EDUCATION, NEED FOR COGNITION, AND CAMPAIGN INTEREST AS MODERATORS OF NEWS EFFECTS ON POLITICAL KNOWLEDGE: AN ANALYSIS OF THE KNOWLEDGE GAP

By Yung-I Liu and William P. Eveland, Jr.

This study attempts to replicate recent findings suggesting a reversal of the standard knowledge gap, i.e., that the relationship between television news use and knowledge is greater among those with less than with more education. We also extend this approach to examine need for cognition and campaign interest as additional moderators beyond the standard education-based analysis. Our results reveal mixed support for the general hypothesis that the pattern of interaction between these moderators and news media use varies depending on whether the medium of interest is television news or print newspapers.

The knowledge gap hypothesis[1] predicts that knowledge is unequally distributed in society based on socio-economic status (SES), and that attempts to alter this distribution through communication campaigns may amplify it. The underlying assumption is that SES, typically operationalized as level of formal education, is a determinant of exposure to relevant information and motivation or ability to learn from it. Generally, people with more education have greater cognitive ability and learning experience; more training and practice in integrating and elaborating on information; and, in the political realm, more interest in politics and its relevance. Finally, those with low levels of education may also have less access to sources of political information. Thus, a sustained communication effort can potentially widen pre-existing gaps in knowledge between those high and low in education.

Despite these expectations, the research literature is full of findings inconsistent with the original expectation that gaps would increase in the presence of increased information flow.[2] Among many variables identified as potentially influencing whether or not knowledge gaps increase, decrease, or remain constant are factors such as community size or pluralism, level of community conflict, nature of the issue, and type of knowledge measures employed.[3]

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Our central concern is the communication modality—whether individuals encountered campaign information in the newspaper or on television news. One goal of this study is to replicate the findings of Eveland and Scheufele,[4] who found a weaker relationship between education and political knowledge among heavy than light users of television news during the 1996 presidential campaign,[5] and that the education-knowledge relationship was mostly unaffected by use of newspapers.[6] In addition, we extend the logic of examining the impact of different media on education-based knowledge gaps to knowledge gaps based on motivation (in the form of campaign interest) and personality (in the form of need for cognition). In essence, the study examines why knowledge gaps appear and disappear under a variety of conditions—the interaction between education, need for cognition, or campaign interest, on the one hand, and newspaper or TV news use on the other.

The Logic of Statistical Moderation

Thus far, we have employed the language of knowledge gap research, referring to factors that may alter "gaps" in knowledge between various subsets of people based on variables such as SES. This implies that these factors are the "causes" of knowledge and that other variables, such as communication, simply moderate the effects of these causes. In reality, the reverse is theoretically much more plausible. Formal education—especially for those who completed school before, say, 1999—cannot directly cause knowledge of candidate issue stances during the 2000 campaign. And, no matter how interested someone may be in the campaign, if we lock that person away without the ability to talk about politics or use news media, that interest cannot produce knowledge.

Instead, variables such as education or interest either act as distant causes of knowledge that work *through* communication variables, or *moderators* that influence the degree to which communication variables have influence. Here we focus on how these variables moderate the impact of news media use. This means that our language must change to talk not of what variables alter SES-based knowledge gaps, but instead what factors influence how strongly various forms of news media produce learning effects.[7]

News Media Use: Content and Modality

Claims regarding the effects of different media, particularly the difference between audiovisual messages, such as television news, and textual messages, such as newspapers, on the public's political learning continue to be controversial. Much early work supported print, asserting that the public can benefit more from newspapers than from television.[8] The traditional inverted pyramid structure, which presents the most important and recent information first in the structural sequence, is believed to assist readers' information processing.[9] Moreover, newspaper stories provide more contextual and background information than television,[10] and print media provide more election coverage than television.[11] Thus, it has been argued that the structure and the content of print media may be superior to television news for learning.

On the other hand, a number of studies have argued that television news may be more effective for political learning than print, at least

under some circumstances. Chaffee and his colleagues argued that television contributes more to learning about candidates as individuals, whereas newspapers contribute more to learning about political parties.[12]

Graber[13] pointed out that people process information rich in audiovisual stimuli more "quickly, easily, and accurately" than information without such stimuli; messages rich in audiovisuals enhance memory and thus increase recall and accuracy. [14] Further, she argued that messages with audiovisuals are more similar to real-life or firsthand experiences, which generally activate more sensory neurons in the brain, and thus are more easily recalled. One question, however, is whether or not television news uses visuals effectively by providing consistent messages in both audio and visual channels simultaneously.[15]

Given our "reversal" of the causal language of the knowledge gap hypothesis, noted above, it is worth considering how social, cognitive, and motivational variables may influence learning from television news and newspapers.

Education as Moderator

Nearly every study of the predictors of political knowledge controls education, and, with a few rare exceptions, education is a powerful if not the most powerful predictor of political knowledge in these studies. Most research on the knowledge gap employs education as the key indicator of SES. A common interpretation is that education serves as a proxy for cognitive ability, although clearly education taps more than just this.

As we have already noted, recent research[16] found that, in the political context, education interacted with television news use in predicting political knowledge. Television news use was more strongly related to knowledge among those with less rather than more education. This may be as much a function of television's unsophisticated content failing to encourage learning among the more educated, as it is of television's being particularly effective in facilitating learning by the lesser educated. Thus, we predicted:

> H1a: The relationship between television news use and political knowledge will be weaker among those with more education than those with less education.

Despite the relative lack of evidence in this same prior research for gaps being larger based on levels of newspaper use, theory still suggests that the structure and style of newspapers make it harder to learn information about political issues for those with less cognitive ability.[17] Moreover, formal education provides experience and skills in reading and synthesizing written information in particular, and so newspaper use may have a greater impact on knowledge among the more highly educated. Therefore:

> H1b: The relationship between newspaper use and political knowledge will be greater among those with more education than those with less education.

