



Knowledge about the Gulf Wars

A Theoretical Model of Learning from the News

Yen-hwei Lo and Chingching Chang

This study explores the relationship of factors that influence adolescents' learning about the two Gulf Wars from the news. A model constructed from data gathered in two sample surveys in Taiwan depicts these relationships. The results largely support the hypotheses that newspaper use, television news use, attention, and elaboration are related to knowledge about the Gulf Wars—and that television news tends to make a significant contribution to adolescents' knowledge. Finally, path analyses suggest that media diversity seems to be an important factor influencing the relationships between media use, attention, elaboration, and knowledge.

Keywords: *knowledge; Gulf War; adolescent; attention; elaboration; newspaper use; television news use; news diversity*

Although it is well established that television is the main source of news for most people and is considered the most credible medium, many past studies have repeatedly demonstrated that television news contributes little or nothing to the public's knowledge of public affairs (Becker and Whitney 1980; Patterson and McClure 1976; Robinson and Levy 1986). However, several recent studies have shown that television news correlates significantly and positively with public affairs knowledge under certain circumstances and for certain topics (Bennett et al. 1996; Chaffee et al. 1994; Chaffee and Frank 1996; Norris and Sanders 2003). This study attempts to extend this recent line of research by examining the impact of television on political learning of adolescents during the two Gulf Wars. Because adolescents are poorly informed on public affairs (Chaffee and Tims 1982; Sotirovic and McLeod 2004; Tan and Vaughn 1976), it is theoretically important to determine whether the intensive coverage of the two Gulf Wars by television has helped inform adolescents about these important international events.

Much of the research examining the impact of news media on political knowledge seems to be guided by a simple direct effects approach, where media use is thought to have direct effects on public affairs knowledge (Eveland 2002; Garramone 1983). The learning process that involves direct and indirect effects has received little attention (Eveland 2002). Therefore, the main objective of this study is to explore the relationships between media use, attention, elaboration, and knowledge about the Gulf War through a model that examines both direct and indirect effects. According to the Cognitive Mediation Model (CMM; Eveland 2001, 2002; Eveland et al. 2003), attention and elaboration are the key information-processing factors that determine learning from the news. When people are motivated to process information about an event, they should be more attentive to the media message and more likely to engage in elaborative processing and thus should acquire more information from media. This study attempts to expand on the cognitive mediation model by incorporating measures of television and newspaper use to examine the relationships between media use, attention, elaboration, and knowledge with a new population—adolescents. The growing research on the CMM has primarily focused on adult respondents (Beaudoin and Thorson 2004; Eveland 2001, 2002; Eveland et al. 2003). The influence of information process strategies on adolescents' political learning has constituted a gap in the research. The need for research in this area is particularly strong.

Another study objective is to examine whether the relationship between media use, attention, elaboration, and knowledge about the Gulf War has varied as the media environment has changed. During the first Gulf crisis and the ensuing war in 1991, Taiwan had only three over-the-air television stations, and the amount of time each station devoted to newscasts and Gulf War coverage was very limited. By 2003, with the introduction and rapid growth of cable television in Taiwan, about fifteen television channels broadcast regular news programs, including seven 24-hour, all-news channels. As a result, Taiwanese television covered the second Gulf War far more extensively and viewers had far more viewing options than in 1991. By contrast, changes in the newspaper industry were much less dramatic. Although newspapers have faced declining readership and advertising, the number of daily newspapers changed little between the two Gulf Wars. Most important, coverage of the wars by the largest dailies was similar in terms of amount of coverage devoted to Gulf War stories and number of wire stories used. Thus, a sample survey was conducted in 2003—as one had been in 1991—to see whether the relationships between media use, attention, elaboration, and knowledge about the Gulf War vary when diversity in television news increases.

The Changing Media Environment in Taiwan

When the first Gulf War broke out in 1991, three over-the-air television stations served Taiwan. With 49 percent of the stock, the Taiwan Provincial

Government controlled the Taiwan Television Company (TTV). The ruling political party, the Kuomintang (KMT), owned 68 percent of the China Television Company (CTV). The Ministry of Defense (72 percent) and the Ministry of Education (10 percent) owned the Chinese Television System (CTS). Therefore, the triple alliance of the government, the military, and the governing party controlled all three television stations (Lo et al. 1998).

Although each station broadcast morning, afternoon, and evening newscasts, the amount of time each station devoted to news was very limited. After the U.S.-led allied forces began a long-anticipated ground battle against Iraq, all three television stations expanded their regular thirty-minute evening news programs to one hour to provide more extensive coverage of the war (Lo 1994). Nonetheless, viewers could only watch the Gulf War news carried by the three stations at a given time each day. Their viewing options were very few.

