I use a probit link function for estimation. Continuous variables are grand mean centered (see Raudenbush and Bryk 2002 for a discussion).

TABLE 1 The Effects of Expert Commentary and Contextual Coverage on Knowledge

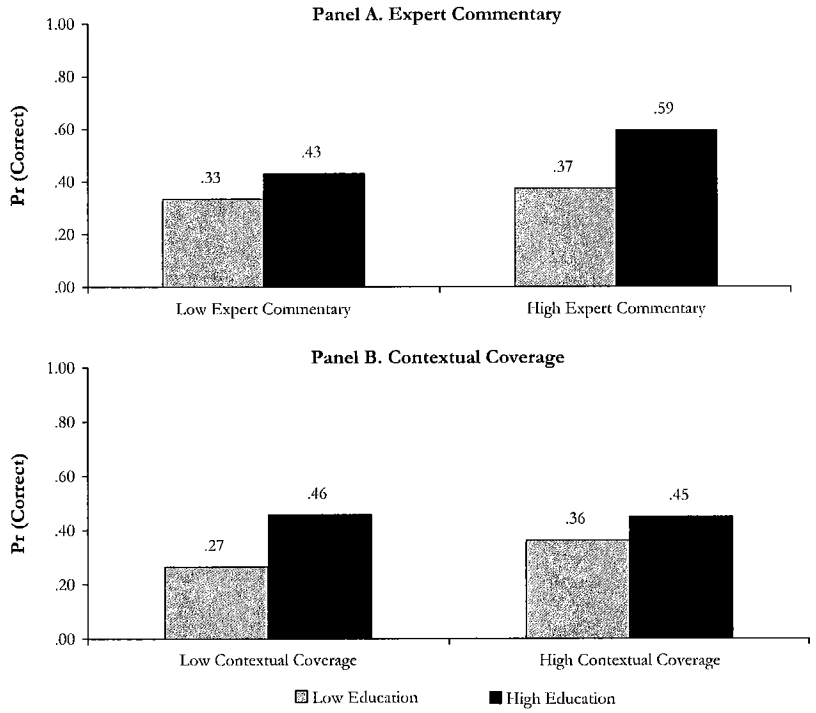
	Study 1 Coefficients	Study 2 Coefficients	
		Print Users & USA Today	*TV Users & CBS News*
Intercept	−.363***	−.341**	−.571***
	(.064)	(.145)	(.126)
Education	.470***	.421***	.429***
	(.040)	(.102)	(.074)
Income	.176***	.197**	.175**
	(.031)	(.077)	(.077)
Age	.268***	.433**	.276*
	(.061)	(.172)	(.152)
Male	.109***	.092	.190***
	(.028)	(.073)	(.058)
White	.074 **	.191**	.187**
	(.034)	(.095)	(.074)
Follows issue	.818***	.883***	.748***
	(.049)	(.120)	(.148)
Item Difficulty	−.622***	−1.007***	−1.193***
	(.208)	(.174)	(.367)
Volume of media coverage	.007**	.042	−.104
	(.003)	(.128)	(.336)
Expert Commentary	.220	−.101	.169
	(.225)	(.107)	(.462)
Contextual Coverage	.167	.315**	.156
	(.199)	(.155)	(.527)
Education × Volume	.005**	.589***	.130
	(.002)	(.177)	(.126)
Education × Expert	.464**	−.031	.459**
	(.198)	(.136)	(.184)
Education × Context	−.446**	−.463*	−.157*
	(.202)	(.257)	(.086)
Variance Complements			
Intercept	.168***	—	—
	(.027)		
Education	.071***	—	—
	(.018)		
N	59034 (lev 1), 53 (lev 2)	3563	9824

Note: Entries for study 1 are maximum likelihood (IGLS/MQL) estimates with estimated standard errors in parentheses. Entries for study 2 are probit coefficients with clustered standard errors in parentheses. The data have been weighted to reflect the U.S. population. *$p < .10$, **$p < .05$, ***$p < .01$ (two-tailed).

