Semantic Networks and Competition: Election Year Winners and Losers in U.S. Televised Presidential Debates, 1960–2004

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Drawing on network theory, this study considers the content of U.S. presidential debates and how candidates' language differentiates them. Semantic network analyses of all U.S. presidential debates (1960–2004) were conducted. Results reveal that regardless of party affiliation, election winners were more central in their semantic networks than losers. Although the study does not argue causation between debating and electoral outcomes, results show a consistent pattern: Candidates who develop coherent, central, semantically structured messages in debates seem to be victorious on election day. An argument is made for employing semantic networks in studying debates and political discourse.

Televised debates are an institutionalized, highly anticipated part of U.S. presidential campaigns (Lemert, Elliott, Bernstein, & Rosenberg, 1996; Lemert, Elliott, Bernstein, Rosenberg, & Nestvold, 1991). Previous research on debates has emphasized the rhetorical styles of candidates, debate formats, debates' effects on the electorate, and debate content. This study builds on the literature that examines the latter—the content of debates. Although a rich body of literature on this subject exists, this article is specifically focused on exploring the extent to which candidates' message structure differentiates them from one another during debates. By examining the text-based content of televised U.S. presidential debates, this article asks: How does language differentiate presidential candidates during televised debates?

This is an important question because previous research has found that debates influence voters' perceptions of candidates (Carlin, 1992; Chaffee, 1978). Thus, examining the language that candidates use lends insight into some factors that may influence those perceptions. Building on previous research that also has addressed this question (Benoit, 2003, 2004), albeit in different ways than done here, this investigation is framed with network theory and considers the *semantic networks* of the content of U.S. presidential debates[1] held from 1960 to 2004. Conducting network analysis on the content of candidates' communication in the debates enables examination of the structure of candidates' language. The results allow for an understanding of how the candidates "link" with the key issues being discussed as well as the nature of links among words and concepts in each debate. Thus, this study contributes another dimension to the ongoing conversation about debate content and applications of network analysis. Specifically, this article accomplishes three goals: (a) to describe the structure of issues created by debaters in their respective presidential candidacies, (b) to compare the debaters in terms of how they are positioned in the issue networks of debate content, and (c) to extend network theory as a theoretical approach to the study of debates.

Presidential Debates and Communication Content

For nearly 5 decades, televised debates have been a public component of U.S. presidential campaigns (Lemert et al., 1996; Lemert et al., 1991), and research investigating these public forums is vast. Scholars have utilized several theoretical approaches to studying debates, including democratic theory, agenda-setting, uses and gratifications, argumentation and debate theory, and functional theory (for a review, see McKinney & Carlin, 2004).

Although varied in approach, previous research has seemed to concur that debates are important for both candidates and voters. For candidates, debates constitute a medium in which they discuss their platforms. Candidates are

Received November 6, 2007; revised July 22, 2008; accepted July 22, 2008

 DOI: 10.1002/asi.20950

[1]This study is interested in differentiating the language of winners and losers, not in predicting eventual electoral winners due to their debate performances.

expected to talk about issues during debates, and because they are commercial-free, debates are often perceived as "serious politics" (Jamieson & Birdsell, 1988). Indeed, research has demonstrated that voters themselves consider debates as a source for learning about candidates (Drew & Weaver, 1991; Lemert et al., 1991). For voters, debates provide opportunities to assess and form opinions about the candidates (Carlin, 1992; Chaffee, 1978; Jamieson & Birdsell, 1988; Leon, 1993) and to observe the candidates "play President" (Leon, 1993). These public forums have been found to influence voters in various ways. Carlin (1992), for instance, found voters' perceptions about candidates can be shaped by their impression of who won, both in terms of voters' perceptions immediately following debates as well as their perceptions fostered by media analyses. Additionally, research on the 1992 debates showed that voters did indeed learn from these forums (Lemert, Bernstein, Elliott & Rosenberg, 1993; Zhu, Milavsky, & Biswas, 1994).[2]

Presidential Debate Content

Previous research on debate content has used argumentation and debate theory as well as functional theory to reveal several characteristics of candidates' messages. For one, scholars have found that candidates do articulate differences between their positions on issues and those of their opponents during debates (called "clash"). In comparative analyses of presidential debate content (1960–1988), Carlin, Howard, Stanfield, and Reynolds (1991) revealed considerable clash between presidential candidates. In later analyses, Carlin, Morris, and Smith (2001) found that the extent of clash is related to the debate format (e.g., town hall vs. mediator facilitator formats). In addition, Benoit and Harthcock (1999) and Benoit, Pier, Brazeal, McHale, Klyukovski, and Airne (2002) noted three functions of candidate verbal utterances in both primary and general-election presidential debates: Candidates *acclaim* themselves, *attack* their opponent(s), and *defend* themselves. Benoit and colleagues' analyses have shown that candidates acclaim more often than attack, attack more than defend, and focus on issues more than candidate character during debates.

Another arm of previous research on debate content has compared incumbents' responses with those of challengers. For instance, Hellweg, Pfau, and Brydon (1992) found that challengers focus on errors of the incumbent administration and promise to do better while incumbents ask challengers to support such criticisms by being more specific. Research has noted that incumbents tend to have terse answers and declarative argumentation, and emphasize the status quo as opposed to future visions (Hellweg et al., 1992; Ritter & Hellweg, 1986). Other scholars also have compared the discourse of incumbents and challengers. Using functional theory as a lens through which to examine presidential campaign discourse more broadly, Benoit (2000) found that incumbent candidates acclaim and defend more, and attack less, than do challengers.

Benoit (2003, 2004) contributed another comparison to political communication research: He contrasted the content of presidential campaign messages of election winners and losers, and included data from presidential debates in so doing. In one study, employing data that consisted of three message forms (debates, television spots, and speeches) across three campaign phases (primary, convention, and general) from 1948 to 2000, Benoit (2003) utilized chi-square analysis to test the hypothesis that presidential candidates who discuss policy more than their opponent(s) do are more likely to win elections. He found that overall, winners discussed policy in approximately 66% of their campaign message themes whereas losers talked about policy in 60% of their messages, and losers spent more time talking about character (40%) than did winners (34%). Benoit (2003) found significant differences between winners' and losers' use of policy and character topics in five message forms (primary television spots, primary debates, acceptance addresses, general television spots, and general debates). Following the same methodology, in a study specifically devoted to examining the relationship between the nature of attacks (policy vs. character) and winning elections, Benoit (2004) found that candidates whose attacks emphasize policy more (and character less) than their opponents are more likely to win.

Still other work on debate content has examined how candidates use language to talk about issues and to differentiate themselves from the other candidate(s). In their content analysis of presidential debates from 1960 to 1996, Hart and Jarvis (1997) concluded that the debate form leads candidates to focus on their message and to respond to opponents' challenges, and that debates are thus void of campaign spectacle. Benoit and Hansen (2004) also examined debate messages, and built on Petrocik's (1996) issue ownership theory to explore patterns of issue ownership in presidential debate discourse of Republican and Democratic candidates from 1948 to 2000. The authors noted how, in debates, candidates develop their issue appeals in line with the traditional issues "owned" by either the Democrats or Republican parties. In another study, Hansen and Benoit (2001) conducted a computer content analysis of various forms of discourse (including presidential debates, television and radio spots, and Web pages) during the 2000 primary campaign, and correlated (a) issues that were important to Republican voters (i.e., Social Security) with (b) frequency of discussion of those topics by the Republican party candidates. They found that the eventual nominee, George W. Bush, discussed issues that correlated significantly with GOP voter preferences in debates, television spots, and radio spots whereas John McCain's sole significant correlation was in his Web page.