Since 1993, when the government lifted a twenty-two-year ban on the establishment of new television stations and enacted a law to legalize the cable industry, television in Taiwan has grown rapidly. In 1994, about 42 percent of Taiwan's total television households subscribed to cable television services (Liu 1994). By 1998, the proportion soared to 80 percent, with many operators offering more than ninety channels of information and entertainment programs (Wang and Lo 2000). By 2003, a total of fifty-nine domestic and twenty foreign companies were operating eighty-nine and thirty-nine cable channels, respectively (Government Information Office 2004a). The fourth over-the-air television station also came into existence in 1997. At present, about fifteen channels broadcast regular Chinese news programs. Of the fifteen television channels, seven are entirely devoted to news. Most cable news channels have their own staff of reporters and editors and offer news in various forms including breaking news reports, interviews, financial news, public affairs shows, and call-in programs around the clock. From the viewers' perspective, television news has never been so diverse or easier to access.

The changing media environment exercised a profound influence on Taiwanese television's coverage of the Gulf War and the audience's media choice. With their enormous news hole, cable news channels have provided viewers significantly more viewing diversity by offering more war reports, more interviews, and more thorough analysis about the war. As a result, television has covered the second Gulf War far more extensively.

By contrast, changes in the newspaper industry have been much less dramatic between the two Gulf Wars. In 1991, Taiwan's newspapers already enjoyed broader freedom in news coverage. After the lifting of martial law in 1987 and newspaper restrictions in 1988, newspapers were free to release information or comments on the performance of any government official or public figure. The numbers of registered newspapers grew from 31 in 1987 to 249 in 1992 (Government Information Office 1993), although only 25 were widely read. The

two largest dailies, the *United Daily News* and *China Times*, dominated the market, accounting for more than two-thirds of the total daily newspaper circulation in Taiwan. The number of pages for the largest dailies also expanded from twelve in 1987 to range from thirty to fifty per issue in the early 1990s (Rampal 1994). Although most papers devoted considerable space to Gulf War coverage, most of the straight news originated from major Western news agencies such as the Associated Press, United Press International, Reuters, and Agence France Presse (Lo 1994).

In 2003, the *United Daily News* and *China Times* continued to dominate the daily newspaper market. Only one of the new publications, the *Liberty Times*, has been able to expand enough to threaten the big two. The three together shared more than two-thirds of the total daily newspaper circulation in Taiwan (Liu 2004). Although the numbers of daily newspapers did not change significantly, the proportion of newspaper readers in the total population had declined dramatically from 76.3 percent in 1991 (Liu 2004) to around 50 percent in 2003 (Government Information Office 2004b). As a result, newspapers' advertising revenue had decreased substantially (Liu 2004).

Despite fierce competition—especially from cable television—and declining readership and advertising revenue, their coverage of the two Gulf Wars changed very little. As in the first Gulf crisis, the largest dailies sent their own reporters to capital cities in the Middle East. Furthermore, all major newspapers still relied on a few powerful Western news organizations, primarily from the United States, for their coverage of the war. Thus, diversity of newspaper coverage scarcely changed from the first Gulf War to the second.

Media Use and Knowledge of International Affairs

Although there has been plenty of literature from Western nations, particularly the United States, regarding the impact of news media on public affairs knowledge of the general public, relatively little research has been done on political learning from news media by adolescents. Most past studies examining the influence of media use on adults indicate that newspaper use is correlated more strongly with knowledge of public affairs than is television news use. For example, Robinson and Levy (1986), who analyzed fifteen separate studies of media use and information, found newspaper use generally was a significant predictor of political knowledge, while television news had a very small to negligible effect on knowledge. They thus concluded, "Television news should not be considered the public's main source of news" (p. 232).

Although newspapers have continued to be major sources of political information, there is growing evidence that television news can make a significant contribution to knowledge of public affairs (Chaffee and Frank 1996). In a comparison of six elections in various states in the United States from 1984 to 1992,

for example, Zhao and Chaffee (1995) found that television news was consistently informative regarding issue differences between candidates. A survey of North Carolina voters during the 1992 campaign found that television news was the most significant predictor of knowledge of issue differences between candidates (Chaffee et al. 1994). During the first Gulf War, Pan et al. (1994) found that exposure to cable and PBS news was positively related to Gulf War knowledge.

For adolescents, television news has played a major role in the process of their political socialization (Chaffee et al. 1990). Past research indicates that adolescents seem to develop the news habit first via television (Chaffee et al. 1990). During junior and senior years, the amount of time they spend watching television news increases significantly (Garramone 1983). Thus, it is not surprising to find that past studies consistently show that exposure to television news is positively related to adolescents' public affairs knowledge (Chaffee et al. 1990; Eveland et al. 1998; Garramone 1983). In a survey of 734 high school students in Taiwan, Lo (1994) also found that television news use was related significantly to knowledge of the Gulf War. Based on these research findings, we expected that television news use would be positively correlated with adolescents' knowledge about the Gulf War.