Commentary nor *Contextual Coverage* influences average levels of knowledge in these data.

The first cross-level interaction in Table 1 (*Education* × *Volume*) provides a test of Tichenor, Donohue, and Olien's (1970) original knowledge gap argument. As expected, the coefficient is positive and statistically significant ($p < .05$), thus confirming past research in this area (and also lending face validity to the data used here). If differences in cognitive ability are responsible for the knowledge gap, then characteristics of media coverage that increase the cognitive burden associated with processing the news should increase the size of knowledge gaps, while news practices that reduce this burden will diminish them. The *Education* × *Expert* and *Education* × *Context* terms provide the evidence on this point. Consistent with Hypothesis 1, the coefficient on *Education* × *Expert* is positive and significant ($p < .05$). Thus, higher levels of expert commentary enlarge the difference in knowledge across low- and high-education groups. By contrast (but consistent with the second hypothesis), the coefficient on *Education* × *Context* is negative and significant ($p < .05$). This means that as the proportion of contextual

FIGURE 1 **How the Knowledge Gap Varies across Different Kinds of Media Coverage**



coverage increases, the difference in knowledge between the least and most educated diminishes.[15] These effects are best conveyed graphically.

Using the parameter estimates from Table 1, Panel A of Figure 1 shows the predicted probability of providing a correct response as the level of expert commentary varies from the sample minimum to sample maximum. When media coverage does not make any references to experts (but is "average" in every other respect), the difference in the probability of a correct answer between the least and most educated respondents is .10 (the difference between .43 and .33) This gap more than doubles (to .22) when academics, policy specialists, and other experts figure more prominently in the news. Moreover, it is the most educated who experience the greatest gains. As the amount of expert commentary varies from minimum to maximum, their probability of providing the correct answer increases from .43 to .59 (a nearly 40% increase, in relative terms). For the least educated, the probability of giving a correct answer increases from .33 to .37. This translates into a 12% gain.

As expected, Panel B shows the opposite pattern. The gap between the least and most educated shrinks and this change is due almost entirely to an increase in the probability that the least educated provide the correct answer. More specifically, the difference in the probability of providing the correct answer is .19 when the media provide low levels of contextual coverage (the difference between .46 and .27). Consistent with Hypothesis 3, this gap is cut in half (to .09) when there is a high level of contextual coverage (.45 minus .36). The fact that contextual coverage levels differences in knowledge across education groups is consistent with the work of Kuklinski et al. (2001), who found that exposure to diagnostic information eliminated differences between the least and most educated when it came to one particular dimension of citizen competence, policy tradeoffs.[16]

Taken together, the findings from Table 1 suggest that one way to reduce SES-based differences in knowledge is to increase the amount of contextual information in news coverage. Stories that provide comparisons with related issues, discuss the consequences of political developments, or supply background information can provide meaning for people who have little prior knowledge about politics. By contrast, when contextual coverage is at its lowest, so

[15]H1 and H2 are supported when *Education* × *Expert* and *Education* × *Context* appear in separate models ($p < .05$).

[16]According to Kuklinski et al., information has high diagnostic value "when it clearly and fully conveys the central considerations relevant to a decision or judgment task" (2001, 412).

too is the probability that low SES people provide the correct answer. Since it may not be possible (or even desirable) to eliminate entirely those aspects of news coverage that contribute to the knowledge gap (e.g., expert commentary), providing some minimal level of contextual coverage seems essential for keeping low SES people engaged in the political world.[17]

To this point, the analysis has shown support for Hypotheses 1 and 2. However, several threats to causal inference loom in Study 1. For starters, the model lacks a conventional measure of media exposure. The "follows" variable controls for differences in issue interest, but it is only a rough proxy for exposure to the mass media. This is potentially problematic insofar as the knowledge gap is a phenomenon that takes place among people who have been exposed to the news. A second threat pertains to the media source used in Study 1. Few people consume information directly from the *Associated Press.* Although there is anecdotal evidence that material from the *AP* appears in print and television outlets (often in identical form across sources), reporters and journalists may be selective in what they choose to incorporate from the *AP.* This means that the *AP* may not always be a good indicator of the overall information environment. The next study will address both limitations by focusing on a subset of the PSRA data that asked respondents where they were getting most of their information.[18] Focusing on respondents who answered "print" or "television," I will examine how the education-knowledge relationship varies across print and broadcast media environments.