Other scholars also have examined debates' messages for understanding how issues were "owned" by the respective candidates. Citing Woelfel (1995), Doerfel and Marsh (2003) argued that candidates can use language that separates them

[2]Previous research also has shown, however, that debate viewing has very little influence on voting behavior (see McKinney & Carlin, 2004).

DOI: 10.1002/asi

from or integrates them closer with particular issues. They argued generic language in the following first example distances the speaker from the issue while in the second example, the speaker is situated more tightly with the issues: "(a) 'the administration agrees that the country faces serious economic challenges and the plan is to . . .' (b) 'I agree that we face serious economic challenges and we can change that by . . .'" (p. 215). Doerfel and Marsh's research revealed candidate *ownership* of issues. That is, candidates take personal credit for national successes, resulting in enhanced credibility and a more presidential character.

Previous research on debate content has often relied on a content analytic perspective, and has focused on both verbal and visual/nonverbal content (for the latter, see Hellweg et al., 1992; Morello, 1988a, 1988b, 1992). This study builds on that body of literature, and examines verbal content in ways previously unexplored in this body of research. Whereas scholars have enhanced understandings of the nature of discourse during debates, in terms of arguments and clash (Carlin, 1992; Carlin et al., 1991; Carlin et al., 2001) and have unearthed rhetorical moves debaters make (e.g., acclaims, attacks, and defenses; see Benoit & Harthcock, 1999; Benoit, McHale, Hansen, Pier, & McGuire, 2003; Benoit et al., 2002), this study examines the structure of language in debates and how debaters' language use positions them within a context of issues created by their participation. Like Benoit (2003, 2004), this study's interest is in how campaign messages may differentiate candidates and how that might be related to who wins and loses elections, albeit not the determining factor of electoral outcomes. The current study extends Benoit and colleagues' work by looking for macropatterns in language structure (semantic networks). This is done with an emphasis on communication content and how language use positions candidates within a network structure of the issues. By emphasizing macropatterns across debates, this study captures how words and concepts used habitually in messages differentiate candidates. Findings from this study suggest that the old adage "they're only words" is misleading. Indeed, this study demonstrates that words—and word usage—do matter.

Semantic Network Theory and Presidential Debates

Semantic networks describe the structure of relationships among people, organizations, or other entities, based on communication content (Danowski, 1982, 1993; Monge & Eisenberg, 1987). As Monge and Contractor (2000) explained, semantic networks provide a picture of some set of entities (e.g., individuals, organizations) which share common understandings. They also can be used to pinpoint unique distinctions among individuals or collectives that are otherwise not apparent (Doerfel & Barnett, 1999; Lievrouw, Rogers, Lowe, & Nadel, 1987).

In the communication discipline, semantic network analysis has grown concurrently as an extension of network theory and analysis (Carley, 1993; Carley & Kaufer, 1993; Danowski, 1982, 1993; Doerfel, 1999; Doerfel & Barnett, 1999; Doerfel & Marsh, 2003). Although semantic network analysis is seen as a valuable *method* (Monge & Contractor, 2000; Monge & Eisenberg, 1987), semantic networks themselves also have enhanced understandings of discursive systems. Semantic network studies have applied concepts drawn from social network research and, in so doing, have developed a body of literature that attends to understanding the structure of language and how it represents meaning (Carley 1993; Carley & Kaufer, 1993; Danowski, 1982, 1993; Doerfel & Barnett, 1999; Woelfel, 1993a, 1993b).

In the context of presidential debates, Doerfel and Marsh (2003) extended a framework of semantic networks (Barnett & Danowski, 1992; Jang & Barnett, 1995; Lievrouw et al., 1987) to reveal differences among senders of messages based on their language use. Doerfel and Marsh analyzed the way debaters George H.W. Bush, William J. Clinton, and Ross Perot's semantic networks differentiated the candidates. The authors argued that semantic network analysis and the semantic networks themselves helped identify how the debaters differed in terms of what they said. Doerfel and Marsh speculated that by "semantic networking" (used here to characterize how a network-based assessment of content enables meaning inferences; see Doerfel & Marsh, 2003) various pertinent topics, Clinton was able to consistently be seen as the "winner" in the 1992 debates. As an extension, the extent to which each candidate's semantic networks differed from the others' semantic networks is a way of seeing how, through the structure of their language, the candidates might strategically differentiate themselves from each other. Note that this notion of semantic networking is not used as if a candidate actively thought "I am semantic networking" before and while answering a debate question. Yet, the candidate's framing of issues—and the language he or she chooses to frame those issues—can be seen as an intended act that reflects semantic networking as a construct.

Semantic network theory can provide unique insights into what is known about debate content. One insight involves the notion of semantic centrality. In general, centrality refers to the extent to which nodes[3] are more systematically linked to other nodes in a system. Various measures of centrality exist, and they differ based on the theoretical issues with which the researcher is concerned. The theoretical issues, then, influence the type of calculation required. *Degree centrality*, for instance, reflects how many other nodes to which a focal node is connected (Freeman, 1979). *Betweenness centrality* refers to the extent to which a node connects groups of other nodes. A node with high betweenness centrality "falls between" or is a gatekeeper among others in the network. *Closeness centrality* indicates which nodes have the shortest distance from any other node in the network (for

[3]A node refers to the actors in a network, and connections among those actors make up the network itself. In social networks, nodes can be people, groups, or organizations. In the semantic networks used in this article, nodes are the words (i.e., concepts), and the network reflects how those words are connected to each other. The more generic term *node* is used because the network concepts and measures are consistent regardless of whether the discussion is gleaned from social or semantic networks literature.

DOI: 10.1002/asi

extended theoretical discussion and calculations, see Freeman, 1979). Given the theoretical interests of this study, *eigenvector centrality* (Bonacich, 1987) was used because it captures more than just repetition in speech. Eigenvector centrality takes into account the centrality of the nodes to which a focal node is connected. Whereas closeness centrality accounts for steps or "shortest paths" from one node to another in the network, eigenvector centrality uses the centralities of others' nodes as weights. Applied to the debate context, this means that those nodes (i.e., concepts) in the text that have high eigenvector centrality are connected to other concepts which also are central in the debate discourse. The approach used in this study also uses the debaters as nodes. Thus, the speaker's greater eigenvector centrality indicates that the speaker is connected to concepts that also are highly central.

In this study, semantic network nodes include (a) words spoken and (b) the name of the speaker. Two types of semantic networks include word networks: networks of meaning and networks where the strength of the links between actors is based on shared meaning or overlapping use of words or symbols. In this article, the actors are the debating candidates, and the relationships among them are a function of their debate content. In terms of semantic centrality, then, a speaker who is "semantically central" uses language in a systematic way that links him or her to concepts or words throughout the text. Applied to the debate context, to be central in semantic networks, candidates must emphasize specific words in systematic ways that consistently link them to other central debate topics' words.