This study was designed to fill a gap in media use and political learning research by examining the impact of television news on political knowledge of adolescents during international crises that received comprehensive media coverage and by expanding the cognitive mediation model to see if changes in the media environment over time have influenced the theoretical links among media use, attention, elaboration, and knowledge about the Gulf War.

A Theoretical Model of Learning from the News

Past research has focused on a variety of factors that influence learning from the news. After a critical review of existing theory and research, Eveland (2001, 2002) proposed an integrated model, the CMM, to explain the process of learning from the news. The CMM states that when people are motivated to use news media, they tend to employ two types of information-processing strategies: attention and elaboration (Eveland 2001). Attention and elaboration in turn will lead to a higher level of learning from the news. Thus, the CMM assumes that attention and elaboration are the most important information-processing factors that determine what people learn from the news media.

While the CMM represents a useful contribution to research on learning from the news, it does not specify the connections between media use and attention; nor does it describe the processes by which media use led to elaboration and learning. Past research has consistently demonstrated that media use is an important prerequisite for learning from the news. Although media use may not account for much variance in learning, it remains a necessary condition

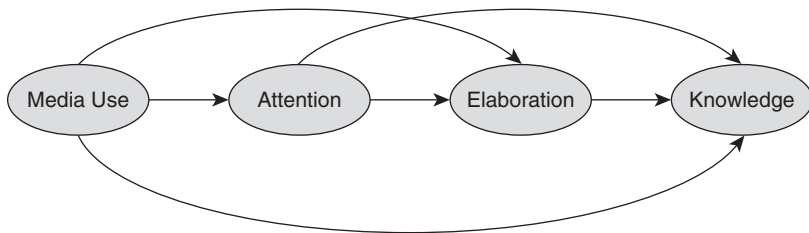


Figure 1

Proposed Theoretical Model of Learning from the News

for learning. Thus, a theoretical model of learning from the news could benefit from the inclusion of media use variables. In light of these considerations, this study proposes a new model that reflects the theoretical links among adolescents' media use, attention, elaboration, and knowledge about the Gulf War.

Figure 1 depicts a hypothesized model of learning from the news that includes media use, attention, elaboration, and learning from the news about the Gulf War. The figure shows that media use will predict news attention, which in turn will predict news elaboration, which will further predict learning from the news.

Media use is perhaps the most important precondition for learning from the news (Rhee and Cappella 1997). Numerous studies have indicated that media use, such as newspaper use and television news use, is positively related to public affairs knowledge (Bennett et al. 1996; Chaffee and Frank 1996; Lo 1994; Norris and Sanders 2003). Past research also has identified a variety of factors that affect knowledge of international affairs (Andreyenkov et al. 1989; Bennett et al. 1996; Korzenny et al. 1989; Lo 1994). Potentially most important among these is the intensity of news coverage (Price and Czilli 1996). A study by Price and Czilli (1996) found that audiences learned quite a bit from stories that received heavy news coverage. As a result, they suggested that levels of audience news recognition and recall are "largely a function of the amount of coverage given to any particular story by the media" (p. 56). The Gulf Wars unquestionably have been two of the most thoroughly reported international events in history (Greenberg and Gantz 1993; Niblock 2003). They were also the most extensively covered wars in Taiwan's television history. In fact, Taiwanese television news gave them virtual saturation coverage. Therefore, the first hypothesis predicts

Hypothesis 1: Television news use and newspaper use will be positively related to knowledge about the Gulf War.

Past research also indicates that media use is positively related to news attention (Chaffee and Schleuder 1986). In this study, media use is seen as a necessary

but not sufficient condition for attention, which is defined as a mental and perceptual focus on particular messages or stimuli to which one has been exposed. Thus, attention is a mental activity that occurs after exposure (McGuire 1978) and may enhance the impact of mediated messages (Chaffee and Schleuder 1986). This study further proposes that media use will be positively related to elaboration. Elaboration has been recognized as an important mental process that relates incoming information into existing knowledge (Eveland 2002; Perse 2001). In a sense, news elaboration represents one form of postactivity after media use (Levy and Windahl 1984). For instance, after reading a Gulf War report, a person may evaluate the implications of the news story and think about the consequences of the war. These elaborations help create additional ways of integrating the new information with prior knowledge (Perse 2001).

Our model considers learning from news to be a process that involves media use, attention, and elaboration. Sheer media use is not enough to guarantee learning. The most effective learning occurs after news has been attended to and elaborated on (Perse 2001). Thus, attention and elaboration play an important role in knowledge gains from media exposure. Accordingly, we expect that higher levels of media use will be correlated with greater news attention, elaboration, and learning. In light of these considerations, we predicted that

Hypothesis 2: Television news use and newspaper use will be positively related to news attention.