Although education may be the most common variable studied within the knowledge gap framework, other potential variables are theoretically relevant, including "need for cognition" (NFC). Although NFC can be traced to Cohen and his colleagues' work in the 1950s,[18] Cacioppo and Petty[19] popularized the concept, arguing that NFC is an individual difference variable that is stable within individuals. They considered it a personality trait that describes "an individual's tendency to engage in and enjoy effortful cognitive endeavors."[20] Cacioppo and colleagues[21] proposed that NFC, which can be differentiated from cognitive ability, is a continuous variable, ranging from cognitive misers to cognizers in terms of level of intrinsic motivation to engage in effortful cognitive activities. They attributed this inter-individual difference in NFC to past experience, supported by accessible memories and behavioral histories, and argued that this difference influences how people acquire or process incoming information.

Because of its connection to work on the elaboration likelihood model, most research on NFC focuses on attitude change. However, because individuals vary in their enjoyment of cognitive activities and challenges, need for cognition becomes a potentially important influence on how much an individual might learn from news media use.

Newspapers are generally considered to require higher levels of cognitive effort for comprehension than television news, and television news is seen as a source that requires less cognitive input.[22] Television news should thus provide little challenge for those high in NFC, and thus should produce a weaker learning effect than among those who are low in NFC.

> H2a: The relationship between television news use and political knowledge will be weaker among those with higher NFC than those with lower NFC.

By contrast, given the structure and content of newspapers, those who enjoy and habitually engage in effortful cognitive activities will be in the position to take advantage of the opportunities offered by newspapers in terms of more and more detailed content and context than those who do not enjoy thinking. Thus, we predict:

> H2b: The relationship between newspaper use and political knowledge will be greater among those with higher NFC than those with lower NFC.

Interest is another important factor related to people's media use and learning, and political interest is typically a strong predictor (if not actually a direct cause) of political knowledge. Previous research[23] has emphasized that interest may be a primary determinant of knowledge gaps. Genova and Greenberg[24] proposed a news interest knowledge gain model, which suggested that interest in specific news events, rather than SES or education, is a stronger predictor of learning from mediated infor-

mation; people who had strong interest in a news topic had more knowledge about that topic than those with weaker interest.

In considering the possible moderating effect of interest on news media use, we make predictions based on a similar logic. Since television news focuses more on the entertainment aspect of politics and provides attention-grabbing visual images, it is likely that even those with relatively low levels of interest can learn something about politics with increasing levels of exposure to television news. And, the limited depth with which television news covers politics may mean that those with high interest find relatively little to learn from television news, at least in part due to a ceiling effect. Therefore, we predict:

> **H3a**: The relationship between television news use and political knowledge will be weaker among those with higher campaign interest than those with lower campaign interest.

In contrast with television news, political coverage in the newspaper may be less inherently exciting and engaging. Indeed, based on their content analysis of 100 years of newspaper coverage, Barnhurst and Mutz[25] claimed that "recent stories are fiercely dull." This makes it harder for less interested individuals to devote the effort needed to gain information about politics from newspapers. By contrast, for those who are inherently interested in politics and thus do not need to have the source constantly generate that interest, newspapers offer considerably more content from which to learn than television news. Thus, there is something left for those high in interest to learn from newspapers. Therefore, we predict:

> **H3b**: The relationship between newspaper use and political knowledge will be greater among those with higher campaign interest than those with lower campaign interest.

Method

Sample. This study employed data gathered as part of the 2000 and 2004 American National Election Study (ANES) pre- and post-election surveys. Thus, each hypothesis is tested twice, using both the 2000 and the 2004 data.

The 2000 pre-election survey was conducted between 5 September and 6 November 2000, and 1,807 interviews were conducted (801 by telephone and 1,006 interviewed face-to-face). The 2004 pre-election survey was conducted between 7 September and 1 November 2004, and a total of 1,212 interviews were conducted. The post-election survey was conducted between 3 November and 20 December 2004, and 1,066 of the respondents in the pre-election survey were interviewed again. All 2004 interviews were face-to-face.

Measures.

Control Variables. Respondents were asked to give the highest grade of school or year of college they had completed. Those who reported eight or fewer years were scored as "8" because so few respon-

dents were involved. Thus, the *education* measure ranged from 8 through 17 (2000 and 2004 median = 14 [2 years of college]). *Gender* was coded with males (2000: 44%; 2004: 47%) as the high value. Respondent year of birth was recoded to *age* (2000: $M = 47.21$, s.d. = 16.96; 2004: $M = 47.27$, s.d. = 17.14).[26] In 2000, *income* was an ordinal variable with 22 categories ranging from less than $4,999 to $200,000 and over (median = 6 [$35,000 - $49,999]). In 2004, income was an ordinal variable with 23 categories ranging from less than $2,999 to $120,000 and over (median = 16 [$45,000 - $49,999]).

In addition, two study design factors were employed as controls. In the 2000 ANES analyses, we included a dummy variable indicating whether the respondent was interviewed face-to-face or by phone (phone interviews coded as the high value). This was not necessary for 2004. In both years we also constructed a variable indicating the number of days before the election the respondent was interviewed, assuming that those interviewed later would have had longer to learn campaign facts, all else constant.

Independent Variables. Independent variables are television news use and newspaper use. We followed prior research[27] that has combined measures of exposure and attention into a single variable to focus on how individuals use print and television. Thus, television news use was constructed using exposure to national television news and attention to the campaign in national television news. Because these two items employed different metrics, we standardized them before constructing the index (2000: $r = .73$; 2004: $r = .72$).

Newspaper use was constructed using two exposure items (days reading a daily newspaper and reading about the campaign) and one attention item (attention to the campaign in the newspaper). Again, items were standardized before being combined (2000: $\alpha = .90$; 2004: $\alpha = .89$). The two exposure items were effectively weighted by 1/2 so that the balance between exposure and attention measures was equivalent for television news and newspapers.