Clearly, presidential candidates face questions on various topics during the debate, and the realities of debate structure mean that the candidates will be addressing different issues throughout the debates (see the discussion of debate formats in McKinney & Carlin, 2004, pp. 219–223). Yet, semantic network theory enables a view of the debates through a useful lens. For example, utilizing semantic network theory, Doerfel and Marsh (2003) made the case that Clinton's 1992 campaign successes were in large part due to his use of a strategically ambiguous theme that was clearly his point through out the campaign: "America needs a change." This slogan, though seemingly simple, was the foundation on which he discussed any particular issue. On the other hand, Perot very clearly emphasized "It's the economy, stupid" with a very specific focus on fiscal issues; thus, when he discussed fiscal issues, he was very central in the semantic network. But in all other issues in the Doerfel and Marsh analyses, Perot tended to be more peripheral. Although strategic ambiguity emphasizes intentions of the speaker, those messages that are consistently and systematically associated with the debater (regardless of intentions) enable his or her increased semantic centrality relative to the other speakers. Semantic network theory is thus appropriate for studying presidential debate messages because it (a) unpacks the language that candidates use and, in so doing, (b) shifts the focus from who won and lost a particular debate to the structure of the candidates' debate discourse. Based on this theoretical orientation, the following research question is posed:

- What is the semantic structure of the content of the U.S. presidential debates held from 1960 to 2004?

Network Theory in the Context of Presidential Debates

Network research, in general, is dedicated to unearthing the structure and order within a system of actors and explaining the advantages associated with various structures. Network scholars often investigate semantic networks and/or social networks; that is, where the strength of the links between actors is based on shared meaning or overlapping use of words or symbols.

In translating a social network perspective to a semantic network perspective and in focusing on individual candidates' language, it is expected that those debaters who are more centrally located in the semantic networks also will reap advantages associated with that semantic centrality. In the case of the political campaign, an indicator of greater centrality would be that the candidate talked in ways that consistently tied him or her to the key issues of that debate. To have semantic centrality, the speaker must not merely repeat words but integrate words that represent central themes throughout his or her discourse. In this way, he or she becomes more semantically central, and we contend that the centrality ultimately would play a part in winning the election.[4] In other words, a peripheral location in the semantic network reflects that the debaters, due to their weak ties to the debated issues, would be seen as less competent while those who are more semantically networked with the key issues of the debates (i.e., more central debaters in the semantic network) would be seen as more appealing. A conclusion to be drawn, then, is that semantic centrality is advantageous. It follows to reason that there is an association between semantic network centrality and election outcomes:

> **H1:** The eventual electoral winners will be more central in the semantic network of debates than will the losers.

Analyzing the content of presidential debates using semantic network analysis will contribute to existing research by enhancing understanding of how candidates' language differentiates them from their competitors. By identifying the candidates' semantic centrality within the issues, this study tests the contention that semantic network location of a candidate's node in terms of centrality in presidential debates differentiates winners and losers of elections.

Method

Following Benoit and colleagues (2003; Benoit et al., 2002) and Hart and Jarvis (1997), debate messages are

[4] Note that we do not mean to imply direct causality between (a) a candidate being more central in the semantic network of the debates and (b) eventual electoral victory. Clearly, there are many factors that influence electoral outcomes. We mean only to suggest that debate content may be one of them, as part of a larger body of campaign discourse.

DOI: 10.1002/asi

TABLE 1. Dates, participants, and length of debates.

Year	No. of debates held	Participants (party, election winner)	Date (length in words)
1960	4	John F. Kennedy (D, Winner) Richard M. Nixon (R)	9/26 (10,731); 10/7 (11,023); 10/13 (10,607); 10/21 (10,728)
1976	3	Gerald R. Ford (R) James E. Carter (D, Winner)	9/23 (14,728); 10/6 (13,342) 10/22 (14,179)
1980	1	James E. Carter (D) Ronald W. Reagan (R, Winner)	10/28 (15,169)
1984	2	Ronald W. Reagan (R, Winner) Walter F. Mondale (D)	10/7 (15,323); 10/21 (13,796)
1988	2	George H. W. Bush (R, Winner) Michael S. Dukakis	9/25 (15,527); 10/13 (15,440)
1992	3	George H. W. Bush (R) William J. Clinton (D, Winner) H. Ross Perot (I)	10/11 (16,105); 10/15 (17,260) 10/19 (17,550)
1996	2	William J. Clinton (D, Winner) Robert J. Dole (R)	10/6 (16,829); 10/16 (16,581)
2000	3	George W. Bush (R, Winner) Albert A. Gore, Jr. (D)	10/3 (16,111); 10/11 (16,228) 10/17 (15,246)
2004	3	George W. Bush (R, Winner) John F. Kerry (D)	9/30 (15,019)

analyzed over time (1960–2004). Transcripts of all televised presidential debates held since 1960 were the data sources for this investigation; thus, the population was assessed. For debates that occurred from 1960 to 1996, Annenberg/Pew Archive transcripts were utilized,[5] and the debates transcripts from 2000 and 2004 were taken from the Commission on Presidential Debates Web site (www.debates.org). Table 1 summarizes the debate years, how many presidential debates were held during a particular year, the candidates who participated, the number of words in each of the debates, and the winners of the respective election years. Debates that did not include representatives from both the Republican and Democratic parties were not included in this analysis. The population was defined in terms of only those debates in which representatives between the Republican and Democratic Parties participated because those parties constitute the two dominant parties in the United States and were those between which one would expect to see the most differentiation. Thus, the September 21, 1980 debate between Anderson, an independent, and Reagan, a Republican, was not used since the Democratic party was not present. On the other hand, the 1992 debates included candidates from both the Republican and Democratic parties in addition to the Independent candidate, Ross Perot. Since both major parties were represented, 1992 debates were included in the analyses. Because this study used the variable *election year outcome*, the debates were analyzed collectively by election year; that is, all texts from all debates in a particular campaign were aggregated and analyzed as a single text for that election year.

Election Year Outcome

Because of the controversy surrounding the Gore–Bush outcome in 2000, election year outcome was coded in two ways: (a) electoral college outcome and (b) popular vote outcome. This decision was made for theoretical and conceptual reasons. Theoretically, since the focus of this study is on differentiating candidates in the context of presidential campaigns, who actually becomes President is a way to identify who "won" in the electoral college; however, since the history of debate research emphasizes popular opinion, the definition of "winner" also can be measured in terms of the popular vote. Moreover, as these analyses were discussed with peers and colleagues, without exception, we were asked about how we handled the 2000 campaign.