Study 2

Of the original 53 PSRA surveys, 16 include a question that asks people to identify where they get most of their information. Nearly three-quarters of the sample selected either television or print; these respondents are the focus of Study 2. Whereas Study 1 examined how the education-knowledge relationship changed across varying media contexts, here I will examine how, *among print users,* this same relationship changes across varying print contexts as well as how, *among television users,* the relationship changes in different broadcast environments. The media sources in Study 2 are *USA Today,* nicknamed "the nation's most read daily newspaper," and *CBS Evening News,* one of the three major network news programs (randomly selected).[19] If the primary advantage of Study 1 was its breadth, Study 2 is able to identify the people for whom variations in expert commentary and contextual coverage matter most. The disadvantage of this approach is that there are fewer surveys to work with ($N = 16$), which will necessitate a slightly different empirical strategy.[20]

Like the previous study, I will focus on the interaction between a person's level of education and the amount of expert commentary (H1) and the interaction between education and contextual coverage (H2). I include the usual array of individual-level predictors (income, age, and so on) along with a control for item difficulty. The model is estimated separately for print and television users.

Study 2 Results

The second and third columns of Table 1 report the results of a probit analysis in which knowledge is the dependent variable. The first series of coefficients in the Study 2 columns present the estimates for print viewers. This means that the interaction between *Education* and *Expert Commentary* indicates how, among newspaper users, the education-knowledge relationship changes across varying levels of expert commentary in *USA Today.* The interpretation for the *Education* × *Context* interaction in similar, but here I am interested in how the education-knowledge relationship changes across varying levels of contextual coverage in *USA Today.*

Because most of the individual-level variables have a similar effect across Studies 1 and 2, I proceed directly to variables of interest: the interaction terms. Consistent with past research, the interaction between *Education* and *Volume* is positive and significant in the print model. This implies that as the amount of print coverage increases, so too does the gap in knowledge between low and high SES print users. Reading down the table, there is no support for Hypothesis 1 in the print model (i.e., the coefficient

[17]Although education is the most commonly used indicator of SES in knowledge gap research, I exchanged *Income* for *Education* in the cross-level interactions in Table 1 and obtained identical results. The findings also hold when I include dummy terms that control for some of the issue differences in these data (indicators for health, presidential, or partisan issues). Finally, I explored three-way interactions between *Follows, Education,* and the environmental measures. These interactions were insignificant in Study 1 (a similar pattern was observed for the next two studies).

[18]The choices were television, newspapers, radio, magazines, internet, friends, or other sources.

[19]Each of these sources is viewed as a proxy for newspaper and television coverage, respectively.

[20]Instead of estimating a multilevel model, which is inadvisable when the size of the level-2 sample is small (e.g., less than 30; see Kreft 1996 or Mass and Hox 2002), I will estimate a probit model with the standard errors clustered by survey.

on the interaction between *Education* and *Expert Commentary* is indistinguishable from zero). There is, however, support for Hypothesis 2. The interaction between *Education* and *Contextual Coverage* is negative, as expected, and marginally significant ($p = .07$).

The final column in Table 1 shows the estimates for television viewers. The interaction between *Education* and *Volume* is insignificant, which is consistent with past work examining the separate effects of print and TV (e.g., Jerit, Barabas, and Bolsen 2006). In line with Hypothesis 1, the *Education* × *Expert Commentary* interaction is positive and significant ($p < .05$). There also is support for the second hypothesis, with a negative and significant interaction between *Education* and *Contextual Coverage* ($p = .06$). Taken together, the results are broadly consistent with those obtained in Study 1. The key advance in Study 2 is that the analysis examined people who had been exposed to news either in print or on television. It showed that, for the most part, the amount of expert commentary and contextual coverage in both outlets had the expected effect on the size of the knowledge gap.