Moderator Variables. In addition to the traditional education variable in knowledge gap studies, there were two additional moderator variables measured in this study: NFC and campaign interest. The NFC index was an average of two items: a 5-point Likert-type question about preferences for thinking, and an item about preferences for solving simple (coded zero) versus complex (coded one) problems. These items were standardized before being combined (2000: $r = .50$; 2004: $r = .54$).[28]

Campaign interest was an average of two items. The first item asked about interest in the campaign and was recoded into zero (not much interested), one (somewhat interested), and two (very much interested). The second item asked respondents if they cared about who wins the presidential election, with "don't care very much" coded as zero and "care a good deal" coded as one. The items were standardized before being combined (2000: $r = .43$; 2004: $r = .41$).

Dependent Variable. Political knowledge in the election campaign context is often conceived of as possession of accurate information about

candidate positions on major social, economic, and political issues. Previous studies have demonstrated the value of measuring the relatively correct[29] or the absolutely correct placement of candidates or the parties on issue position items.[30] This study used relative placement because it is very difficult to fairly and accurately place candidates on specific points of the ANES issue position scales. Typically candidate positions are too ambiguous to make such precise assessments. However, one can accurately identify where one candidate stands *relative to another* in most cases, and so the relatively correct placement serves as the more valid measure in our opinion.[31] See Price[32] for a discussion of the various ways researchers have used these sorts of questions on the ANES.

In both the 2000 and 2004 ANES, questions were asked regarding government services/spending tradeoffs, defense spending, guaranteed jobs/standards of living, aid to blacks, protection of the environment, and gun control. A question on environmental regulation was asked in 2000 only. Each issue had either two or four questions, asking respondents to place Bush and Gore in 2000, Bush and Kerry in 2004, or the Democratic and Republican parties, or both, on these issues. There were eleven possible comparisons across the seven issues in 2000, and ten possible comparisons across six issues in 2004. Respondents were given one point for each comparison if they placed the two candidates (or the two parties) in the correct relative positions on the issue. (For instance, it would be correct to place Gore more in favor of environmental regulation than Bush, and to place the Republican Party as more opposed to increases in government services and spending than the Democratic Party, regardless of where in an absolute sense the candidates or parties were placed on the issues.) If respondents indicated "don't know" for any member of a pair, their answer was considered incorrect since no comparison of relative position could be made. The number of correct responses out of the eleven comparisons in 2000 or ten comparisons in 2004 were tallied and used to determine a percentage correct score (2000: $\alpha = .88$; 2004: $\alpha = .82$).

Data Analysis. The traditional approach to testing the knowledge gap requires either longitudinal data on a single topic to examine changes in the size of gaps over time as media flow changes, or cross-sectional data across topics that vary in level of media publicity.[33] However, an alternative approach[34] uses cross-sectional data to evaluate the impact of publicity not at the system level (e.g., number of news stories) but at the individual level by tapping exposure to particular sources of information.

In the present study the moderated multiple regression approach[35] was used to investigate whether news media use interacted with education, NFC, and campaign interest respectively in predicting issue stance knowledge. In other words, statistical interactions between news media use and education, between news media use and NFC, and between news media use and campaign interest served as the test of the central hypotheses of the study. Each hypothesis was tested with both 2000 and 2004 ANES data.

TABLE 1
Correlation between Education, NFC, Campaign Interest, and News Media Use

	TV News Use	Newspaper Use	Education	Need for Cognition	Campaign Interest
TV News Use	—	.33**	.08**	.13**	.42**
Newspaper Use	.28**	—	.25**	.18**	.37**
Education	.08**	.24**	—	.37**	.25**
Need for Cognition	.07*	.20**	.34**	—	.20**
Campaign Interest	.42**	.35**	.23**	.21**	—

Note: The Pearson Correlations above the diagonal are the results of 2000 data set, whereas those below the diagonal are the results of 2004 data set. # $p < .10$; * $p < .05$; ** $p < .01$ two-tailed test

Statistical research indicates that evidence of interaction effects are sometimes spurious due to the presence of a nonlinear (e.g., quadratic) relationship between one of the components of the interaction term and the dependent variable.[36] Preliminary analyses using the present data suggested some evidence for bivariate nonlinearity. Thus, we follow an effect size comparison approach[37] to distinguish between nonlinear and interaction effects. Doing so requires us to employ a stepwise entry procedure for the final block of our regression equations which includes the square of each component of the interaction term (which tests for a quadratic relationship) as well as the interaction term itself. Variables that survive entry into the regression equation at this step (with a standard of $p < .10$) are interpreted. Those that do not (indicated "NS" in the tables) are not included in the analyses to reduce concerns about multicollinearity.

Results

Before addressing the hypotheses, we examined relationships among the main predictors and main effects of each of the predictors in the model for each of the two studies. In both years, education, NFC and campaign interest are all positively related to either TV news use or newspaper use (see Table 1). The three moderating variables also had positive relationships with each other. That is, individuals who had more education also had higher need for cognition and campaign interest, and vice versa.