Semantic Network Analysis

Semantic network analysis has a strong theoretical base stemming from a variety of research (see Carley, 1993; Carley & Palmquist, 1992; Danowski, 1982; Doerfel, 1999; Doerfel & Barnett, 1999).[6] Semantic networks provide an

[5]In addition to the University of Pennsylvania's Annenberg School of Communication, the Annenberg Public Policy Center, and specifically, Kathleen Hall Jamieson, the authors thank the Minnesota Historical Society, the George Bush Library, the Jimmy Carter Library, the Shell Library Archives, the Gerald Ford Library, the John Fitzgerald Kennedy Library, the Richard Nixon Library and Birthplace Foundation, and the Ronald Reagan Library for making these data available to them.

[6]While related, semantic approaches to text retrieval and eigenvector-based word similarity retrieval algorithms are important to advances in semantic and content-focused research and highly salient to the *Journal of the American Society for Information Science and Technology*, this work is conceptually different; thus, that body of work is beyond the scope of this article.

DOI: 10.1002/asi

assessment of a corpus's dominant themes using network-analysis techniques. A form of semantic networks as presented by Rice and Danowski (1993) was used in this study. As such, an identifier signifying which of the candidates was speaking was included in the debates' content. In this way, the candidates' identities, by virtue of being linked to what they were talking about, was part of the network analysis.

CATPAC, a computer program that is a self-organizing artificial neural network computer program optimized for analyzing text (Terra Research and Computing, 1994), was used. This tool is one example of a class of methods used to address textual meaning. The program scans the text, identifies the extent to which words co-occur based on contingency analysis, and provides results about the text's semantic structure (Doerfel, 1999; Doerfel & Barnett, 1999; Woelfel, 1993a).[7] CATPAC begins by reading the body of text and eliminates "stopwords," which include a list of articles, prepositions, conjunctions, and transitive verbs that do not contribute to the meaning of the text (e.g., and, to, the, that). The occurrences of the remaining words are then counted to identify the most frequently occurring words equal to the value set by the user. CATPAC can treat a block of text (instead of using a sliding window of *k*-words long) as a unique case. In this case, we used blocks of text based on each candidate's turn taken. A delimiter was placed on the line following each case. The delimiter tells the program to treat each block of text in the same way as a window slide. A words-by-words matrix is then created in which each cell contains the likelihood that the occurrence of one word will indicate the occurrence of another (i.e., the frequency of co-occurrence of any two words). This matrix is then cluster analyzed using Ward's cluster analysis method (Woelfel, 1993b). The neural network is constructed by reading a window of text that determines if any of the most frequently occurring words co-occur. The program then reads the next window of text. This process is repeated until the entire text is read. From this windows-by-word matrix, the words-by-words matrix is constructed.

CATPAC reports semantic structure with a Ward's cluster analysis which generates discrete clusters among the words. If these words cluster hierarchically in the outputs, meaning can be inferred. CATPAC also has companion visualization software (*ThoughtView*). ThoughtView (TV) is a second way to report results from CATPAC. TV displays three-dimensional conceptual maps using the coordinates' file values generated by CATPAC analyses. TV plots are a simple linear transformation of the connection strengths (i.e., weights), and no information is lost nor is any distortion introduced. TV also provides the ability to rotate the graph for multiple perspectives of the same information. Words that *cluster* together in this space are read together and represent emergent meaning in the text. *Centrally located* words in the graphs reflect the dominant themes in the text. The speakers' locations within that space (e.g., RWINNERREAGAN, DLOSERCARTER) reveal their semantic network—or the extent to which their identities clustered with the words as well as with each other in terms of what they said. In this way, both TV and Ward's cluster analysis are used to describe main clusters as a way to best depict with which words the candidates cluster.[8]

Data-organizing procedures. For each election year, all debates transcripts were combined in a word-processing program (e.g., one document contained the four debates of 1960; another document contained the three debates of 1976, etc.). This decision was made since the outcome variable in this study, election outcome, occurs weeks after the conclusion of the year's respective debates and not when voters still have "fresh" memories of the separate debates. Moreover, the collection of debates' transcripts as a whole is a way to capture the campaign themes that were addressed in any given year. Debates represent an opportunity for candidates to come together to discuss the same questions in an ordered and structured way. The debates, then, represent events that mimic a controlled research environment and have been similarly aggregated for all of the years that this dataset contains.

CATPAC allows the analyst to set the number of unique and most frequently occurring words. Its default value is 25; however, given the scope of topics in each election year, this number was too low. To determine what number to use, all debates were initially analyzed with a large-enough number of unique words ($n = 150$) so that breaks in repetition could be determined. In other words, programming CATPAC to consider 150 unique words enabled us to identify when a substantive shift occurred from content-oriented words to functional words. Words tended to shift from content to function at around 75 most frequently used words in each of the debates, except in 1992. In 1992, the substantive shift occurred at 60 words. In 1960, for example, words such as *prestige*, *judgment*, *entertainment*, and *committee* were in the top-75 most frequent words whereas words such as *indicate*, *matter*, and *half* were in the second group of most frequent 75 words. Given our knowledge of the corpus, we determined that a shift from substance to functional was best captured across all debates (except 1992) with the 75 most frequently occurring concepts in each election year's transcripts. In 1992, 60 most frequently occurring concepts were used in analyses.

Case delimiter and candidate identity. For each debater's turn, a case delimiter was added to the text as was a label to

[7]Note that analyses allow for comparisons across years regardless of which specific issues emerge in that particular election year. The focus in this study is not on whether specific issues occur (e.g., "cold war" one year; "education" another year) but rather, regardless of what each year's issues are, they are the *key themes* that emerge as relevant in that given aspect of the data.

[8]In the interest of saving space and because quantitative analyses are based on eigenvector values, visualizations are not reproduced here. Samples of the TV figures are available online at [http://www.scils.rutgers.edu/images/comprofiler/plug_profilegallery/85/pg_1607075373.pdf]. All cluster analyses and Thoughtview visualizations are available by contacting the first author at mdoerfel@scils.rutgers.edu

DOI: 10.1002/asi

denote who was speaking. The candidate-identifier label for each year included the first initial of the candidate's political party, that candidate's election outcome status (i.e., winner or loser), and his name. For example, each time John F. Kennedy took a turn, the delimiter "−1" as well as the label "DWINNERKENNEDY" was added while the delimiter "−1" and RLOSERNIXON was added for Richard Nixon. Note that the "−1" delimiter identifies a new case (the unit of analysis is the text spoken during a turn), and the label identifies which candidate is speaking. Thus, the identity labels are nodes in the semantic network data, just as the words are nodes in the data. In this way, CATPAC was programmed to record who was speaking, and the program therefore included this label as a concept in the semantic network analyses. Thus, these labels (DWINNERCARTER, RLOSERFORD; RWINNERREAGAN, DLOSERCARTER, etc.) are referred to as candidate *identity*, and in the results section, this term (candidate identity) is used in discussing how the candidates are semantically networked with key concepts.