Hypothesis 3: Television news use and newspaper use will be positively related to elaboration.

Attention is a psychological, cognitive process that varies within individuals over time (Reeves et al. 1986). As we mentioned earlier, that attention is a mental effort that determines to a considerable degree what information is likely to be retained (Stephan 1985). Because attention is the allocation of cognitive effort or a readiness to process information (Perse 2001), audience members are very selective in allocating their attention. Therefore, attention enables an individual mentally to focus on specific content after exposure and thus enhances the impact of media messages. Existing research indicates that attention is an important variable in the processing of media messages and has a positive impact on memory (Cowan 1995) and political learning (Chaffee and Schleuder 1986; Moy et al. 2004). The CMM predicts that news attention will be positively related to news elaboration and learning from news. Past studies (Eveland 2001, 2002; Eveland et al. 2003) found that news attention was positively related to elaboration and public affairs knowledge. Thus, this study predicts that greater attention to news content should lead to greater elaboration of that content and higher learning from the news. Based on the CMM and previous studies, we predict the following:

Hypothesis 4: News attention will be positively related to elaboration.

Hypothesis 5: News attention will be positively related to knowledge about the Gulf War.

Elaboration refers to issue-relevant thinking or the inclination to think about the content of a message (Petty and Cacioppo 1986). The CMM assumes that elaborative processing leads to a higher level of political learning by linking new information with previous stored knowledge (Eveland 2001, 2002). Thus, elaboration is seen as “a central determinant” of learning from the news (Eveland and Dunwoody 2002: 41). In fact, numerous studies have demonstrated that elaboration is positively related to learning (Beaudoin and Thorson 2004; Eveland 2001, 2002; Eveland and Dunwoody 2002; McLeod et al., 2000). Thus, this study predicted

Hypothesis 6: Elaboration will be positively related to knowledge about the Gulf War.

Media Diversity and Learning from News

The next logical question for research to explore is whether the relationships between media use, attention, elaboration, and knowledge about the Gulf War vary when media diversity changes. Diversity has become an important concept in communication research and has been perceived as a central objective of government policy (Napoli 1999; Voakes et al. 1996). Diversity has been defined as channel capacities, content varieties, and consumer choices (Hellman 2001; McQuail 1992). Napoli (1999) identified three main dimensions of diversity: source diversity, content diversity, and exposure diversity. Source diversity refers to the diversity of ownership and workforce. Content diversity refers to the category designations given to channel or program formats. Exposure diversity is the diversity of content as received by the audience. The rapid expansion of cable television in the 1990s has significantly increased source diversity, content diversity, and exposure diversity in Taiwan’s television news. For example, recent studies conducted in Taiwan have shown that the growth of cable television has greatly increased the degree of competition in television, which in turn has resulted in more content diversity and greater freedom in news coverage (Li 1999; Wang and Lo 2000). A number of studies on television coverage of the election campaign have also demonstrated that the privately owned cable television channels are far more likely than the state-owned broadcast television stations to allot more coverage to the opposition candidates, to use the opposition parties’ officials as news sources, and to offer more news coverage favorable to the opposition parties’ candidates (Lo et al. 1996, 1998, 2004).

The question arises, then, whether the relationships between media use, attention, and knowledge vary when diversity in television news increases substantially. Past studies indicate that diversity is related to market structure (Burnett

1992; Li and Chiang 2001; Lin 1995), media competition (Dominick and Pearce 1976; Jong and Bates 1991; Li and Chiang 2001; Litman 1979), and audience responses (Becker and Schoenbach 1989). No research has attempted to examine the influence of diversity on the relationship between media use, attention, and knowledge. With the increased number of choices and the twenty-four-hour news channels provided by cable television, viewers have far more options. Thus, attention becomes extremely important in determining what people learn from the news. For example, people may watch a great amount of television news for the latest information about crimes or sports without paying attention to Gulf War stories. Some others may tune in especially to get television news about the Gulf War. According to the theory of selective attention (Zillmann and Bryant 1985), audience members are more likely to pay attention to subjects that are relevant to their interests or congruent to their information goals. With a wide choice of channels, the viewers can tune in more often and actively search out topics of most personal interest. Therefore, this study proposes that when the degree of diversity delivered in television news increases, media use will not necessarily account for differences in knowledge gains. Rather, it is attention that will lead to higher learning from the news. Thus, this study predicted

Hypothesis 7: News attention will be correlated more strongly with knowledge about the Gulf War in 2003 than will television news use.

