Agenda-setting and Rhetorical Framing by Semantic Proximity:

A New Computerized Approach to the Analysis of Network TV News

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Abstract

The present study combined agenda-setting and news framing analysis to examine a random sample of 631 presidential campaign stories from 1992, 1996, 2000, and 2004. It is the first study to combine the strengths of three specialized software programs (QDA Miner 1.3, WordStat 4.0, and Diction 5.0) to (a) discover the major topics in the campaign coverage, (b) identify patterns by which the topics were co-mentioned to frame each other, and (c) determine how the networks used different rhetorical styles to frame the news. The findings were presented in both tables and semantic proximity plots to visually demonstrate the framing patterns. A surprising finding was the high correlation ($r = .98$) between the amount of optimism (measured by Diction 5.0) in the sound bites of the presidential candidates and actual election outcomes, suggesting that sound bites are an important source of candidate information for voters.
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News bias is difficult to define and measure, which explains why media watchdogs often question others’ research findings. Media Matters for America (2004), for example, challenged the finding announced by the Center for Media and Public Affairs (CMPA) that Fox’s coverage of the 2004 campaign was fairer and more balanced than the other news networks. Media Matters of America challenged the CMPA used coding method that might have lead to dubious results. Ambiguity in the definition of news bias also has been reflected by scholars’ different approaches to measure bias and their inconsistent findings as to whether the new media favored liberal or conservative views (Claney & Robinson, 1985; Graber, 1972; Klein & Maccoby, 1954; Lowry & Shidler, 1998).

Despite the rich literature devoted to the detection of simple partisan news bias, there is a paucity of research on how the news media frame presidential campaigns. Two related facts explain the lack of literature: presidential campaigns are always steered by a multitude of diverse topics, but framing research, according to Eko (1999), usually focuses on one particular topic. Based on an earlier endeavor to integrate agenda-setting and framing research (citation omitted for anonymity purpose), this study overcomes the problem by using specialized content analysis software to identify (1) major topics in the network TV news coverage of four consecutive (1992, 1996, 2000, and 2004) presidential campaigns and (2) the way the networks framed these topics by using topic co-mentioning and different rhetorical styles as specified by Hart’s (1984, 2000, 2001) method of computerized rhetorical analysis. In addition, to respond to Druckman and Parkin’s (2005) call for more attention to the news media’s role on voting, the study goes beyond content level by examining how optimism in the sound bites of the presidential candidates had influenced voting behavior.
Literature Review

A Brief Overview of Agenda-setting Theory, Framing Theory, and News Bias Research

Presidential elections formed the basis for the development of agenda-setting theory. McCombs and Shaw’s (1972) study at Chapel Hill, N.C. during the 1968 presidential campaign correlated the public agenda with the media agenda hallmarked one of the milestones in mass communication research. Since then, a mounting body of literature has confirmed the explanatory power of agenda-setting theory and added new contextual meanings to the theory when societies and mass media advance worldwide (Dearing & Rogers, 1996; Ghanem, 1996; McCombs, 2005; McCombs & Shaw, 1973; Weaver, Graber, McCombs, & Eyal, 1981).

Over the years, scholars have used presidential campaigns as laboratories for theory development. Political scientists used agenda-setting to explain how political candidates, government, and political parties transferred their agendas to public agendas (Baumgartner & Jones, 1993; Cobb & Elder, 1971; Kingdon, 1984; Laver & Budge, 1992; Walgrave & Aelst, 2006). Communication scholars, on the other hand, were more interested in the concept of agenda-building—that is, how candidates influenced media agendas. Newspaper and TV news agendas can be influenced by candidate advertising (Roberts & McCombs, 1994), and by candidate public relations (Kaid, 1976). McKinnon and Tedesco (1998) compared candidate press releases from the 1996 general election campaign with media agendas in print and online versions of the Chicago Tribune and found that Clinton was better than Dole at setting media agendas.

Tuchman (1978) brought the concept of “framing” from pathology (Bateson, 1972) to communication research and contended that framing was how the mass media reconstructed reality. Entman’s (1993) explanation of the concept is probably among the most accurate and comprehensive. He identified seven dimensions: (1) selecting certain aspects of a perceived
reality, (2) highlighting them and (3) communicating them in a way that promotes, (4) coining a particular version of a problem, (5) interpreting its causes, (6) passing moral judgment and (7) prescribing a remedy for the problem.

Framing research has been conducted extensively in the political arena. The use of framing theory is often related to finding news bias. Most studies in this sector focus on political campaign coverage. By conducting content analyses, some scholars found robust differences favoring Republicans (Graber, 1972; Klein & Maccoby, 1954; Stempel, 1991), while others reported notable differences favoring the Democrats (Claney & Robinson, 1985; Frank, 1973; Lowry & Shidler, 1998). Still other studies provided evidence of unbiased coverage. When analyzing the 1972 presidential campaign, Hofstetter (1976) found the overwhelming tone of the coverage was neutral for both Democrats and Republicans. He argued that the result “certainly challenges studies that assert strong biases in favor of, or in opposition to, a candidate are present in news coverage” (p. 50). In a more recent study, Domke, Fan, Fibison, Shah, Smith, and Watts (1997) also found little evidence of any partisan imbalance in their massive content analysis of newspaper coverage of the 1996 presidential campaign.