Study 2 went a long way toward eliminating two of the most problematic aspects of Study 1. Another threat to causal inference remains, however. All along, the presumption has been that the direction of causality runs from media coverage to patterns of knowledge in the population. But media coverage may be endogenous to issue type, preexisting levels of knowledge, or some other factor. Fortunately, auxiliary analyses indicate that there are no systematic patterns in the amount of expert commentary or contextual coverage across issues of varying levels of difficulty. Moreover, most of the topics in Studies 1 and 2 represent late-breaking political developments that people become aware of *as a result* of increased media attention. That is, it is unlikely many people knew about the government's policy on small pox or a recent Supreme Court ruling until these topics became the subject of news stories. Nevertheless, even if reverse causation seems implausible, one of the best ways to rule it out is with a panel design in which the *same* people are interviewed before and after an exogenous news event.

Study 3

The third and final study addresses the issue of causality by employing a longitudinal, before-after design. Here, the news event was the April 23, 2007 announcement about the financial status of the Medicare and Social Security trust funds. Information about the public's knowledge comes from a panel survey that was administered before and after the news event (i.e., the same people were interviewed at two points in time).[21] In past years, the annual announcement by the Board of Trustees overseeing the two programs has received a considerable amount of media attention. This year the announcement coincided with the death of former Russian President Boris Yeltsin, meaning that coverage of the Trustees' report was somewhat muted. As I discuss below, however, there was variation in how two key facts from the Trustees' report were covered. This variation provides a unique opportunity to evaluate my theoretical argument.

The first fact pertains to the "exhaustion" date of the two programs, which refers to the year after which each program will no longer be able to pay full benefits to retirees. In 2007, the Trustees reported that both Social Security and Medicare had gained one year of additional "life," with Medicare's exhaustion date extended to 2019 and Social Security's to 2041. Of the 45 stories that appeared in newspapers and on television in the one-week period surrounding this news event, 31 (or about 70%) mentioned both dates.[22] Among the stories mentioning the two dates, the amount of contextual information was impressive. Three-quarters of the television stories were coded as providing "some" context, while 93% of newspaper stories on this topic had that designation. In contrast, very few stories in either outlet quoted or paraphrased experts (six of the 27 newspaper stories did, while the figure was zero for television news). On the whole, media coverage in both outlets provided contextual information but little expert commentary. Because the former reduces the knowledge gap while the latter increases it, I expect that after news coverage of this event differences in knowledge about the exhaustion dates will become *smaller* among print and TV users.

The second important piece of information from the Trustees' report concerned what would happen to either program if no changes are made in the next few

[21]These data come from a larger survey conducted over the internet by Polimetrix. The survey was in the field from March 1 to 21, 2007 (wave 1) and from April 26 to May 16, 2007 (wave 2). I limit my attention to 163 respondents who were reached in both waves and who were *not* exposed to the study's question wording experiments.

[22]Multiple coders analyzed the full text transcripts of all major papers archived in Lexis-Nexis and NewsBank, along with the three major news networks, CNN, Fox, and *The News Hour with Jim Lehrer*. The correlation in the two sets of scores was .97 (kappa = .94) for a subset (40%) of the data.

decades. For Medicare, if no changes are made between now and 2019, the federal government will be able to pay out 80% percent of promised benefits. Unlike the first fact, the "If No Changes" information was not mentioned in any newspaper stories. It *was* mentioned in a television story appearing on CNN. The CNN story did not quote or mention any experts, although it did provide important contextual information about how both programs are funded. I expect that in the aftermath of the media coverage of the Trustees' report, the knowledge gap between low and high SES *television* users should become smaller (because what little coverage there was provided contextual information). In contrast, the knowledge gap between low and high SES *print* users should remain unchanged because newspapers did not carry any information about the "If No Changes" fact.[23]