In both years age was nonlinearly related to issue stance knowledge, with the nonlinear relationship in an inverted U-shaped form. Table 2 shows that males were more likely to be knowledgeable than females ($\beta = .19$ in 2000 and .08 in 2004). In 2000, phone respondents were more informed than their face-to-face counterparts ($\beta = .10$). The number of days prior to the election the interview took place was unrelated to knowledge in either 2000 or 2004.

|		2000		2004	
		TV Model	NP Model	TV Model	NP Model
Block 1	Education	.22**	.22**	.22**	.22**
	Income	.07**	.07**	-.02	-.02
	Age	.01	.01	.01	.01
	Age Squared	-.10**	-.10**	-.10**	-.10**
	Gender (High = Male)	.19**	.19**	.08**	.08**
	Survey Mode (High = Phone)	.10**	.10**	—	—
	Days before Election	.02	.02	-.01	-.01
	TV News Use	.05*	.05*	-.01	-.01
	Newspaper Use	.08**	.08**	.15**	.15**
	Need for Cognition	.03	.03	.02	.02
	Campaign Interest	.26**	.26**	.31**	.31**
Block 2	Education Squared	.05*	.05*	.07*	NS
	TV News Use Squared	NS	—	NS	—
	NP Use Squared	—	NS	—	NS
	Ed.* TV News Use	-.04#	—	NS	—
	Ed.* NP Use	—	NS	—	.09**

Note: Variables in Block 1 do not control for Block 2 variables. Variables in Block 2 control for Block 1 and one another.   # $p < .10$; * $p < .05$; ** $p < .01$ two-tailed test

In both years education was a significant positive predictor of issue stance knowledge ($\beta = .22$ in both years). NFC, however, was unrelated to knowledge in either year. Campaign interest predicted knowledge in both 2000 ($\beta = .26$) and 2004 ($\beta = .31$). And, after controls for all of these variables, television news use was a significant predictor of issue stance knowledge in 2000 ($\beta = .05$) but not 2004. By contrast, newspaper use was a significant predictor in both years ($\beta = .08$ in 2000 and .15 in 2004).

H1a predicted that television news use would interact with education in predicting knowledge. After accounting for a significant quadratic relationship between education and knowledge that took a U-shaped form, Table 2 also reveals that there was a marginally significant interaction effect ($\beta = -.04$, $p = .07$ two-tailed) in the 2000 ANES. The form of the interaction is consistent with the hypothesis that the relationship between television news use and knowledge would be greater among those with less education than with more education (see Figure 1). However, this finding is not replicated in the 2004 ANES. Education

FIGURE 1

Interaction of Television News Use and Education Predicting Issue Stance Knowledge (2000)
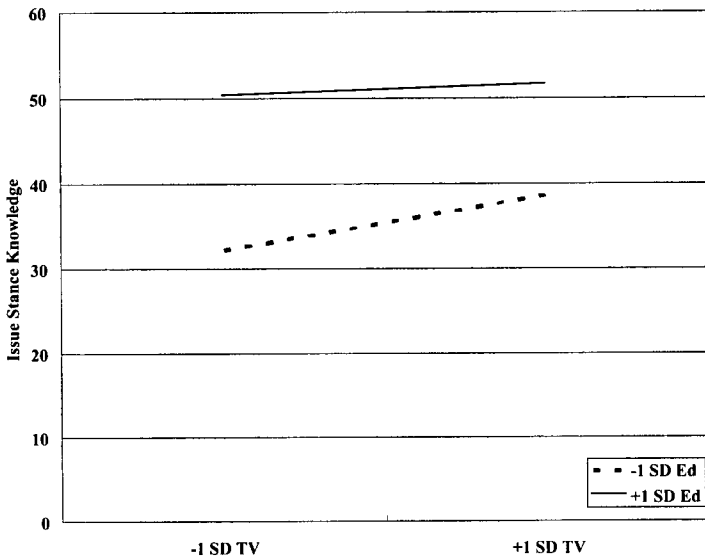
again has a quadratic relationship with knowledge, but there is no significant interaction present.

H1b predicted an interaction between newspaper use and education. Table 2 indicates that **H1b** was not supported in the 2000 data, but was supported in the 2004 data with the presence of a significant interaction ($\beta = .09$). The significant interaction is of the form predicted in **H1b**; the relationship between newspaper use and issue stance knowledge is stronger among those with high levels of education than those with low levels of education (see Figure 2).
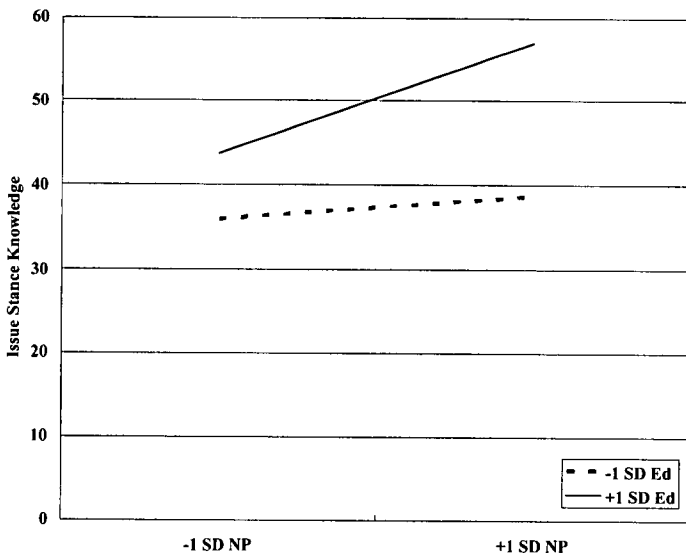
H2a predicted an interaction between television news use and NFC. Table 3 indicates no support for this hypothesis in either 2000 or 2004 data. There was, however, a marginally significant ($\beta = -.04$, $p = .09$ two-tailed) quadratic relationship between NFC and knowledge that took the form of an inverted U.

H2b predicted an interaction between newspaper use and NFC: newspaper use would have a stronger relationship with knowledge among those high than among those low in NFC. Table 3 reveals partial support for this hypothesis. Although there was no significant interaction in the 2000 data, findings from the 2004 ANES indicate a significant interaction ($\beta = .08$) consistent in form with our prediction (see Figure 3).

H3a predicted an interaction between television news use and campaign interest: television news use would have a stronger relationship with knowledge among those less interested in the campaign than those more interested. Table 4 indicates partial support for this hypothesis. There was no evidence of this interaction in the 2000 ANES. However, there was a marginally significant interaction ($\beta = -.07$, $p = .06$

FIGURE 2

Interaction of Newspaper Use and Education Predicting Issue Stance Knowledge (2004)

two-tailed) consistent with **H3a** in the 2004 ANES, over and above a significant quadratic effect of campaign interest (see Figure 4).