To obtain a more comprehensive view of the conflicting research results, D’Allessio and Allen (2000) conducted a meta-analysis of 59 studies that analyzed coverage of presidential elections. They concluded that no significant biases were found for the newspaper industry and there were no more than “insubstantial” differences in TV coverage.

*Topic Proximity, Rhetorical Styles, and Attribute Agenda-Setting*

McCombs (2005) argued that agenda-setting theory deals not with only public issues, but sometimes also with “attitude objects,” a term referring to the attitudes or opinions that an individual has towards public issues. He contended that “when the news media talk about an object—and when members of the public talk and think about an object—some attributes are
emphasized, others are mentioned only in passing” (p. 546). This expansion of the theory, which McCombs called “attribute agenda-setting,” is significant in that it attempts to bridge agenda-setting and framing theory. People’s attitudes toward agenda objects are related to how the objects are framed by the media, and “attributes”—namely, aspects of a central theme—determine the frames (McCombs, 2005). A poll story that appeared on September 4 in ABC’s coverage of the 2004 campaign exemplifies “attribute agenda setting.”

John Kerry has had an array of issues on which to mount a stiff challenge to George W. Bush. The economy, health care, poverty and the war in Iraq are all problems for the president. And polls show more than half the country believes Bush is leading the nation in the wrong direction. (ABC, 2004)

In this story, the main theme—poll—did not stand alone. Rather, it was depicted inside a frame consisting of four other topics as “attributes”: economy, health care, poverty, and the war. After watching the story, viewers knew not only the fact that half the country thought Bush was leading the nation in the wrong direction, but perhaps more importantly, in which respects and why the people believed so.

McCombs (1997) maintained that framing was an expansion of agenda-setting and functioned as “the selection of a restricted number of thematic related attributes for inclusion on the media agenda when a particular object is discussed” (p. 6). Such a close relationship makes framing second-level agenda-setting (McCombs, Llamas, Lopez-Escobar, & Rey, 1997). In other words, the media process information in two steps. First, they make selections of topics to tell the audience “what to think about,” which is precisely what agenda-setting attempts to theorize. Second, they reconstruct an internal structure of the selected topics in the way that some topics become attributes of others, so as to suggest to the audience “how to think about it.”
To present such an internal structure visually, we employed the concept of topic proximity. The concept sounds perplexing but is in fact self-explanatory. In the aforementioned case, if poll, economy, health care, poverty, and the war are found to be the main agenda topics (themes) in the whole campaign coverage, then a tabulation of word co-occurrence will identify the close proximity among the topics in the story, and with the help of frequency analysis, we can readily know how the poll story was framed by other topics. Furthermore, when the same analysis is run on a much larger sample, a general framing pattern of poll stories will emerge.

Given that the co-mentioning of topics can suggest to audiences how to think about a topic, rhetorical styles shown in news coverage can be considered another powerful way to influence the perception of salient topics. Political scientists have long been interested in the use of rhetorical styles in political persuasion (Conger, 1991). An array of studies discovered an a strong correlation between rhetorical styles and the perceived greatness of U.S. presidents (Fiol, Harris, & House, 1999; Shamir, Arthur, & House, 1994; Willner, 1984). Most recently, Emrich Brower, Feldman, and Garland (2001) found that U.S. presidents who employed more “image-based” rhetoric in their speeches, namely words that evoke mental pictures or sounds, are rated higher in perceived charisma and greatness. Hart and others brought rhetorical analysis to media studies by analyzing not only presidential speeches (Hart, 1984; Hart & Childers, 2005), but how mass media used their own set of rhetorical devices to “mediate” political messages to the public (Hart, 2000; Hart, Jarvis, Jennings, & Smith-Howell, 2005). By comparing the amount of optimism in politicians’ speech and that in the press from 1948 to 1996, he found that politicians seemed to be much more optimistic than the press, a fact that unfolded two distinct characteristics of both parties: politicians’ tendency to remain positive to stay in the office, and the press’ detached quality and its social function as a critic (Hart, 2000, pp. 144-146).
Note that such a comparison treats the press as a single entity without distinguishing a deeper level of characteristics individually produced by its components. Finding out the rhetorical styles that function as framing devices within the press, however, requires an investigation on a microscopic level. Politicians’ sound bites, for example, can serve as a window to uncover the way the media “gate-keep” original political information, a mechanism vital to the perception of political discourse.