Network Analysis Procedures

Centrality. The values in each cell of the ".win" file in CATPAC are neural synaptic connections among the nodes in the data. Some are excitory (i.e., positive); others are inhibitory (i.e., negative). In other words, if negative, the neural network algorithm reduces their effect over iterations. This distinguishes the neural approach used in CATPAC from co-occurrence analysis. Co-occurrence analysis does not consider the propinquity of semantic items beyond their pairwise co-occurrences; on the other hand, neural analysis does, and hence yields deeper and more detailed semantic networks. The resulting .win file contains values ranging from -1 to $+1$. The use of negative values in the .win file presents a problem because the UCINET (Borgatti, Everett, & Freeman, 1992) computer program's algorithms for centrality require positive values that represent similarities. Therefore, to each of the .win matrices created with CATPAC, a constant ($C = 1$) was added so that all values were greater than zero, ranging from 0 to 2. This way, a score closer to zero appropriately represents maximally dissimilar pairs of concepts while the greater the value, the more similar the pair of concepts. The resulting matrix for each year was entered in UCINET, and Bonacich's eigenvector centrality was calculated. Bonacich's (1972, 1987) eigenvector centrality is determined by the extent to which concepts are connected to other centrally connected concepts. In other words, the node's centrality is "its summed connection to others, weighted by their centralities" (Bonacich, 1987, p. 1172; for extended mathematical derivation of the measure, see Bonacich, 1972, 1987). Normalized values are a percentage that is calculated by taking the scaled eigenvector centrality divided by the maximum difference possible.

Results

The exploratory aspect of this study, as described by the research question, was to assess the semantic structure of the content of the U.S. presidential debates held between 1960 and 2004. Evident in each of the years' analyses was the way the winners were clustered. Each year's results included two distinct clusters of concepts that differentiated the eventual electoral winners and losers. Electoral winners were typically semantic networked to a more tightly clustered group of concepts while losers were typically semantic networked with a looser, more general cluster of concepts. The following paragraphs summarize what words constituted these key clusters with which candidates were semantically linked for each of the election years.

Kennedy Versus Nixon (1960)

The cluster in which Kennedy's identity is located includes the concepts *United States*, *against-communists*, *means-better-America*, *union*, *Mr. Nixon*, *country-freedom*, *government-free-power*, *great-union*, *growth*, *programs*, and *security*. In a second cluster of concepts not part of the main cluster with Kennedy's identifier were words such as *Islands*, *Formosa*, *Castro*, *party*, *bill*, *senate-committee*, *judgment*, *right-course*, *program*, *federal*, *administration*, *education*, *war-conference*, *countries*, *record*, and *prestige*. Nixon's identifier clustered with *first*, *SenKennedy*, *point*, *far*, and *concerned*. Key concepts that winner Kennedy clustered with had to do with collective, national identity issues ("better America" "against communists"). Table 2 contains a summary of the eigenvector centralities for the top-75 concepts analyzed in this year. For easier identification, those listed in the Kennedy cluster are in bold, those with Nixon are underlined, and those in the second cluster are in lower case, italicized letters. Those words with which Kennedy clustered are all nearly equally central and twice as high as those not in the Kennedy cluster (their normalized eigenvector centralities range from 21.01–20.97) The words in the second cluster, including Nixon's identifier (RLOSERNIXON), are in the bottom half of the centrality scores, and their scores show a 10-point jump from those values in the top half versus the bottom half of the rankings.

Ford Versus Carter (1976)[9]

Carter, the 1976 election winner, was most tightly clustered with concepts including *increase*, *budget*, *percent-unemployment-down*, *next program*, *great government*, *four years*, and *country*. Ford clustered with *under*, *GovCarter*, and *UnitedStates*. Consistent with the losing candidate in other debates, Ford was peripheral and clustered with concepts relatively low in centrality. Concepts in the second dominant cluster included the more general debate topics such as *American-world-defense*, *president*, *office*, *federal*, *court*, *energy*, *bill*, *better*, and *countries*. The semantic networks show that Carter clustered with concepts associated

[9]Although U.S. televised presidential debates began in 1960, they did not take place again until 1976. This explains the jump between 1960 and 1976 in our analyses. Debates have occurred in every presidential campaign since 1976 (see McKinney & Carlin, 2004).

DOI: 10.1002/asi

TABLE 2. 1960 Kennedy versus Nixon eigenvector centralities.

Concepts	Eigenvector	Normalized	Concepts	Eigenvector	Normalized
AFRICA	0.149	21.013	**COMMUNISTS**	0.148	21.001
AHEAD	0.149	21.014	OVER	0.148	20.979
AMERICA	0.149	21.117	**PROGRAMS**	0.148	20.967
AMERICAN	0.149	21.048	PRESIDENT	0.065	9.124
BETTER	0.149	21.026	*Administration*	0.064	9.103
BILLION	0.149	21.016	RLOSERNIXON	0.063	8.854
COUNTRY	0.149	21.007	FIRST	0.061	8.688
DOLLARS	0.149	21.021	SENKENNEDY	0.057	8.083
DWINNERKENNEDY	0.149	21.134	POINT	0.056	7.926
ECONOMIC	0.149	21.015	FAR	0.055	7.724
EIGHT	0.149	21.025	POSITION	0.055	7.755
FIVE	0.149	21.074	NEXT	0.054	7.633
FREE	0.149	21.012	*Program*	0.054	7.696
FREEDOM	0.149	21.012	CONCERNED	0.053	7.549
GOVERNMENT	0.149	21.029	*Course*	0.053	7.454
GREAT	0.149	21.098	*Education*	0.053	7.437
GROWTH	0.149	21.021	FACT	0.053	7.512
LAST	0.149	21.111	*Federal*	0.053	7.433
LATIN	0.149	21.014	*War*	0.053	7.51
LOOK	0.149	21.056	AID	0.051	7.157
MEANS	0.149	21.031	*Committee*	0.051	7.184
MEET	0.149	21.044	Congress	0.051	7.269
MOVE	0.149	21.041	*Right*	0.051	7.227
MOVING	0.149	21.012	*Senate*	0.051	7.189
MRNIXON	0.149	21.085	AREA	0.05	7.106
PERCENT	0.149	21.039	*Countries*	0.05	7.092
POWER	0.149	21.002	ECONOMY	0.05	7.13
SECURITY	0.149	21.07	*RECORD*	0.05	7.064
SOVIET	0.149	21.033	*Judgment*	0.049	6.937
STRENGTH	0.149	21.012	*Conference*	0.046	6.518
UNDER	0.149	21.067	*Prestige*	0.046	6.507
UNION	0.149	21.086	VOTED	0.046	6.511
United States	0.149	21.082	*Bill*	0.045	6.365
WORLD	0.149	21.047	*Castro*	0.045	6.298
YEAR	0.149	21.105	*Party*	0.045	6.365
YEARS	0.149	21.1	*Formosa*	0.044	6.238
AGAIN	0.148	20.886	*Islands*	0.043	6.016
AGAINST	0.148	21.001			

with national concerns such as unemployment and the budget. Table 3 contains a summary of the 1976 concepts. Those words listed in the Carter cluster are in bold; the words in the second cluster in lower case, italicized letters; and the Ford cluster words are underlined. Those words with which Carter clustered are in the top third of the most central words in the analysis, with normalized eigenvector centralities ranging from 20.31 to 20.12. The words in the latter cluster, including Ford's identifier (RLOSERFORD), are in the bottom two thirds of the centrality scores, and their scores range from 15.05 to 11.92.