H3b predicted an interaction between newspaper use and campaign interest: the relationship between newspaper use and knowledge would be greater among those with high levels of interest. There was no support for this hypothesis in either year.

Discussion

Building on research from the 1996 presidential election campaign, the present study tested whether the influence of television news and newspaper use differ depending on individual differences in formal education, NFC, or campaign interest. Analysis of data gathered during the 2000 and 2004 presidential election campaigns lead us to more ambiguous conclusions than the prior research, which suggested we would find the relationship between television news use and political knowledge to be moderated by education (the relationship would be stronger among the less than more educated).[38] In two tests, only one marginally significant finding supported the hypothesis. It is possible that differences in the outcome variable in our study compared to previous work are responsible for the variations in findings. But, this is unlikely given that Eveland and Scheufele[39] found a consistent significant interaction between television news use and education across four different knowledge measures (a combination of two of which we employed as our outcome measure here).

Our findings are generally inconsistent with those of Eveland and Scheufele in terms of the interaction between newspaper use and education. Eveland and Scheufele found intermittent support for newspa-

TABLE 3

TABLE 3

Regression Analysis of Political Knowledge by News Media Use and Need for Cognition

		2000		2004	
		TV Model	NP Model	TV Model	NP Model
Block 1	Education	.22**	.22**	.22**	.22**
	Income	.07**	.07**	-.02	-.02
	Age	.01	.01	.01	.01
	Age Squared	-.10**	-.10**	-.10**	-.10**
	Gender (High = Male)	.19**	.19**	.08**	.08**
	Survey Mode (High = Phone)	.10**	.10**	—	—
	Days before Election	.02	.02	-.01	-.01
	TV News Use	.05*	.05*	-.01	-.01
	Newspaper Use	.08**	.08**	.15**	.15**
	Need for Cognition	.03	.03	.02	.02
	Campaign Interest	.26**	.26**	.31**	.31**
Block 2	NFC Squared	-.04#	NS	NS	NS
	TV News Use Squared	NS	—	NS	—
	NP Use Squared	—	NS	—	NS
	NFC* TV News Use	NS	—	NS	—
	NFC* NP Use	—	NS	—	.08**

Note: Variables in Block 1 do not control for Block 2 variables. Variables in Block 2 control for Block 1 and one another.   # $p < .10$; * $p < .05$; ** $p < .01$ two-tailed test

per use by education interaction, as did we. But, whereas they found greater effects of newspaper use among the less educated in their two (out of five) significant newspaper by education interactions, our one significant interaction (in two tests) is of the opposite form. That is, we found—consistent with our hypothesis and with the knowledge gap hypothesis generally—that newspaper use is more strongly related to knowledge among those with higher rather than lower levels of education in the 2004 ANES.

We extended the work of Eveland and Scheufele and others[40] by incorporating NFC as a potential moderator of news media effects. Although we did not find any evidence in support of our hypothesis that those low in NFC would reveal stronger relationships between television news use and knowledge, we did find some evidence (from the 2004 ANES) that those higher in NFC show a stronger relationship between newspaper use and knowledge. This is consistent with our hypothesis and with the theoretical explanation of the knowledge gap hypothesis.

Following a long line of research pointing to the importance of interest or other motivational variables in the knowledge gap,[41] we also

FIGURE 3

Interaction of Newspaper Use and Need for Cognition Predicting Issue Stance Knowledge
(2004)
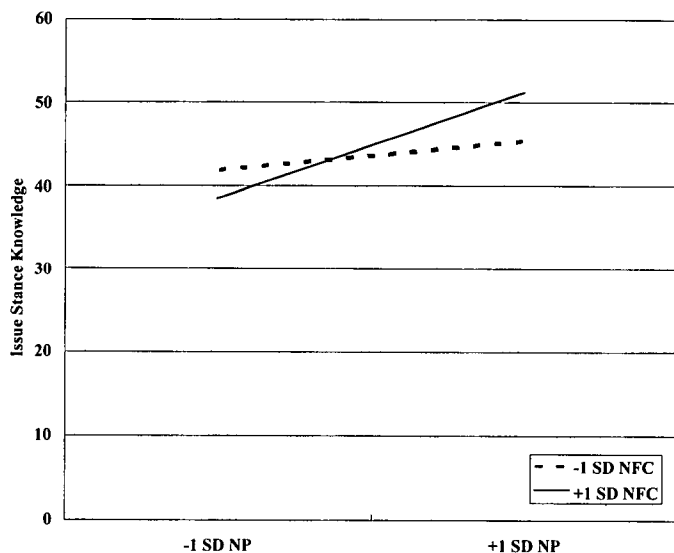
tested the interaction between our news media variables and campaign interest. Our results reveal primarily null findings; only one interaction in four tests was even marginally significant. It appears that those with higher levels of campaign interest have a weaker relationship between television news use and knowledge than those with low levels of interest.

What do these findings tell us about the underlying theoretical expectations we developed earlier in the article? First, every significant interaction we identified was in the "correct" direction—that is, when there is a significant moderating effect of education, NFC, or interest on a news media use variable it works in accordance with the theoretical expectations we set forth. Among those higher in education, NFC, or interest, we are likely to identify a weaker relationship between television news use and issue stance knowledge. Among these same groups, we are likely to find stronger relationships between newspaper use and issue stance knowledge. Thus, despite the inconsistencies, the number of significant interactions we identified is certainly beyond statistical chance, and all significant findings are consistent with our expectations. Our task, then, is to understand the inconsistencies in the general pattern of support for our expectations.