The multichannel cable television not only gives viewers a greater option to choose programs, it also provides viewers with a greater chance of repeated exposure to the same news events that had been shown earlier on the same channel or on other channels because many news stories are repeated or reported several times a day on the cable news channels. According to the Elaboration Likelihood Model (Petty and Cacioppo 1986), variables that concern message recipients' ability to process a message affect message elaboration and persuasion. Specifically, as message recipients' ability increases, they are more likely to elaborate on messages and thus enhance learning. Petty and Cacioppo (1986) found that subjects' recall of message arguments increased with repeated exposures. In other words, repetition enhanced learning by increasing a person's ability to elaborate issue-relevant arguments.

Research in television news and information processing also demonstrates that repetition enhances learning. In an experimental study, for example, Perloff et al. (1982) found that recapping the news or repeating newscast story elements could increase viewers' recall of television news. Similarly, Findahl and Hoijer (1981) found that repetition or reemphasizing the main points of the news increased recall of news details. Thus, in a richer media environment where selective attention becomes easier and repeated exposure is likelier, individuals who are interested in an event would have a much higher probability to attend to

the relevant news reports and to scrutinize and evaluate the implications of the incoming information. Therefore, attention and elaboration could be expected to make a greater contribution to political learning. Individuals who have no interest in the Gulf War would pay relatively little attention to detailed information about the war. On the other hand, individuals interested in the Gulf War could be expected to devote considerable attention to the war report, engage in elaborative processing, and then comprehend its content. Therefore, it is reasonable to expect that when media diversity increases, news attention and elaboration will be correlated more strongly with knowledge than will media use, and higher news attention and elaboration will lead to greater learning. Thus, this study predicted

Hypothesis 8: News attention will be correlated more strongly with knowledge about the Gulf War in 2003 than in 1991.

Hypothesis 9: Elaboration will be correlated more strongly with knowledge about the Gulf War in 2003 than in 1991.

Method

Data Collection

This study is based on surveys conducted in May 1991 and May 2003. Using multistage cluster sampling, subjects for the 1991 survey were drawn from sixteen randomly selected high schools in Taipei, Taiwan. One class was randomly chosen from each school. The questionnaires were distributed in class during a two-week period. Of the total 770 students, 734 (95 percent) completed the questionnaires. The respondents included 395 (53.8 percent) males and 339 (46.2 percent) females. The 2003 survey also employed a multistage cluster sampling plan. Subjects were drawn from two randomly chosen classes in ten randomly selected high schools in Taipei. The self-administered questionnaires were distributed in class during a two-week period. The total completed sample was 739, consisting of 250 (33.8 percent) males and 489 (66.2 percent) females.¹

Measurement of Key Variables

Media Use

In both surveys, two questions measured newspaper use. First, respondents were asked to indicate the number of days per week that they read newspapers. Then they were asked to estimate the average daily amount of time spent reading newspapers. A newspaper use index was created by multiplying the number of days they read newspapers per week and the amount of reading time per day to provide an overall measure of newspaper use (in 1991, $M = 135.21$, $SD = 103.26$; in 2003, $M = 81.76$, $SD = 93.94$). Television news use was measured with two similar questions, and a television news use index

was constructed in a similar manner (in 1991, $M = 139.71$, $SD = 120.08$; in 2003, $M = 306.86$, $SD = 244.63$).

News Attention

In both surveys, respondents were asked to indicate the extent to which they agreed with the following statement on a 5-point scale, from *strongly agree* (5) to *strongly disagree* (1): "You have frequently paid attention to news reports about the Gulf War" (in 1991, $M = 3.69$, $SD = 0.99$; in 2003, $M = 3.48$, $SD = 0.91$).

Elaboration

To assess news elaboration, respondents in both surveys were asked to indicate their agreement (5 = *strongly agree*, 1 = *strongly disagree*) with the following statement: "You have frequently thought about the consequences of the Gulf War" (in 1991, $M = 3.78$, $SD = 0.92$; in 2003, $M = 3.61$, $SD = 0.99$).

Knowledge about the Gulf War

In the 1991 survey, knowledge about the Gulf War was measured with nineteen questions. The 2003 survey contained thirty-four knowledge items, which included eleven identical items used in the 1991 survey. A knowledge index was created by adding the eleven identical items that asked respondents to identify people, issues, events, weapons, and localities prominent in the news during the Gulf crisis, such as the current secretary general of the United Nations, the British prime minister, the Iraqi president, the capital city of Iraq, the underlying reason for the war, countries that supported or did not support the United States during the Gulf crisis, and the missile used by the coalition troops. In the 1991 survey, the knowledge scores ranged from 0 to 11 ($M = 6.99$, $SD = 2.49$). In the 2003 survey, the knowledge scores also ranged from 0 to 11 ($M = 4.71$, $SD = 2.37$).