Unlike Studies 1 and 2, which examined how the knowledge gap changed across different issues with varying levels of expert commentary and contextual coverage, Study 3 focuses on a single news event. In this situation, a common way of studying the knowledge gap is to examine how the education-knowledge relationship varies across different levels of news media use (e.g., see Eveland and Scheufele 2000). I follow that approach here and will focus on the interaction between education (a proxy for a person's SES) and media usage.[24] When it comes to awareness of the "If No Changes" fact, for example, the sign on the *Education* × *TV User* term should be negative and significant, while the *Education* × *Print User* coefficient should be insignificant.

Study 3 Results

I begin by examining knowledge gains regarding the exhaustion dates for each program.

The question read as follows: "According to news reports, both Social Security and Medicare are facing financial problems in the future. If Congress doesn't take any action, which of these two programs is expected to be the first to not have enough money to cover all benefits—Medicare or Social Security?"[25]

[23]As a result of the pattern of media coverage on this issue, Study 3 focuses on the effect of variations in contextual coverage (because expert commentary was low across both outlets).

[24]The question read, "How have you been getting most of your information about current events?" The choices were television, newspapers, radio, internet, and conversations with others. Dummy terms are used to identify respondents answering "television" or "newspapers."

[25]The correct answer is Medicare. All other responses (e.g., don't know) were coded as 0.

Before the Trustees' announcement, there was a significant difference in knowledge across low- and high-education groups ($|t| = 1.59$; $p = .06$; one-tailed).[26] Sixty-three percent of high-education respondents provided the correct response while only 43% of low respondents did. After the announcement, the two groups were indistinguishable in terms of their knowledge ($|t| = .073$; $p = .53$; one-tailed).

From the content analysis we know information about the exhaustion dates was available in both print and television outlets, and that journalists also provided a substantial amount of contextual information. Among those using print or television, the knowledge gap should shrink in the aftermath of the trustees' announcement.[27] The first column of Table 2 presents the results of a model in which the dependent variable is a change score (e.g., respondents' wave 1 answer is subtracted from their wave 2 response). The variable is coded "1" if the person answered the question incorrectly in the first wave but correctly in the second wave, "0" if the answer was the same across both waves, and "−1" if a respondent chose the correct answer in wave 1 but offered an incorrect response in wave 2.[28]

Focusing on the first column, we see that the highly educated are more likely to learn over the course of the two surveys, but this difference is only marginally significant ($p = .13$; two-tailed). Learning also is associated with self-reported exposure to print and television news, which is to be expected given coverage of the date information in both outlets. The key test of the theoretical argument occurs with the two interaction terms at the bottom of Table 2. As

[26]Once again, the low-education category represents someone with a high school degree or less and the high-education category refers to a person with schooling after college.

[27]There is a slight tendency for the highly educated to rely on newspapers, but people of varying education levels reported using each source. For example, 11% of television users had schooling after college, which is only slightly less than the 15% of print users with the same credentials. It is not the case, then, that newspaper users are composed solely of the highly educated or that TV users are made up only of those in the low-education category. This observation also holds for Study 2.

[28]Approximately 15% "learned" over the course of the two waves (i.e., they were coded "1"). Nearly 70% offered the same response across both waves (and almost all of these cases represent wrong answer choices in both waves). The remainder provided a correct response in the first wave, but an incorrect response in the second. In Study 3, I include a variant of the "follows" measure. The question asked, "How much, if anything, have you heard or read about a report from the trustees overseeing the Medicare and Social Security programs? Answer choices were "nothing," "a little," and "a lot." Other independent variables were measured in identical format across the three studies.