Part of the problem may stem from the nature of testing interaction effects in survey data. It has been well-documented that interactions have low power in survey contexts by comparison to experimental contexts.[42] For this reason we chose to interpret interaction and nonlinearity findings reaching the $p < .10$ level (in addition to the fact that a two-tailed $p < .10$ is equivalent to a one-tailed $p < .05$ and we employed

TABLE 4

Regression Analysis of Political Knowledge by News Media Use and Campaign Interest

		2000		2004	
		TV Model	NP Model	TV Model	NP Model
Block 1	Education	.22**	.22**	.22**	.22**
	Income	.07**	.07**	-.02	-.02
	Age	.01	.01	.01	.01
	Age Squared	-.10**	-.10**	-.10**	-.10**
	Gender (High = Male)	.19**	.19**	.08**	.08**
	Survey Mode (High = Phone)	.10**	.10**	—	—
	Days before Election	.02	.02	-.01	-.01
	TV News Use	.05*	.05*	-.01	-.01
	Newspaper Use	.08**	.08**	.15**	.15**
	Need for Cognition	.03	.03	.02	.02
	Campaign Interest	.26**	.26**	.31**	.31**
Block 2	Camp. Int. Squared	NS	NS	.16**	.11*
	TV News Use Squared	NS	—	NS	—
	NP Use Squared	—	NS	—	NS
	Camp. Int.* TV News Use	NS	—	-.07#	—
	Camp. Int.* NP Use	—	NS	—	NS

Note: Variables in Block 1 do not control for Block 2 variables. Variables in Block 2 control for Block 1 and one another.   # $p < .10$; * $p < .05$; ** $p < .01$ two-tailed test

directional hypotheses, meaning interpretation of one-tailed p-values would have been appropriate anyhow). Moreover, measurement error in component terms of interactions is amplified in the interaction itself since the reliability of an interaction term is the product of the reliabilities of its components,[43] making detecting interactions even harder. This may explain the less consistent findings for NFC and interest compared to education, given the relatively low reliability of our two-item NFC and interest measures (compared to the assumed high reliability of the single-item education measure).

But, even our education interactions were significant only in half of the tests. One explanation may lie in differences occurring from 1996 to 2004. For television, Eveland and Scheufele[44] found a significant interaction in the 1996 ANES, and we found a marginally significant interaction of the same form in the 2000 ANES. But, the interaction was nonsignificant in 2004. This may suggest some change in the content of television news that has made education a less important moderator of television news effects over the past decade. Could it be that the increasing use of

FIGURE 4

Interaction of Television News Use and Campaign Interest Predicting
Issue Stance Knowledge (2004)
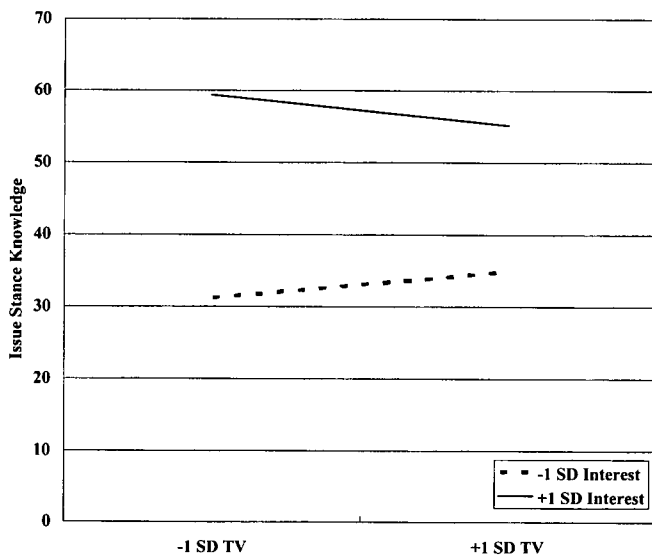
scrolling text at the bottom of television newscasts (particularly in cable news) has led to this change? The timing appears to fit, but only further research will tell.

A similar, even stronger, temporal pattern is evident for the newspaper by education interaction. Eveland and Scheufele[45] found a negative interaction between newspaper use and education in predicting candidate issue stance knowledge (but none for party issue stance knowledge) in 1996, a finding opposite the prediction made in this study. In our study, there was no interaction in 2000, but then an interaction of opposite form from Eveland and Scheufele—a positive interaction—was significant in the 2004 data. Over time, newspaper content may have changed such that while the relationship between newspaper use and knowledge was stronger among the *less* educated a decade ago, now (and maybe into the future) the relationship between newspaper use and knowledge will be stronger among the *more* educated.

Although we suspect this is probably not the case—we think it at least possible that Eveland and Scheufele's finding for 1996 was an anomaly—there may be other temporal factors at work. For instance, there may be differences over time based on the nature of political campaigns—the amount of coverage they receive, the complexity of the issues under debate, and the willingness of candidates to take clear stances (and news media to report them) that can lead to variations in findings over time. Only future research that takes into account more variables—especially temporal variables relating to media content or political context—will be able to answer these questions.

This study had a number of limitations that we must acknowledge. The first and potentially most important is the lack of longitudinal data with which to examine actual change. Instead, we settle for an alternative approach that, while present in the literature since 1979,[46] has only recently begun to be used on a regular basis in knowledge gap studies.[47] This approach, which examines interactions between self-reported news media use variables and variables such as SES or motivation, is useful but ultimately less ideal than longitudinal data.

Another limitation is the nature of our dependent variable. In this study political knowledge was based on measures of relatively correct placement of candidates and parties on issue positions. Admittedly, political knowledge involves more than knowledge about candidates' and parties' issue positions, and some knowledge gap research has suggested that variations in knowledge measures (e.g., closed-ended vs. open-ended question formats) may have important implications. In particular, we suggest that future research extend the measurement of political knowledge beyond factual political knowledge, which usually requires simple recall or recognition, to structural knowledge, which requires the ability to associate, integrate, and relate various news issues or topics.[48] By definition, "structural knowledge is the knowledge of how concepts within a domain are interrelated."[49] Recent research suggests that effects of various media may be different depending on whether one measures factual knowledge or structural knowledge,[50] and so this distinction, as well as others that have been made in the knowledge gap literature, should be more closely scrutinized.