Control Variables

Finally, respondents were asked about their gender and years in school.² These two variables were used as controls in the statistical analyses because previous studies indicated that they were related to political knowledge (Chaffee and Frank 1996; Lo 1994; Robinson and Levy 1986; Sotirovic and McLeod 2004).

Results

Test of Hypotheses

The first stage of the analysis was to test the seven hypotheses of the study. The Pearson and partial correlations (controlling for gender and years in school) were used to explore the bivariate relationships between attention, newspaper use, television news use, elaboration, and knowledge about the Gulf War. The Pearson and partial correlations are presented in Table 1.

The first hypothesis predicted that television news and newspaper use would be positively correlated with knowledge about the Gulf War. As shown in Table 1,

Table 1

Bivariate and partial correlations between media use variables, attention, elaboration, and knowledge about the Gulf Wars

	1	2	3	4	5
The 1991 survey					
1. Newspaper use					
2. Television news use	.26*** (.21***)				
3. Attention	.14*** (.13***)	.14** (.13***)			
4. Elaboration	.12** (.10**)	.13*** (.11**)	.45*** (.46***)		
5. Knowledge about the Gulf War	.26*** (.25***)	.20*** (.19***)	.24*** (.22***)	.15*** (.17***)	
The 2003 survey					
1. Newspaper use					
2. Television news use	.25*** (.20***)				
3. Attention	.17*** (.15***)	.29*** (.30***)			
4. Elaboration	.08* (.08*)	.20*** (.22***)	.52*** (.53***)		
5. Knowledge about the Gulf War	.20*** (.18***)	.19*** (.24***)	.39*** (.37***)	.27*** (.30***)	

Note: Figures in parentheses are partial correlations controlling for gender and years in school. * $p < .05$. ** $p < .01$. *** $p < .001$.

this hypothesis was supported. Television news use was significantly related to knowledge in 1991 ($r = .19, p < .001$) and in 2003 ($r = .24, p < .001$) after controlling for gender and years in school. Newspaper use was also significantly related to knowledge in 1991 ($r = .25, p < .001$) and in 2003 ($r = .18, p < .001$).

The second hypothesis predicted a positive relationship between media use and news attention. This hypothesis was supported. As shown in Table 1, news attention was significantly related to newspaper use (in 1991, $r = .13, p < .001$; in 2003, $r = .15, p < .001$) and television news use (in 1991, $r = .13, p < .001$; in 2003, $r = .30, p < .001$) after controlling for gender and years in school.

The third hypothesis of the study predicted a positive relation between media use and news elaboration. As shown in Table 1, this hypothesis was supported. Newspaper use (in 1991, $r = .10, p < .01$; in 2003, $r = .08, p < .05$) and television news use (in 1991, $r = .11, p < .01$; in 2003, $r = .22, p < .001$) were significantly related to elaboration after controlling for gender and years in school.

The fourth hypothesis predicted that attention was positively correlated with elaboration. This hypothesis gained strong support. The analysis indicates

that attention was strongly related to elaboration in 1991 ($r = .46, p < .001$) and in 2003 ($r = .53, p < .001$) after controlling for gender and years in school.

The fifth hypothesis predicted that attention would be related to knowledge about the Gulf War. As expected, this hypothesis was also supported. Attention was positively related to knowledge about the Gulf War in 1991 ($r = .22, p < .001$) and in 2003 ($r = .37, p < .001$) after controlling for gender and years in school.

The sixth hypothesis predicted a positive relationship between news elaboration and knowledge about the Gulf War. As results in Table 1 show, elaboration was positively related to knowledge about the Gulf War in both 1991 ($r = .17, p < .001$) and 2003 ($r = .30, p < .001$) after controlling for gender and years in school. This hypothesis was also supported.

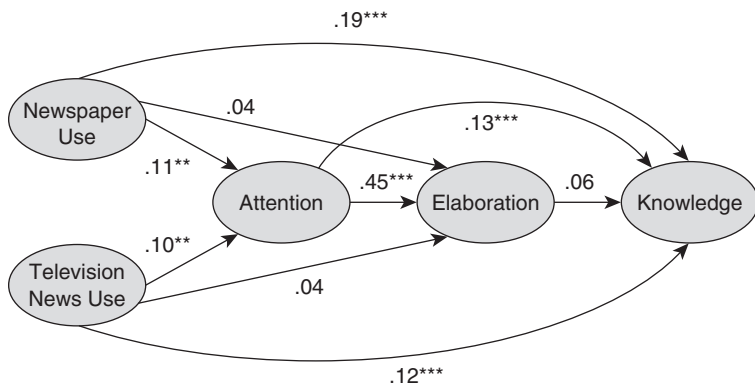
The seventh hypothesis predicted that attention would be correlated more strongly with knowledge in 2003 than would television news use. This hypothesis was also supported. News attention was correlated more strongly with knowledge in 2003 ($r = .37, p < .001$) than was television news use ($r = .24, p < .001$) after controlling for gender and years in school. A Z-test for two correlation coefficients showed that the difference is statistically significant ($Z = 2.76, p < .01$).