TABLE 2 **News Coverage and Learning about the Trustees Report**

	"Exhaustion Date" Question	"If No Changes" Question
Education	.779	−0.133
	(0.511)	(0.427)
Income	−0.474	0.355
	(0.477)	(0.448)
Age	0.208	−0.444
	(0.564)	(0.600)
Male	0.054	0.098
	(0.209)	(0.197)
White	0.061	−0.390
	(0.389)	(0.308)
Follows issue	−0.209	0.056
	(0.210)	(0.192)
Television User	2.522**	2.392**
	(1.133)	(0.028)
Newspaper User	2.590*	−0.910
	(1.512)	(2.168)
Education × TV User	−1.598**	−1.558**
	(0.768)	(0.685)
Education × Newspaper User	−1.948**	0.717
	(0.975)	(1.323)
Cut 1	−0.303	−1.623**
	(0.909)	(0.775)
Cut 2	1.870**	0.934
	(0.915)	(0.782)
N	163	163

Note: Table entries are ordered probit coefficients with standard errors in parentheses. The data have been weighted to reflect the U.S. population.
*$p < .10$, **$p < .05$, ***$p < .01$ (two-tailed).

expected, they are both negative and significant, indicating that the relationship between education and knowledge becomes weaker among those who were exposed to news in either outlet. First differences help put these findings in perspective. For white female who has a high school degree or less (and takes on average values of all other variables), television usage is associated with a .14 increase in the probability of stating the correct answer in wave 2 (s.e. = .06; 95% C.I. = .04 to .26). The same first difference for a more highly educated person is insignificant (i.e., the confidence interval crosses zero). As a result of contextual news coverage, the least educated catch up to the more highly educated and the knowledge gap on this topic shrinks.

Examination of the "If No Changes" question (the second column in Table 2) provides a more difficult test of the theoretical argument because the expectations for the print and television interactions diverge. Recall that the second key fact appeared in a television news report providing contextual information, but received no coverage in either local or national newspapers. The expectation, then, is that the coefficient on the *Education* × *TV User* term will be negative and significant. The coefficient on the *Education* × *Newspaper User* should be insignificant. The second column of Table 2 presents the results of an ordered probit model in which the dependent variable is a trichotomous (1, 0, −1) change score for the "If No Changes" question.[29]

On this question, 15% of the sample went from an incorrect to a correct response on this question. The highly educated were more likely to answer the question correctly at both points in time, but this difference was not statistically significant (i.e., *t*-tests across the two groups are insignificant). Table 2 shows that TV exposure was positively associated with learning and the interaction between *Education* and *TV User* is negative and significant, as expected. Neither print usage nor the *Education* × *Newspaper Usage* term was statistically significant—a pattern that makes sense given the lack of coverage of the "If No Changes" fact in newspapers.[30]

The reversal in the knowledge gap for the "Exhaustion Date" and "If No Changes" questions was dramatic, so it is reasonable to wonder if the Study 3 sample was unusual in any regard. Aside from a higher level of self-reported internet usage, respondents in this survey mimicked national probability samples in many important respects (e.g., age, gender, race, education). Moreover, analyses of other knowledge questions in the survey show that the basis for a knowledge gap across SES groups did in fact exist. When it came to programmatic knowledge of Social Security and Medicare, the highly educated were significantly more knowledgeable than their less educated peers—at both points in time ($p < .01$ for two-tailed *t*-tests in each wave). Thus, the reversal of

[29]The question reads, "If no changes are made to the Medicare program, what do you think will happen? Please indicate the amount or percentage of Medicare benefits that everyone will receive over the next few decades if no changes are made to the Medicare program." There were 10 answer choices, ranging from "less than 10 percent" to "90 percent or more." The correct answer is 79%, but answer choices ranging from "60 percent" to "90 percent or more" were considered correct. Similar results are obtained with narrower definitions of accuracy.

[30]Once again, for low-education respondents, the first difference for *TV User* is positive and significant ($p = .05$); it is insignificant for high-education respondents. As expected, first differences for *Print User* are insignificant for both low- and high-education respondents.