NOTES

1. Phillip J. Tichenor, George A. Donohue, and Clarice N. Olien, "Mass Media Flow and Differential Growth in Knowledge," *Public Opinion Quarterly* 34 (summer 1970): 159-70; Kasisomayajula Viswanath and John R. Finnegan, Jr., "The Knowledge Gap Hypothesis: Twenty-Five Years Later," in *Communication Yearbook* 19, ed. Brant R. Burleson (CA: Sage, 1996), 187-227.

2. For example, see George A. Donohue, Phillip J. Tichenor, and Clarice N. Olien, "Mass Media and the Knowledge Gap: A Hypothesis Reconsidered," *Communication Research* 2 (January 1975): 3-23; William P. Eveland, Jr. and Dietram A. Scheufele, "Connecting News Media Use with Gaps in Knowledge and Participation," *Political Communication* 17 (July-September 2000): 215-37; Thomas M. Holbrook, "Presidential Campaigns and the Knowledge Gap," *Political Communication* 19 (October 2002): 437-54; Michael McDevitt and Steven Chaffee, "Closing Gaps in Political Communication and Knowledge: Effects of a School Intervention," *Communication Research* 27 (June 2000): 259-92.

3. See Viswanath and Finnegan, "The Knowledge Gap Hypothesis" for a review.

4. Eveland and Scheufele, "Connecting News Media Use."

5. See also Nojin Kwak, "Revisiting the Knowledge Gap Hypothesis:

Education, Motivation, and Media Use," *Communication Research* 26 (August 1999): 385-413.

6. See also Kwak, "Revisiting the Knowledge Gap Hypothesis."

7. Others (e.g., Eveland and Scheufele, "Connecting News Media Use") have described their work using the traditional knowledge gap terminology. Statistically speaking, it does not matter which variable is considered the causal agent and which is the moderator; the empirical test of moderation is the same. However, this is conceptually important.

8. For example, see Peter Clarke and Eric Fredin, "Newspapers, Television and Political Reasoning," *Public Opinion Quarterly* 42 (summer 1978): 143-60; John P. Robinson and Mark R. Levy, "News Media Use and the Informed Public: A 1990s Update," *Journal of Communication* 46 (spring 1996): 129-35.

9. Doris A. Graber, "Why Voters Fail Information Tests: Can the Hurdles Be Overcome?" *Political Communication* 11 (October/December 1994): 331-46.

10. Eveland and Scheufele, "Connecting News Media Use."

11. Marion R. Just, Ann N. Crigler, Dean E. Alger, Timothy E. Cook, Montague Kern, and Darrell M. West, *Crosstalk: Citizens, Candidates, And the Media in A Presidential Campaign* (Chicago: University of Chicago Press, 1996).

12. Steven H. Chaffee and Stacey Frank, "How Americans Get Political Information: Print Versus Broadcast News," *The Annals of the American Academy of Political and Social Science* 546 (July 1996): 48-58; Steven H. Chaffee, Xinshu Zhao, and Glenn Leshner, "Political Knowledge and the Campaign Media of 1992," *Communication Research* 21 (June 1994): 305-24.

13. Doris A. Graber, *Processing Politics: Learning from Television in the Internet Age* (Chicago: University of Chicago Press, 2001), 24.

14. Graber, *Processing Politics*, 11-42.

15. See Hans-Bernd Brosius, Wolfgang Donsbach, and Monika Birk, "How Do Text-Picture Relations Affect the Informational Effectiveness of Television Newscasts?" *Journal of Broadcasting & Electronic Media* 40 (spring 1996): 180-95; Stephen D. Reese, "Visual-verbal Redundancy Effects on Television News Learning," *Journal of Broadcasting* 28 (winter 1984): 79-87.

16. Eveland and Scheufele, "Connecting News Media Use"; Kwak, "Revisiting the Knowledge Gap Hypothesis."

17. See Jan Kleinnijenhuis, "Newspaper Complexity and the Knowledge Gap," *European Journal of Communication* 6 (December 1991): 499-522.

18. Arthur R. Cohen, Ezra Stotland, and Donald M. Wolfe, "An Experimental Investigation of Need for Cognition," *Journal of Abnormal and Social Psychology* 51 (September 1955): 291-94.

19. John T. Cacioppo and Richard E. Petty, "The Need for Cognition," *Journal of Personality and Social Psychology* 42 (January 1982): 116-31; John T. Cacioppo, Richard E. Petty, Chuan Feng Kao, and Regina Rodriguez, "Central and Peripheral Routes to Persuasion: An Individual Difference Perspective," *Journal of Personality and Social Psychology* 51 (November

1986): 1032-43.

20. John T. Cacioppo, Richard E. Petty, and Chuan Feng Kao, "The Efficient Assessment of Need for Cognition," *Journal of Personality Assessment* 48 (June 1984): 306.

21. John T. Cacioppo, Richard E. Petty, Jeffrey A. Feinstein, and W. Blair G. Jarvis, "Dispositional Differences in Cognitive Motivation: The Life And Times of Individuals Varying in Need For Cognition," *Psychological Bulletin* 119 (March 1996): 197-253.

22. Also see Maria E. Grabe, Annie Lang, Shuhua Zhou, and Paul D. Bolls, "Cognitive Access to Negatively Arousing News: An Experimental Investigation of the Knowledge Gap," *Communication Research* 27 (February 2000): 3-26 for an alternative perspective.

23. Fiona Chew and Sushma Palmer, "Interest, the Knowledge Gap, and Television Programming," *Journal of Broadcasting & Electronic Media* 38 (summer 1994): 271-87; B. K. L. Genova and Bradley S. Greenberg, "Interests in News and the Knowledge Gap," *Public Opinion Quarterly* 43 (spring 1979): 79-91.