The eighth hypothesis predicted that news attention would be correlated more strongly with knowledge about the Gulf War in 2003 than in 1991. As shown in Table 1, news attention was correlated more strongly with knowledge about the Gulf War in 2003 ($r = .37, p < .001$) than in 1991 ($r = .22, p < .01$) after controlling for gender and years in school. A Z-test for two correlation coefficients showed that the difference is statistically significant ($Z = 3.17, p < .001$). This hypothesis was also supported.

The ninth hypothesis predicted that elaboration would be correlated more strongly with knowledge about the Gulf War in 2003 than in 1991. As shown in Table 1, elaboration was correlated more strongly with knowledge about the Gulf War in 2003 ($r = .30, p < .001$) than in 1991 ($r = .17, p < .001$) after controlling for gender and years in school. A Z-test for two correlation coefficients showed that the difference is statistically significant ($Z = 2.65, p < .01$). This hypothesis was also supported.

Path Analyses

To examine the proposed model in Figure 1, two separate path analyses were performed. Figures 2 and 3 report the results of the path analyses. In each of the 1991 and 2003 surveys, the path analysis consists of three standard regression analyses. In the first regression analysis, attention was regressed on newspaper use and television news use and the two control variables (gender and years in school). As shown in Figures 2 and 3, the regression analyses indicated that newspaper use (in 1991, $\beta = .11, p < .01$; in 2003, $\beta = .09, p = .02$) and television news use (in 1991, $\beta = .10, p < .01$; in 2003, $\beta = .29, p < .01$)

**Figure 2**

Results of Path Analysis, 1991 Survey

were significantly related to news attention after controlling for gender and years in school. These results showed that while the relationship between newspaper use and attention changed very little, television news use correlated more strongly with attention in 2003 than in 1991.

In the second regression analysis, elaboration was regressed on newspaper use, television news use, attention, and the two control variables. The results of the analysis show that attention was strongly related to elaboration in 1991 ($\beta = .45, p < .001$) and in 2003 ($\beta = .51, p < .001$) after controlling for newspaper use, television news use, and the two control variables. However, both newspaper use and television news use were not significantly related to elaboration in both years.

The third regression analysis regressed the variable of knowledge about the Gulf War on newspaper use, television news use, attention, elaboration, and the two control variables. As expected, attention was positively related to knowledge about the Gulf War in both years, but attention correlated more strongly with knowledge in 2003 after controlling for gender, years in school, newspaper use, and television news use (in 1991, $\beta = .13, p < .001$; in 2003, $\beta = .25, p < .001$).

The third regression analysis also examined the relationship between news elaboration and knowledge about the Gulf War. As results in Figures 2 and 3 show, elaboration was not significantly related to knowledge about the Gulf War in 1991, but it was significantly related to knowledge in 2003 (in 1991, $\beta = .06, p > .05$; in 2003, $\beta = .13, p < .01$) after controlling for newspaper use, television news use, attention, and the two control variables. The path analyses

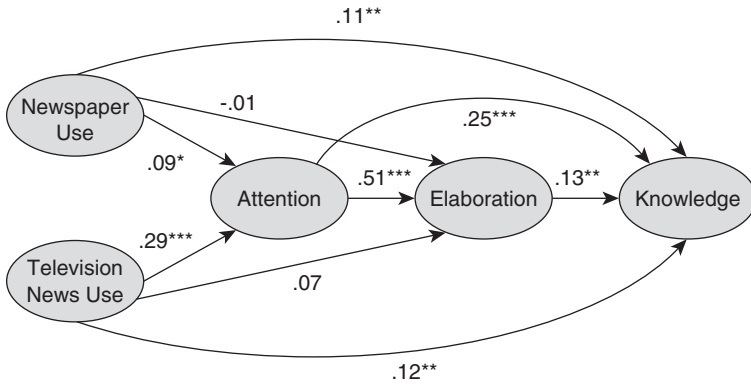


Figure 3
Results of Path Analysis, 2003 Survey

indicated that there were some significant differences in the relationships between media use, attention, elaboration, and knowledge in 1991 and 2003.

Conclusions and Discussion

This study sought to examine the relationship of factors that influence adolescents’ learning about the two Gulf Wars from the news. As expected, our study indicates that television news use was significantly related to knowledge about the Gulf War when gender, years in school, newspaper use, news attention, and elaboration were controlled. Research in information processing has indicated that intensive coverage enhances news recognition and recall (Price and Czilli 1996). Undoubtedly, the intensive coverage of the two Gulf Wars by television has helped inform adolescent viewers about the wars.