Reagan Versus Carter (1980)

Similar to other years, two dominant clusters emerged. Carter, the loser, was located on the periphery, not networked tightly with any particular issue except for the concepts *Governor*, *Reagan*, and *life* (underlined words in Table 4). Reagan was tightly clustered with one of the two main clusters. Words that Reagan's identity clustered with included *four-last-years*, *first ever*, *world-security*, *peace*, *never*, *control*, *under*, *national*, *good*, *years*, and *country* (bolded in Table 4). The second main cluster in the semantic network included such concepts as *against-nuclear*, *democratic*, *president*, *future*, *nation*, *American*, and *Governor-Reagan*. In Table 4, the second-cluster words are in lower case italics. In 1980, the cluster with which the winner was associated reflected topics that were related to national security and world peace. As shown in Table 4, the words with which Reagan tightly clustered were 14 of the top-16 most central concepts. The results here show that Carter's identity was the 17th-most central concept, but this score was about 4 eigenvector units lower than the words in Reagan's cluster.

Reagan Versus Mondale (1984)

Like the two-cluster results of previous years, one of the two main clusters included the winner, Reagan, and the concepts with which he clustered, *national-government*, *economic*, *interest*, *percent*, *taxes*, *growth*, *deficit*, *increase-rates-down*, *budget*, *plan*, *bill*, and *economy* (bolded in Table 5). Reagan's opponent, Mondale, was isolated from the key

DOI: 10.1002/asi

TABLE 3. 1976 Carter versus Ford eigenvector centralities.

Concepts	Eigenvector	Normalized	Concepts	Eigenvector	Normalized
DWINNERCARTER	0.144	20.313	BILLION	0.097	13.783
PERCENT	0.144	20.307	PUT	0.096	13.628
STRONG	0.144	20.309	UNDER	0.096	13.587
UNEMPLOYMENT	0.144	20.31	*Federal*	0.095	13.427
BUDGET	0.143	20.283	FIVE	0.095	13.447
CUT	0.143	20.293	*Office*	0.095	13.397
DOWN	0.143	20.226	OVER	0.095	13.469
FIRST	0.143	20.261	RLOSERFORD	0.095	13.453
FOUR	0.143	20.21	MILLION	0.094	13.316
GOOD	0.143	20.189	MRFORD	0.094	13.287
GOVERNMENT	0.143	20.264	THREE	0.093	13.101
GREAT	0.143	20.17	UNITEDSTATES	0.093	13.139
INCREASE	0.143	20.288	GOVERNOR	0.092	13.009
INFLATION	0.143	20.271	POLICY	0.092	12.943
JOBS	0.143	20.285	*World*	0.092	12.946
MONEY	0.143	20.274	AGO	0.091	12.828
NEED	0.143	20.287	FOREIGN	0.091	12.813
NEVER	0.143	20.21	KIND	0.091	12.844
NEXT	0.143	20.286	*Defense*	0.09	12.717
OUGHT	0.143	20.277	FACT	0.09	12.73
PART	0.143	20.248	MONTHS	0.09	12.795
PROGRAM	0.143	20.282	*Better*	0.089	12.571
PROGRAMS	0.143	20.271	*Energy*	0.089	12.628
RATE	0.143	20.244	FAR	0.089	12.575
TAX	0.143	20.282	INCOME	0.089	12.521
TAXES	0.143	20.273	LONG	0.089	12.636
WORK	0.143	20.289	MIDDLE	0.089	12.63
YEARS	0.143	20.222	*Bill*	0.088	12.504
COUNTRY	0.142	20.12	CONTROL	0.088	12.436
HOUSE	0.142	20.144	MILITARY	0.088	12.44
President	0.106	15.051	MODERATOR	0.088	12.425
ADMINISTRATION	0.101	14.352	MATTER	0.087	12.354
GOVCARTER	0.1	14.12	*Countries*	0.086	12.216
CONGRESS	0.099	14.012	AGREEMENT	0.084	11.886
LAST	0.099	14.069	*Court*	0.084	11.924
PRESFORD	0.099	13.95	SOVIET	0.084	11.814
YEAR	0.099	13.994	UNION	0.083	11.804
American	0.098	13.816			

concepts and clustered only with *strong*, *American*, and *president* (underlined in Table 5). In fact, as Table 5 shows, Mondale's identifier (DLOSERMONDALE) was the 12th-least central concept of all 75 words. The other main cluster included concepts such as *nuclear*, *weapons*, *nation*, *administration*, *world*, *security*, and so on (lowercase italics in Table 5). The 1984 debates showed the winner clustered with economic/fiscal issues such as the budget, interest rates, and taxes. Table 5 reports the centralities with Reagan's identifier (RWINNERREAGAN) clustered with words that, except for *bill*, were most central in the network.

George H.W. Bush Versus Dukakis (1988)

The Bush–Dukakis debate also resulted in two dominant clusters. The losing candidate, Dukakis, was peripheral to the main network space, and the winner (Bush) was tightly linked to the bolded words in Table 6: *drug*, *better-education-program*, *young*, *American*, and *liberal-values-little*. The other main cluster of concepts (lower case in Table 6) included *weapons*, *billions*, *defense*, *decision*, *governor*, *United States*, *spent*, *need-strong*, and *government*. Bush's semantic network cluster reflected national issues having to do with education and drugs, and appeared to also include attacking issues with his semantic link to liberal. Yet, Table 6 shows that the losing candidate (Dukakis) ranked in the top-14 most central concepts. Indeed, Dukakis clustered with *country*, *kind*, *over*, and *work* (underlined in Table 6)—all words in the top third of centrality scores. None of these concepts, or his identifier, however, are more central than those in the Bush main cluster.

Clinton Versus George H.W. Bush Versus Perot (1992)

The 1992 debates yielded somewhat different semantic networks, with normalized centrality for Clinton (16.35) slightly greater than that for Bush (16.02). The words with which Clinton's identity most associated included *right*, *need-good-tax*, *work-congress*, *jobs-America*, *world-first*, *good-president*, *years*, and *American* (Table 7 bolded words). Yet, the cluster analysis results show that Bush, too, clustered with those words in the previous sentence and in Table 7

DOI: 10.1002/asi

TABLE 4. 1980 Reagan versus Carter eigenvector centralities.