To detect and quantify rhetorical styles, Hart (1984, 2001) developed a conceptual framework comprised of five almost mutually exclusive variables: optimism, activity, certainty, realism, and commonality. Each variable is calculated with a text by a computer program named “Diction” based on the valences of smaller sub-variables that are standardized. For example, the “optimism” score, which conceptually measures “language endorsing some person, group, concept or event or highlighting their positive entailments,” is tabulated in the following form:

Optimism = [Praise] + [Satisfaction] + [Inspiration] - [Blame] – [Hardship] – [Denial]

Researchers from a wide spectrum of disciplines, such as business (Alexander, Ober, Zhao, & Davis, 1999), law (Allison & Hunter, 2006), psychology (Bligh, Kohles, & Meindl, 2004), and information technology (Hunter, 2003), have adopted Hart’s approach to rhetorical styles analysis. The beauty of this computerized approach is that standardized scores allow scholars to compare rhetorical styles scores of any number texts regardless of their number or size (Hart, 1984). This study took full advantage of the program and compared rhetorical styles manifest in TV networks’ coverage of four presidential campaigns based on years, network, and sound bites as independent categorical variables. Furthermore, by combining concept mapping and rhetorical analysis, we obtained both statistical and visual presentations of how topical themes were framed by rhetorical styles based on those categorical variables.
Concept Mapping

Concept mapping provides a relatively new and objective way of studying campaign news agenda-setting and framing. According to Miller and Riechert (1994), concept mapping is a computerized multidimensional scaling technique that generates maps of content themes based on two simple textual analyses: keyword frequency and co-occurrence. It can be used to identify important themes, or agenda topics in this study, and indicate the relationship, such as topic proximity, from one to another. Because concept mapping analysis involves little human intervention, the method is ideal for addressing complex topics that include numerous issues and diverse viewpoints in a huge body of texts (Miller & Riechert, 1994). However, although seemingly complicated, the most frequently used computer algorithm to draw a concept map is based on keyword frequency and keyword co-occurrence, two widely used variables in textual analyses.

Concept mapping first involves “keyword frequency listing,” a procedure that generates a descending list of the most frequently used words while ignoring articles, prepositions, conjunctions, and auxiliary verbs. This step virtually distills the words that have both high frequencies and meanings substantial enough to indicate certain themes or topics in the text. Second, an expected value of frequency for a certain keyword will be calculated by dividing its overall frequency in the whole dataset by the number of variable values. For example, given the word “economy” appears 1000 times in the dataset, and our interested variable—year—has four values (1992, 1996, 2000 and 2004), the expected frequency is 250 (1000/4). A Chi-square analysis is done by comparing the keyword’s frequency in a specific variable category against its expected frequency. It must be noted that choosing keywords for concept mapping is not based on frequency rank, but Chi-square rank. The higher the Chi-square value, the more likely that the
keyword will be used to draw concept maps, because such a keyword not only indicates a certain theme or topic, but also maximizes variability across categories.

Salton’s article (1970) provided a way to transform a keyword co-occurrence matrix into matrix cosine coefficients, which indicate the degree of the co-occurrence of the selected keywords. Three eigenvectors are then extracted from the coefficients to indicate not only the prominence of each keyword, but two values—horizontal and vertical—that can be used to position it in a two-dimensional map. One problem of a map derived directly from such method is mostly that the number of keywords would be too large to draw a clear and interpretable map. Usually cluster analysis is used to solve the problem. Keywords are analyzed in clusters and grouped in terms of the themes they indicate. The relative position of a theme is computed by the horizontal and vertical eigenvalues of the keywords associate with the theme, and the size of a theme is determined by its prominence eigenvalues of its associated keywords.

For example, a concept map will show visually which broadcaster was most likely to relate the Iraqi war to economy in Campaign ’04 by showing the shortest distance between the “war” theme and the “economy” theme among all the newscasts’ maps. Also, statistics are run to show whether the differences in distances are significant. Another example would be if CBS tended to relate the “National Guard Record” theme only to Bush, while other networks shared it with both Bush and CBS or Dan Rather. It is worth noting that the size of each theme also can be statistically analyzed to find out how much coverage was devoted to the theme, as well as the differences in the coverage devoted to certain themes across variable categories.

Miller, Andsager, and Riechert (1998) were the first to use this technique to compare the agendas in presidential candidates’ press releases and those in network television news reports. They concluded:
A key conclusion to be reached from this research is that the concept mapping method used here is a convenient and efficient way to examine political communication. It is particularly useful in measuring the success of information subsidies in shaping news coverage, as the presence of key words and concepts can be measured in relative terms rather than in raw frequencies. This technique offers a more comprehensive picture of the tone of the news coverage, which should be of key importance in evaluating information subsidies. The maps provide an interpretable representation of candidate images in both press releases and news stories. A qualitative analysis based on reading the text confirms the interpretation that comes from the map. The mapping method has the advantage of being rigorous and at the same time allowing the patterns to emerge from the data rather than risking having them subjectively imposed by the researcher. (p. 322)