24. Genova and Greenberg, "Interests in News."

25. Kevin G. Barnhurst and Diana Mutz, "American Journalism and the Decline in Event-Centered Reporting," *Journal of Communication* 47 (autumn 1997): 50.

26. Age often is nonlinearly (specifically, in quadratic form) related to political knowledge, such that there is a positive relationship between age and knowledge throughout most of the distribution of age, with a negative relationship occurring only at the highest levels. Thus, in analyses that follow we account for both linear and quadratic relationships between age and knowledge.

27. For example, see Jack M. McLeod, Zhongshi Guo, Katie Daily, Catherine A. Steele, Huiping Huang, Edward Horowitz, and Huailin Chen, "The Impact of Traditional and Nontraditional Media Forms in the 1992 Presidential Election," *Journalism & Mass Communication Quarterly* 73 (summer 1996): 401-16.

28. We gathered data using the standard 18-item NFC short form (Cacioppo, Petty, and Kao, "The Efficient Assessment of Need for Cognition") ourselves from a convenience sample of college undergraduates to help validate the use of these two items as substitutes for a larger scale. A scale of the two ANES items correlated with the full 18-item short form of which they are part at .64. However, ANES converted one of the two Likert-type items in the short form NFC scale to a dichotomous item.

29. William P. Eveland, Jr., "The Cognitive Mediation Model of Learning from the News: Evidence from Nonelection, Off-Year Election, and Presidential Election Contexts," *Communication Research* 28 (October 2001): 571-601; Eveland and Scheufele, "Connecting News Media Use."

30. William L. Benoit and Glenn J. Hansen, "Presidential Debate Watching, Issue Knowledge, Character Evaluation, and Vote Choice," *Human Communication Research* 30 (January 2004): 121-44; Craig L. Brians and Martin P. Wattenberg, "Campaign Issue Knowledge and Salience: Comparing Reception from TV Commercials, TV News and Newspapers," *American Journal of Political Science* 40 (February 1996): 172-93.

31. An example from the 2004 election campaign helps further explain why this approach makes sense. George W. Bush publicly claimed to support the renewal of the assault weapons ban, but did not expend any effort to encourage the Republican-controlled Congress to pass the measure so that he could sign it. Thus, while one might argue that Bush favored the assault weapons ban, others might just as reasonably argue that his public support for the measure was simply a political ploy, and that he did not really support it at all. In fact, at least one non-partisan Web site that provided stances on various issues for all of the candidates (the Minnesota NPR site) indicated that Bush was opposed to the weapons ban despite his public statements in favor of it. This illustrates the difficulty of placing candidates on ambiguously labeled issue positions and claiming the placement is accurate or inaccurate in absolute terms. However, it would not be difficult to argue that Kerry was *more* in favor of this measure than Bush.

32. Vincent Price, "Political Information," in *Measures of Political Attitudes*, ed. John P. Robinson, Phillip R. Shaver, and Lawrence S. Wrightsman (NY: Academic Press, 1999), 591-639.

33. Tichenor, Donohue, and Olien, "Mass Media Flow."

34. See Eveland and Scheufele, "Connecting News Media Use"; Kwak, "Revisiting the Knowledge Gap Hypothesis"; Jack M. McLeod, Carl R. Bybee, and Jean A. Durall, "Equivalence of Informed Political Participation: The 1976 Presidential Debates as a Source of Influence," *Communication Research* 6 (October 1979): 463-87.

35. See William P. Eveland, Jr., "Interactions and Nonlinearity in Mass Communication: Connecting Theory and Methodology," *Journalism & Mass Communication Quarterly* 74 (summer 1997): 400-16.

36. For a review, see Eveland, "Interactions and Nonlinearity."

37. Robert C. MacCallum and Corinne M. Mar, "Distinguishing Between Moderator and Quadratic Effects in Multiple Regression," *Psychological Bulletin* 118 (November 1995): 405-21.

38. Eveland and Scheufele, "Connecting News Media Use"; Kwak, "Revisiting the Knowledge Gap Hypothesis."

39. Eveland and Scheufele, "Connecting News Media Use."

40. Kwak, "Revisiting the Knowledge Gap Hypothesis."

41. Genova and Greenberg, "Interests in News."

42. Gary H. McClelland and Charles M. Judd, "Statistical Difficulties of Detecting Interactions and Moderator Effects," *Psychological Bulletin* 114 (September 1993): 376-90.

43. James Jaccard and Choi K. Wan, "Measurement Error in the Analysis of Interaction Effects Between Continuous Predictors Using Multiple Regression: Multiple Indicator and Structural Equation Approaches," *Psychological Bulletin* 117 (March 1995): 348-57.

44. Eveland and Scheufele, "Connecting News Media Use."

45. Eveland and Scheufele, "Connecting News Media Use."

46. McLeod, Bybee, and Durall, "Equivalence of Informed Political Participation."

47. Eveland and Scheufele, "Connecting News Media Use"; Kwak, "Revisiting the Knowledge Gap Hypothesis."

48. William P. Eveland, Jr., Krisztina Marton, and Mihye Seo, "Moving Beyond 'Just the Facts': The Influence of Online News on the Content and Structure of Public Affairs Knowledge," *Communication Research* 31 (February 2004): 82-108.

49. David H. Jonassen, Katherine Beissner, and Michael Yacci, *Structural Knowledge: Techniques for Representing, Conveying, and Acquiring Structural Knowledge* (NJ: Lawrence Erlbaum, 1993), 4.

50. William P. Eveland, Jr., Juliann Cortese, Heesun Park, and Sharon Dunwoody, "How Web Site Organization Influences Free Recall, Factual Knowledge, and Knowledge Structure Density," *Human Communication Research* 30 (April 2004): 208- 33.