Concepts	Eigenvector	Normalized	Concepts	Eigenvector	Normalized
COUNTRY	0.137	19.343	*Democratic*	0.109	15.462
GOOD	0.137	19.306	DOWN	0.109	15.47
NATIONAL	0.137	19.307	ENERGY	0.109	15.397
RWINNERREAGAN	0.137	19.352	FACT	0.109	15.446
YEARS	0.137	19.324	FEDERAL	0.109	15.366
CONTROL	0.136	19.293	HISTORY	0.109	15.373
EVER	0.136	19.29	INFLATION	0.109	15.396
FIRST	0.136	19.295	JOBS	0.109	15.415
FOUR	0.136	19.279	LIFE	0.109	15.39
LAST	0.136	19.289	LONG	0.109	15.384
NEVER	0.136	19.29	MILLION	0.109	15.418
PEACE	0.136	19.279	NEXT	0.109	15.359
SECURITY	0.136	19.302	OIL	0.109	15.399
UNDER	0.136	19.3	POWER	0.109	15.354
WAR	0.136	19.286	PROGRAM	0.109	15.428
WORLD	0.136	19.284	AIR	0.108	15.287
DLOSERCARTER	0.113	15.915	BILLION	0.108	15.307
Governor	0.112	15.802	CALIFORNIA	0.108	15.299
President	0.112	15.862	CARTER	0.108	15.301
American	0.111	15.676	COAL	0.108	15.298
GOVERNMENT	0.111	15.668	ECONOMIC	0.108	15.288
Nation	0.111	15.712	EQUAL	0.108	15.223
Reagan	0.111	15.678	HEALTH	0.108	15.284
YEAR	0.111	15.675	MILITARY	0.108	15.297
Against	0.11	15.621	PARTY	0.108	15.243
Future	0.11	15.548	REGULATIONS	0.108	15.315
INCREASE	0.11	15.513	RIGHTS	0.108	15.248
Nuclear	0.11	15.491	SOCIAL	0.108	15.282
OFFICE	0.11	15.541	SOVIET	0.108	15.221
PERCENT	0.11	15.6	SPENDING	0.108	15.295
POLICY	0.11	15.535	THREAT	0.108	15.313
PUT	0.11	15.506	TREATY	0.108	15.268
TAX	0.11	15.493	UNEMPLOYMENT	0.108	15.321
AGAIN	0.109	15.375	UNION	0.108	15.287
AGO	0.109	15.407	WEAPONS	0.108	15.314
BETTER	0.109	15.373	WOMEN	0.108	15.325
COMMITMENT	0.109	15.465	ARMS	0.107	15.185
CONTINUE	0.109	15.362			

that also are underlined. Perot, on the other hand, clustered with *country*, *down*, *over*, *money*, *put*, and *government* (in lowercase italics in Table 7). Table 7 shows that, indeed, this year was different from previous years semantically as well as in terms of the number of candidates. Candidates from the "traditional" parties (Clinton, Bush) had overlap with each other, and their word clusters differentiated them from the independent candidate, Perot. Perot was most central, yet words with which he clustered, like the others, were scattered among the top two thirds of the most central concepts. The winner most closely associated with topics about national concerns, including needing to work with Congress, employment in the United States (jobs-America), and the use of language that reflects national identity (America, American).

Clinton Versus Dole (1996)

The semantic network configuration of the 1996 debates mirrored years prior to 1992 with the winner (Clinton) more tightly clustered to a set of key concepts and the loser peripheral to the concept clusters. Clinton clustered with *country*, *help*, *SenDole*, *American-president-better*, *better-years-jobs-keep-country*, *education*, *government*, *work-first-America*, *tax-cut-medicare*, *budget-percent-bill*, *family-welfare-working*, and *let's-thank*—all words that ranked in the top half of the most central words (bolded in Table 8). Losing-candidate Dole, on the other hand, clustered only with *ought* and *right* (underlined in Table 8), and his centrality ranked in the bottom half of the scores. In 1996, the winner associated most strongly with issues relating to national concerns, such as keeping jobs in the country, education, government, taxes, and Medicare.

George W. Bush Versus Gore (2000)

Debates in 2000 yielded semantic network analysis that echoed former assessments with one candidate isolated from the main clusters of concepts and the other tightly clustered with a distinct cluster of concepts. If one considers the winner in terms of the year's *popular* vote, the winner (Gore)

DOI: 10.1002/asi

TABLE 5. 1984 Reagan versus Mondale eigenvector centralities.

Concepts	Eigenvector	Normalized	Concepts	Eigenvector	Normalized
RWINNERREAGAN	0.139	19.631	FIRST	0.103	14.554
THOUGHT	0.139	19.596	LIFE	0.103	14.549
BILLION	0.138	19.559	MIGHT	0.103	14.612
BUDGET	0.138	19.563	NEVER	0.103	14.542
CUT	0.138	19.553	PROBLEM	0.103	14.55
DAY	0.138	19.523	SOCIAL	0.103	14.5
DEFICIT	0.138	19.531	WHETHER	0.103	14.613
DOWN	0.138	19.567	AMERICA	0.102	14.454
ECONOMIC	0.138	19.559	AWAY	0.102	14.445
ECONOMY	0.138	19.556	BETTER	0.102	14.422
FACT	0.138	19.509	CALLED	0.102	14.465
GROWTH	0.138	19.574	COUNTRY	0.102	14.402
INCREASE	0.138	19.558	FOUR	0.102	14.383
INTEREST	0.138	19.561	HUMAN	0.102	14.458
LAST	0.138	19.527	KIND	0.102	14.441
MATTER	0.138	19.484	NEED	0.102	14.444
NATIONAL	0.138	19.515	ONCE	0.102	14.479
PERCENT	0.138	19.564	PRESIDENT	0.102	14.494
PLAN	0.138	19.56	*Security*	0.102	14.371
RATES	0.138	19.574	SOVIET	0.102	14.36
SOMETHING	0.138	19.546	STATE	0.102	14.412
TAX	0.138	19.523	UNION	0.102	14.379
TAXES	0.138	19.524	*Weapons*	0.102	14.397
YEAR	0.138	19.537	ANSWER	0.101	14.336
GOVERNMENT	0.137	19.432	**BILL**	0.101	14.237
REGARD	0.105	14.793	DLOSERMONDALE	0.101	14.324
AGAIN	0.104	14.699	FAITH	0.101	14.254
FIND	0.104	14.659	LEADERSHIP	0.101	14.245
MRMONDALE	0.104	14.709	MISSILES	0.101	14.313
OVER	0.104	14.673	*Nuclear*	0.101	14.308
RIGHT	0.104	14.691	PART	0.101	14.267
World	0.104	14.656	RIGHTS	0.101	14.287
YEARS	0.104	14.718	STRENGTH	0.101	14.281
Administration	0.103	14.58	STRONG	0.101	14.31
AGAINST	0.103	14.52	ARMS	0.1	14.157
AGO	0.103	14.562	CONTROL	0.1	14.188
AMERICAN	0.103	14.577	*Nation*	0.1	14.192
DEFENSE	0.103	14.525			

is, indeed, semantic-networked like former winners. That is, he is more tightly clustered to a set of concepts (i.e., in semantic networks terms, he is more central). On the other hand, if one considers the winner (Bush), the candidate who ultimately became President, in terms of the *electoral* vote, then the results are substantially different from former years' analyses because Bush was on the periphery of the semantic network. The concepts Gore semantic-networked with included *help-put-right*, *sure*, *first-tax-example-America-health-care-national-Medicare-middle*, *cut-parents-schools-children-pay-social-education*, *years-security*, and *down*. In 2000, the issues with which the more central candidate (Gore) clustered were those related to national concerns, including American healthcare, Medicare, taxes, and education. On the other hand, the candidate who actually won the White House (Bush), clustered with *America*, *care*, *help*, *years*, *money*, *need*, *plan*, *governor*, *ought*, *under*, and *Texas, plan, and money*. Table 9 shows those concepts with which Bush clustered in bold, and in lower case and underlined, those terms with which Gore clustered. This analysis shows that this year's pattern followed that of previous years *except* that the candidate who became President (Bush) was clustered with less central words than those with which the loser (Gore) clustered. The patterns depicted in 2000 are the same as those in previous years, yet the results of the election—and the most semantically central candidate—are opposite.