Research Questions

Scholars over the years adopted approaches and perspectives to draw pictures of how presidential campaigns were framed in news coverage. For example, Lowry and Shidler (1998) categorized television sound bites into “predominately positive bites,” “predominately negative bites,” “predominately balanced bites,” and “neutral bites.” To study the campaign in 1996, Domke et al. (1997) coded paragraphs in news stories and television transcripts as “pro-Clinton,” “con-Clinton,” “pro-Dole,” and “con-Dole.” A common deficiency of most studies of this kind (Dalton, Beck, & Huchfeldt, 1998; Domke et al., 1997; Fico, Ku, & Soffin, 1994; Frank, 1973; Graber, 1972; Hofstetter, 1976; Klein & Maccoby, 1954; Niven, 2002; Stempel, 1991) is that their coding schemes rarely went beyond simple taxonomy such as “positive,” “negative,” and “neutral” or “pro” and “con.” Few have taken a closer look at how the media portray campaigns by (1) selecting topics to cover, (2) fabricating the topics together for candidates from different parties, and (3) using rhetorical styles as “attributes” to frame topic in both overt and covert ways.
These two aspects lie at the heart of agenda-setting and framing theory: how they build agendas and how they frame agenda topics. To obtain such a detailed picture, an excessive amount of time would be required for human coders, which is probably why few such studies have been conducted. With the advancement of computerized textual analysis technologies, scholars now can accomplish such tasks and answer the following research questions.

RQ1: What topics were covered most heavily by network TV news during the presidential campaigns of 1992, 1996, 2000, and 2004? How did the emphasis topics differ across each campaign?

RQ2: How did the topic and rhetorical style proximities differ across the five networks (ABC, NBC, CBS, CNN, and FOX)?

RQ3: How did the topic and rhetorical style proximities differ across sound bites (anchors, correspondents, candidates from different parties, and party supporters)?

Besides topic and rhetorical style proximities as representation of agenda-setting and framing, we were interested in the optimism score, which Hart (2001) considered a key indicator of political personality, in the sound bites of presidential candidates, for three reasons. First, the study of optimism in political speeches has been a long-lasting interest to social scientists. U.S. presidents are not only commanders-in-chief, but also the biggest cheerleader for the country, a fact evidenced by high optimism scores of presidential speeches compared with the media’s low scores of the coverage of those speeches (Hart, 1984, 2000). Second, not only the presidents’ optimistic rhetoric but also its social effects have attracted scholars for years. Political scientists have found correlations between the amounts of optimism in presidential speeches with other variables of interest. For example, Wood, Owens, and Durham (2005) discovered that the relative optimism of presidential remarks on economy issues significantly influenced economic performance by changing consumer perceptions of the economic news and consumer sentiment.
and therefore altering their spending decisions. Zullow and Seligman (1990) analyzed pessimistic rumination in Democratic and Republican nomination acceptance speeches from 1948 to 1984 and found that candidates who were more of pessimistic ruminators lost nine of ten times, and the victory margin was proportional to the difference between the candidates in pessimistic rumination. The researchers concluded that U.S. voters historically placed “a high premium on the appearance of hope” (p. 52). The third reason derives from our focus on the media’s uninterrupted editorial selection of the candidates’ language instead of their acceptance speeches at the elections’ early stage (Zullow & Seligman, 1990), as well as the gate-keeping’s influence on voting decisions. If, despite the rise of alternative media, a majority of American voters still learn more about their candidates from network TV than from any other sources, and if audiences tend to be increasingly skeptical to network news (Tsfati & Cappella, 2003), do the candidates’ sound bites hold extraordinary persuasive power and influence the direction of the voting? To find out, we proposed as follows.

RQ4: How do optimism scores of the sound bites between the Democratic and Republican candidates differ in each election (1992, 1996, 2000, and 2004) and how do the differences relate to voting behavior?

Method

Sample

The content universe of the study was comprised of all weeknights from August 24 through October 30, 1992; from September 1 through November 1, 1996; and from September 3 through November 1, 2004. For campaign ’92, ’96 and ‘00, a random sample of 25 network newscasts was drawn from ABC, CBS, CNN, and NBC for each campaign. For Campaign ‘04, we also drew a random sample of 25 network newscasts from ABC, CBS, CNN, FOX, and NBC. All 325 newscasts were screened in two steps. We first located every presidential and vice
presidential campaign story. The databases for Campaigns ‘92 and ‘96 were borrowed from earlier published studies (Lowry & Shidler, 1995, 1998). For Campaign ‘04, eight graduate students used a combination of keywords such as “president,” “vice president,” “presidential campaign,” “Bush,” “Cheney,” “Kerry,” and “Edwards” to locate campaign related news stories in Lexis/Nexis database. For Campaign ’00, one graduate student used a similar method to search for the stories. A total of 631 stories constituted the whole corpus with 93 stories from year 1992, 77 from year 1996, 182 from year 2000, and 279 from year 2004.