Another objective of this study was to develop a model that reflects the theoretical links among media use, attention, elaboration, and knowledge about the Gulf War. The path coefficients show that there were significant paths from newspaper use and television news use to attention, and from attention to elaboration and knowledge about the Gulf War. The results also show that news attention was the strongest predictor of knowledge in both models, indicating significant knowledge gains associated with news attention, even after media use and elaboration were controlled in the path analyses. These findings are consistent with previous studies that found attention to be the key factor in determining learning from the news (Chaffee et al. 1994; Chaffee and Schleuder 1986; Eveland 2001, 2002).

In addition, the results of the study suggest that the relationship between media use and elaboration is a mediated relationship through news attention. Although newspaper use and television news use were positively related to elaboration in both years at the zero-order level and the second-order partial level (Table 1), these relationships were reduced to nonsignificance after the control for news attention was added in the path model (Figures 2 and 3). Thus, the effect of media use on elaboration is indirect through news attention. These findings suggest that media use is an important variable that predicts and precedes learning from the news. Addition of media use measures seems to be important in a model that assesses learning from the news.

Perhaps the most interesting finding of this study is that media diversity seems to be an important influence on the relationships between media use, attention, elaboration, and knowledge. The path analyses indicate that television news use correlated more strongly with attention in 2003 (high television diversity; Figure 3) than in 1991 (low television diversity; Figure 2), while the relationship between newspaper and attention changed very little. Furthermore, news attention correlated more strongly with knowledge in 2003 than in 1991. Similarly, in conditions of high television diversity, elaboration was significantly related to knowledge; and in conditions of low television diversity, elaboration was not significantly associated with knowledge. Thus, it appears that when the diversity in television news increases, news attention and elaboration rather than media use will account for higher levels of learning. In other words, when the number of media choices is expanding greatly, attention and elaboration become more important in information processing that determines learning from the news. These are theoretically important findings because they help advance existing research by demonstrating that changes in media diversity may influence the theoretical links among media use, attention, elaboration, and political learning.

Another interesting finding of this study is that newspaper use correlated more strongly with knowledge in 1991 than in 2003, while the relationship between television news use and knowledge did not change significantly. Because the two surveys were conducted twelve years apart, many factors over this span could explain the changed relationships between newspaper use and knowledge found in this study. Notably, the media environment changed significantly between the two surveys. Cable television and the advent of the Internet and other new technologies confront adolescents in 2003 with a much wider range of media choices and materials. Past research indicates that television viewing and use of other technologies displace other activities, including newspaper reading, radio listening, movie going, and magazine reading (Kayany and Yelsma 2000; Mutz et al. 1993). Thus, it is no surprise that our study found that adolescents' newspaper use declined across the two time points, while their television news use increased sharply. It is likely that the rapid expansion of cable television that considerably increases the amount and variety of news has exercised a significant displacement

effect on adolescents' use of newspapers. Consequently, the effects of newspaper use on knowledge have been weakened over time.

This study, on the other hand, has some limitations. First, this study has not measured motivation. According to the CMM, motivation is the most important determinant of information processing. Motivations are "what drive the processing of information" (Eveland 2002: 27). Past research also indicates that motivation has a positive impact on cognitive activity (Burnkrant 1976; Perse 1990). Thus, motivation to learn seems to be a necessary precondition for any substantial learning (Gandy et al. 1987). Unfortunately, the 1991 survey did not measure motivation. Therefore, motivation could not be included in the theoretical model and in hypothesis testing. Future study can further examine the relationships between motivation, media use, attention, elaboration, and learning from the news.

Another limitation concerns the measurement of key variables. Because news attention and elaboration were both measured with a single item in the 1991 survey, the measures of these two variables in this study thus relied on one item each. Future research may benefit from using more items and measuring the two variables separately for use of newspapers and television news.

In addition to the methodology issues, the correlational design used in this study makes it impossible to establish causation. Future research should use panel design to trace knowledge gains by the same adolescents over time. Despite the limits of this study, we provide some evidence that the CMM can be applied to adolescent respondents. However, it remains to be explored whether the results of this study can readily be generalized to other populations. Additionally, nationality may affect the results; Taiwanese students may differ from their American or European counterparts in watching television news and reading newspapers.

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Notes

1. Among the schools randomly selected in the 2003 survey, three were all-girl high schools. Because there is a difference in the makeup of the two samples, gender and years in school were used as control variables in the subsequent analyses.
2. This study has not measured age. We used years in school as a surrogate for age because most high school students in Taiwan are between the ages of sixteen and eighteen.

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