Coding

All the stories in the sample were organized in chronological order in QDA Miner (Provalis Research, 2005). Two coding units were used: news story and sentence. At the newscast level, the coding categories included campaign year (1992, 1996, 2000, or 2004), network (ABC, CBS, CNN, FOX, or NBC). At the sentence level, we coded different sound bites (anchor, correspondent, democratic candidate, Republican candidate, Democratic supporter, Republican supporter, and all others). Several other coding rules were also employed. For example, a speaker who was an unknown critic of Candidate A was not automatically coded as a supporter of Candidate B. The rationale was that the speaker might be negative toward both candidates. Therefore, without other information, such a negative speaker was coded as “all others.”

Three coders first completed the primary coding of the entire corpus of content (N = 631 stories). Then 20% of the corpus was randomly drawn for double coding, which yielded a high percentage of agreement of 97% (Scotts’ Pi = 0.985). Note that similar to Cohen’s Kappa, Scott's pi adjustment does not assume that all categories have equal probability of being observed, but does assume that the distributions of the categories observed by the judges are equal. However,
unlike the Kappa, it does, in computing the chance factor, take into account the differential
tendencies of the judges.

Dictionary Building

Dictionary building was also critical to this study, because a carefully built dictionary
answers the first half of RQ1: What topics were heavily covered by network TV news during the
four presidential campaigns? Without a rigorously developed dictionary as a solid analytical
foundation that accurately reflects the themes buried in the coverage, answers to the rest of the
research questions would be questionable. WordStat 4.0, the program used to plot semantic
proximity, pre-processed the corpus by using (1) word-stemming, a process by which various
words are reduced to a limited number of forms, and (2) exclusion, a process to remove words
with little semantic value such as pronouns, conjunctions, were done by WordStat, a content
analysis program, to reduce noise during word categorization. To build a user-defined dictionary,
a frequency analysis was run first, yielding a ranked list with all the words with a frequency
above 20. All the listed words then were grouped into categories by a built-in thesaurus. Each
group was examined, and less relevant categories such as “president” and “broadcasting” were
discarded. Six major themes then emerged: economy, security, poll, religion, Democrat, and
Republican. Note that Democrat and Republican were not agenda topics, but they were valuable
in terms of exploring which topic was often related, or in other words “in closer proximity,” to
which party. A final but important step of dictionary building was to scrutinize every keyword in
each category and use WordStat’s keyword-in-context (KWIC) feature to detect any context that
may cause semantic ambiguity of the keyword. When such ambiguity was detected, a rule to
eliminate it was written into the dictionary.

RQ2 and RQ3 are essentially different versions of semantic proximities among topics and
rhetorical styles. To transplant the strength of Hart’s methodological framework from Diction 5.0
to WordStat, keywords that form four major variables (Certainty, Activity, Optimism, and Realism) in Diction were manually added in WordStat’s dictionary, where each variable has three levels. To take optimism as an example, rather than Diction’s presentation of an omnibus calculated optimism score, we partitioned the variable in WordStat into two secondary variables: optimism and pessimism, each bearing a number of third-level of variables, such as “praise” for optimism and “blame” for pessimism. Thus through semantic proximity analysis, we can easily find out which topics or parties were “framed” by optimistic or pessimistic rhetorical style.

For RQ4, we left WordStat and let Diction and SPSS answer the question. Three reasons related to certain distinct features of Diction justified this approach. First, the dataset for RQ4 can be produced only in Diction because the question involves the relationship between two independent variables (party and year) and one dependent variable (optimism), whereas WordStat’s strength is primarily on word co-occurrence analysis. Second, Diction offers a function to compare style scores against a cascade of normative values, which were generated from a broad sampling of texts produced mainly in the U.S. between 1945 and 1998 (Digitext, 2000). We were particularly interested in comparing the optimism in candidates’ sound bites with the optimism normative range for presidential campaign speech. These values came from “analyses of speeches delivered by Democratic, Republican, and third-party presidential candidates between 1948 and 1996” (Digitext, 2000, p. 32). An optimism score of 64.2, for example, would be considered “out of range” or “usually high” because, according to Diction, the optimism scores in presidential campaign speeches normally range from 47.56 to 53.67.

To prepare appropriate data for RQ4, we exported the candidates’ sound bites in the form of paragraph as the coding unit, from QDAMiner to plain text files, imported them into Diction, and labeled each paragraph by party and year. Since Diction’s results can be submitted easily to SPSS, we quickly obtained an SPSS datasheet of 2213 cases for ANOVA. To find out whether
optimism and voting correlated, we used (1) the winning margin of each campaign (standardized in percentage) and (2) the differences of optimism scores of both parties’ candidates’ sound bites of the campaigns. Kendall’s Tau-a, instead of Pearson Product Moment, was used because neither variable was normally distributed.

Results

Table 1 is a cross-tab table visually represented by Figure 1 that shows distribution of the topics across the years. The coverage on economy, security, and polls differs significantly \((\alpha=0.05)\) by year, whereas religion remain relatively stable at a low level. The coverage on economy \((F = 4.138, p = 0.006)\) declined from 45.2% in 1992 to 15.3% in 2004. Poll stories \((F = 2.804, p = 0.039)\) were still one of the favorite topics; they slid in 1996 but bounced back in 2000 and 2004. Religion \((F = 1.814, p = 0.143)\), a relatively small category, did not fluctuate much across the years. It is noticeable that the coverage on security \((F=20.602, p= 0.000)\) almost doubled from the previous campaign, surged from 1992’s 5.6%, 1996’s 11.0%, 2002’s 22.6%, to 2004’s 44.1% and surpassed any other topics in Campaign 2004, showing a strong increase of the networks’ attention to national security issues as a presidential campaign topic.

Figure 2, a proximity plot, revealed each topic’s proximity with years. For example, the acute angle created by connecting “poll,” the origin, and “2004” indicated that campaign 2004’s newscasts covered poll stories more than any other year. Some cautions must be taken when interpreting the proximity relationship between topic and year—the two variables’ angle from the origin and topic’s distance from the origin in combination determine their relationship. Security’s unusual long distance to the origin and its acute angle to 2004 indicated that security tended to be an exclusive topic in 2004, which was in line with Table 1.

RQ2 aimed to find out how the networks employed rhetorical styles to frame the topics discovered by RQ1. The framing pattern was indicated by the proximity plot in Figure 4. Table 2,
Figure 3, and Figure 4 in combination answered RQ2 by showing the following patterns: (1) CNN and FOX were much more interested in security coverage than other networks whereas ABC, CBS, and NBC tended to emphasize economic issues more; (2) The acute angle between CNN and poll and poll’s distance from the origin indicate that CNN had more coverage on poll stories than any other network; (3) Fox’s coverage was the most rhetorically pessimistic (due partly to its heavy coverage on security issues); CNN was the most optimistic of all networks; (4) ABC, CBS, and NBC’s coverage tended to be more “realistic,” than their cable counterparts because their language described tangible, immediate, recognizable matters than affect people’s everyday lives. It is also noticeable that Fox was the most unbalanced because it mentioned Democratic candidates (9.0%) much more often than Republican candidates (5.5%) (see Figure 3). In Fox’s coverage, the Democrats’ references were framed by inactive and pessimistic rhetorical style (in Figure 4, the distances between realism/non-realism and Democrat were almost equal, meaning the two styles counterbalance each other on Democrat).

Table 3 and Figure 5 answered RQ3. Each sound bite was categorized as anchor, correspondent, Democratic candidate, Republican candidate, Democratic supporter, Republican supporter, and all others. All the topics show significant differences across sound bites. Figure 5 helped us visualize some critical information embedded in the Table 3. The following patterns were found: (1) the keywords of economy and security had similar distribution patterns, and therefore the two topics were often correlated in the coverage; (2) sound bites by supporters of both parties were characterized by more optimism than pessimism, whereas the presidential candidates favored optimism slightly more than pessimism; (3) correspondents’ sound bites were featured by more pessimism than optimism, and anchors tended to be more neutral; (4) the close proximities of Democratic supporters, pessimism, and security indicated not only the fact that
security issues were reported with a strong sense of pessimism, but also that Democratic supporters were often the ones who expressed the concern in the coverage.

A two-way ANOVA was run to find out how optimism scores in both parties candidates’ sound bites differed across years, as RQ4 asked. The results showed statistically significant interaction between year and party on optimism, $F(3/2212) = 2.85, p = .036$. For year 1992, Democratic candidates ($M = 48.16$) were slightly more optimistic than Republican candidates ($M = 47.58$). For 1996, Democrats ($M = 52.64$) were much higher than Republicans ($M = 47.96$), followed by almost a tie in 2000 (Democrats $M = 49.93$, Republicans $M = 50.24$). In 2004, Republicans ($M = 48.46$) were slightly higher than Democrats ($M = 47.12$). An interaction plot (Figure 6) showed the winner of optimistic sound bites for each campaign. It is worth noting that when comparing the overall optimism mean ($M = 48.76$) with the normative range that Diction provided ($47.56, 53.67$), we found that the optimism in the candidates’ sound bites was at the lower end of a “normal range” for political campaign speeches. The difference in each year’s optimism scores was then statistically processed with the winning margins (electoral votes) of the corresponding years by using Kendall’s Tau-a correlation procedure. An unusually high correlation was found ($r = .98, p = 0.048$) with statistical significance at .05 level despite the small sample size ($N = 4$ campaigns).

Discussion

The computerized analysis contradicted CMPA’s finding (2004) that Fox gave equal coverage to both parties (see Figure 3) and thus to some degree supports Media Matters for America’s (2004) criticism toward the CMPA study’s accuracy. Furthermore, the proximity analysis (Figure 4) showed a somewhat negative rhetorical frame partly constituted by “inactivity” and “pessimism” that revolving around Democratic candidates’ coverage by Fox. In other words, Fox’s bias was reflected not by giving more attention to the Republican Party, but
by representing the Democratic Party with negative rhetorical styles. This finding explained why a substantial portion of the TV audience believed that Fox was more critical of Democratic candidates than the other networks (Pew Research Center, 2004).

Figure 1 gave us an idea of how campaign news agendas changed. News networks were consistently obsessed with poll stories. Poll stories were the most or second most heavily favored topic during the four campaigns. There also was a clear interactive pattern between economy and security. The economy, a major theme in Campaign 1992, gave way to security issues in 2004 due largely the September 11 attack.

This study also showed that the networks had their own favorite agenda topics. The two cable networks were more interested in covering polls and security issues, whereas the older broadcasters focused more on traditional campaign topics such as the economy (Figure 4). Because poll and security stories were more subject to change than the economy and religion, the pattern implied that compared with the traditional broadcasters, the cable networks were more aggressive in covering “dynamic” topics than “static” topics, a practice that probably allowed them to provide quicker “updates” on the topics and helped establish a perception that they were always “on the run.”

This study focused on the co-mentioning of topics and rhetorical styles as framing devices. Security and economy issues were often mentioned together by the networks, which strongly suggested an adverse relationship between worsening national security and the state of economy. Proximity analysis also shows “who speaks what, and how.” Democratic supporters, for example, often were the ones who expressed concerns about national security with a rather pessimistic rhetorical style as a way to challenge the Republican-controlled White House especially after the September 11 attack. The candidates, on the other hand, used a dual tactic combing optimism and pessimism styles, one for cheerleading, the other mostly for political attacks.
The amount of optimism in presidential candidate’s sound bites served as an excellent indicator of voting results. We hesitated to use the word “predictor” because an analysis of four campaigns is not sufficient to establish solid predictive power of an indicator. Rather, the predictive power needs to be formed by including coverage of more presidential elections for future research. Additionally, we wondered why optimism correlated with voting behavior and how this correlation may help us better understand network framing. Several directions can be taken to answer the questions. Differentiating the influences from various sound bites on the perception of candidates may be the first step to examining the persuasive power of candidates’ sound bites. The difference between actual campaign speeches and the network sound bites of campaign speeches is another aspect to examining the media’s “mediating role” in presidential campaigns. Not only the news reports sounded much less optimistic than politicians (Hart et al., 2005), but the comparison between normative optimism scores of campaign speeches and the scores of the candidates’ sound bites showed that the portrayals of presidential candidates in network TV news were less optimistic than they really are. We believe that this finding may have opened a window to a new line of comparative research.

The methods used in this study bring considerable strength as well as some limitations. First, sorting out media news agendas has never been both easier and more rigorous. QDA Miner and WordStat provide a streamlined way to collect, organize, code, and analyze textual data. By developing our own dictionary, we obtained a general index of agenda topics covered in the campaigns, which was not deductively imposed, but inductively distilled from the corpus itself. Computer-aided dictionary building minimized the number of subjective judgment calls, which were typical in human coding, and thus made finding media agendas a more scientific process. In fact, dictionary building was the only place where human intervention occurs in the analysis.
However, the longitudinal design restricted the number of agenda topics, because some topics belonged almost exclusively to a specific campaign. George W. Bush’s military records and John Kerry’s volatile, for example, were such topics. The security topic, nonetheless, is an exception. Because its coverage overwhelmed any other topic in campaign 2004, and it was covered marginally in the other two campaigns, we decided to keep it in the dictionary.

Proximity analysis combining topic and rhetorical styles is also a strength and an innovation of the study. The research design and the findings have benefitted greatly from the distinct advantages of WordStat and Diction. The two-dimensional and three-dimensional maps not only visualize the tables, but also uncover the proximities among agenda topics and revolving rhetorical styles along with other key variables such as year and network. The discovery of Fox’s use of negative rhetorical styles to cover Democratic candidates showed great potential of this method to detect news bias in a level well beyond mere partisan preferences. This integrated computerized approach was inspired and built upon by the work of a number of scholars who contributed to the idea of attribute agenda setting (McCombs, 2005), political communication in the mass media (Hallin, 1992; Lowry & Shidler, 1998), and computerized content analysis (Hart, 1984; Miller & Riechert, 2001). Even though computerized content analysis was used by a great number of communication scholars in the past 50 years (Diefanbach, 2001), to the best of our knowledge, prior to this study, no research used a computerized method to study both agenda setting and framing at the same time.

The significance of our findings resides largely in the fact that the visual presentations of topic proximity are a substantial step forward to integrating computer technology and the agenda-setting/framing theoretical framework. The networks’ two-step process of information selection and reconstruction has been successfully described by the software’s theme identification and concept mapping technologies. It, nonetheless, must be pointed out that the
limitations of the approach should be understood to avoid the abuse of computerized analysis and over-generalization of the results from similar methodology. As Scheufele (2000) pointed out, media framing is a cognitive process of both news media professionals and their audiences. It is affected not only by the topical structure that agenda-setting contributes, but also by ideological contexts, which is difficult for automated computer process to quantify. Therefore, concept mapping techniques may be combined with other methods to explore both the denotation and connotation of agenda-setting and framing.

The method used in this study can also be an invaluable tool for researchers of their own philosophies of methodology. While the theme-generating procedures resemble what grounded theorists did for years, quantitative analysis was run to explore the dynamics buried in the campaign coverage. As Miller, Andsager, and Riechert’s (1998) suggest, semantic proximity analysis may be used as a foundation for further quantitative or qualitative inquiry. Specifically, this method is able to produce results that will help future researchers propose sound hypotheses or refine in-depth coding themes. It is, we believe, a major advance over traditional content analysis.
References

ABC. (2004). 56 days to go John Kerry's campaign: ABC.


Table 1

*Major Topics Covered by News Networks across Four Presidential Campaigns*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Security</td>
<td>5.6%</td>
<td>11.0%</td>
<td>22.6%</td>
<td>44.1%</td>
<td>20.602</td>
<td>0.000***</td>
</tr>
<tr>
<td>Economy</td>
<td>45.2%</td>
<td>46.6%</td>
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<td>15.3%</td>
<td>4.138</td>
<td>0.006**</td>
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<td>8.4%</td>
<td>4.0%</td>
<td>1.814</td>
<td>0.143</td>
</tr>
</tbody>
</table>

*Note:* * indicates statistical significance at 0.05 level, ** 0.01 level, and *** 0.001 level. Column percentages are shown. Relative Student’s Fs are calculated.
Table 2

Major Topics and Rhetorical Styles Detected across Networks

<table>
<thead>
<tr>
<th></th>
<th>ABC</th>
<th>CBS</th>
<th>CNN</th>
<th>FOX</th>
<th>NBC</th>
<th>F</th>
<th>P(2-tails)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>9.1%</td>
<td>9.5%</td>
<td>9.3%</td>
<td>1.708</td>
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<td>#Certainty</td>
<td>16.8%</td>
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<td>12.9%</td>
<td>15.5%</td>
<td>2.161</td>
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<td>3.4%</td>
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<td>3.9%</td>
<td>3.4%</td>
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<td>1.0%</td>
<td>1.1%</td>
<td>0.9%</td>
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<td>0.717</td>
<td>0.581</td>
</tr>
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<td>7.6%</td>
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<td>6.2%</td>
<td>7.2%</td>
<td>1.980</td>
<td>0.096</td>
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<td>6.1%</td>
<td>6.2%</td>
<td>7.5%</td>
<td>6.7%</td>
<td>1.724</td>
<td>0.143</td>
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<td>2.2%</td>
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<td>0.488</td>
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<td>0.2%</td>
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<td>0.600</td>
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<td>7.4%</td>
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<td>7.3%</td>
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<td>0.7%</td>
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<td>0.8%</td>
<td>3.354</td>
<td>0.010*</td>
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</table>

Note: * indicates statistical significance at 0.05 level, ** 0.01 level, and *** 0.001 level. Pound signs indicate rhetorical style. Column percentages are shown. Relative Student’s Fs are shown.
<table>
<thead>
<tr>
<th>Major Topics and Rhetorical Styles Iterated by Different Sound Bites</th>
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<tbody>
<tr>
<td>Note: Row percentages are shown.</td>
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<table>
<thead>
<tr>
<th>Anchor</th>
<th>Correspondent</th>
<th>Democratic Candidate</th>
<th>All Others</th>
<th>Republican Supporters</th>
<th>Republican Candidate</th>
<th>Democratic Supporter</th>
<th>F</th>
<th>P (2-tails)</th>
</tr>
</thead>
<tbody>
<tr>
<td>#Activity</td>
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<td>5.9%</td>
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<td>3.0%</td>
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<td>Economy</td>
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<td>1.9%</td>
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<tr>
<td>Religion</td>
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<td>10.699</td>
</tr>
</tbody>
</table>
Figure 1

*A Comparison of Keyword Frequencies of Major Topics (Security, Poll, Economy, and Religion) across Years*
Figure 2

Proximities among Topics, Rhetorical Styles, and Years
Figure 3

A Comparison of the Amount of Coverage Devoted to the Democratic Party and the Republican Party across Networks
Figure 4

*Proximities among Topics, Rhetorical Styles, and Networks*
Figure 5

Proximities between Topics and Sound bites
Figure 6

*Interaction Plot of Optimism Scores Varied by Party and Year*