George W. Bush Versus Kerry (2004)

The semantic networks of the 2004 debates mirror all previous years in which two dominant clusters emerged with one candidate being distinguished from the other by his relative centrality or periphery in the semantic network. Similar to 2000, 2004 presented a very tight race. The concepts with which Kerry (the candidate who is more central, in network terms) is clustered include *world-war-wrong-never-better-we'll-thank*, *lead-terror-Iraq*, *need-strong-better-security-United States-American-country*, *president*, *talk*, *job-over-percent*, and *America-plan* (underlined in Table 10). The conceptual cluster reflects Kerry's focus on issues related

DOI: 10.1002/asi

TABLE 6. 1988 G.H.W. Bush versus Dukakis eigenvector centralities.

Concepts	Eigenvector	Normalized	Concepts	Eigenvector	Normalized
AMERICAN	0.133	18.746	JOB	0.112	15.872
RWINNERGHWBUSH	0.133	18.815	LEADERSHIP	0.112	15.858
BETTER	0.132	18.629	PERCENT	0.112	15.785
DRUG	0.132	18.601	RIGHT	0.112	15.886
EDUCATION	0.132	18.615	SAYS	0.112	15.856
LIBERAL	0.132	18.634	SOMETHING	0.112	15.876
LITTLE	0.132	18.638	TALKING	0.112	15.795
OUGHT	0.132	18.721	WORKING	0.112	15.828
PROGRAM	0.132	18.621	YEAR	0.112	15.894
TERMS	0.132	18.618	YEARS	0.112	15.909
VALUES	0.132	18.603	AGAINST	0.111	15.69
YOUNG	0.132	18.629	CUT	0.111	15.749
COUNTRY	0.119	16.874	DOESN'T	0.111	15.754
DLOSERDUKAKIS	0.118	16.75	FAMILIES	0.111	15.714
Kind	0.116	16.376	HEALTH	0.111	15.722
DOWN	0.115	16.222	KEEP	0.111	15.734
GOOD	0.115	16.301	MAN	0.111	15.632
over	0.115	16.299	MATTER	0.111	15.682
PRESIDENT	0.115	16.319	SPEND	0.111	15.722
Work	0.115	16.238	SPENDING	0.111	15.672
CONGRESS	0.114	16.17	UNDER	0.111	15.723
MRBUSH	0.114	16.122	UNITEDSTATES	0.111	15.761
FIRST	0.113	15.927	WEAPONS	0.111	15.736
GOVERNOR	0.113	16.028	WORLD	0.111	15.668
HELP	0.113	15.936	BILLION	0.11	15.623
HOPE	0.113	15.985	BILLIONS	0.11	15.532
NEED	0.113	15.988	BUILD	0.11	15.567
STATE	0.113	15.986	DEFENSE	0.11	15.538
STRONG	0.113	15.921	FORCES	0.11	15.488
SUPPORT	0.113	15.933	NEVER	0.11	15.528
TOUGH	0.113	15.951	OPPORTUNITY	0.11	15.618
VP	0.113	15.941	SECURITY	0.11	15.501
ADMINISTRATION	0.112	15.818	TAXES	0.11	15.574
AMERICA	0.112	15.859	GEORGE	0.109	15.403
CARE	0.112	15.812	HOUSING	0.109	15.447
FACT	0.112	15.846	NUCLEAR	0.109	15.379
FEDERAL	0.112	15.808	DECISION	0.108	15.307
GOVERNMENT	0.112	15.839			

to world affairs and national security (Iraq, terror, security), national identity (use of the labels America, United States), and jobs. On the other hand, the winning candidate (Bush) was not tightly clustered with a collection of terms in either visualizations or the cluster analyses. The one word he most clustered with was *troops* (bolded in Table 10). Like the analysis for 2000, the patterns are consistent with previous years, but the results are the opposite because the loser is more central and clustered with more central terms than is the winner.

The hypothesis predicted that eventual electoral winners will be more central in the semantic network of debates than will the losers. CATPAC analyses (see supplemental materials [http://www.scils.rutgers.edu/images/comprofiler/plug_profilegallery/85/pg_1607075373.pdf]. for samples of TV graphs) showed the semantic network locations of the winners and the losers. Taking the normalized centralities of the candidates from all years (summarized in Table 11), a difference of means test confirmed that means for winners ($n = 9$, including George W. Bush) = 18.69, and were significantly greater than the mean centralities of losers ($n = 9$, Gore included) = 15.07, $F(1, 17) = 8.23$, $p = .01$, $\eta^2 = .34$. Using the popular-vote outcome in the 2000 election to define winners and losers, the hypothesis had even stronger support, with means for winners ($n = 9$, Gore included) = 19.03 being significantly greater than those for losers ($n = 9$, Bush included) = 14.73, $F(1, 17) = 14.83$, $p = .001$, $\eta^2 = .48$. The semantic network for the controversial year 2000 illustrates that, consistent with the tight race, both candidates appeared to have relatively similar semantic network relationships with the concepts. The hypothesis, then, that eventual electoral winners are more central in the semantic networks of presidential debates was supported.

In sum, year-by-year semantic networks illustrated systematic patterns and similarities of the semantic structure of competition, in which winners were more semantically networked while losers were consistently more peripheral to the key issues discussed. The majority of semantic network

DOI: 10.1002/asi

TABLE 7. 1992 Clinton versus G.H.W. Bush versus Perot eigenvector centralities.

Concepts	Eigenvector	Normalized	Concepts	Eigenvector	Normalized
ILOSERPEROT	0.159	22.476	**NEED**	0.114	16.109
CARE	0.158	22.326	*Put*	0.114	16.168
Country	0.158	22.347	SPEND	0.114	16.187
Down	0.158	22.324	TALK	0.114	16.09
EVERYBODY	0.158	22.318	**TAX**	0.114	16.188
FIRST	0.158	22.347	THREE	0.114	16.176
GOOD	0.158	22.344	**WORLD**	0.114	16.086
HEALTH	0.158	22.311	BETTER	0.113	16.024
JOBS	0.158	22.332	BIG	0.113	16.027
LET'S	0.158	22.338	CONTROL	0.113	16.033
Over	0.158	22.319	*Government*	0.113	16.024
PAY	0.158	22.316	PLAN	0.113	15.995
RIGHT	0.158	22.355	**PRESIDENT**	0.113	15.968
SURE	0.158	22.354	PROGRAM	0.113	16.023
TWELVE	0.158	22.312	PUBLIC	0.113	15.964
WORK	0.158	22.337	RLOSERGHWBUSH	0.113	16.023
YEARS	0.158	22.349	BILL	0.112	15.905
YOU'VE	0.158	22.309	CHILDREN	0.112	15.832
Money	0.157	22.273	DEFICIT	0.112	15.855
AMERICAN	0.116	16.369	EDUCATION	0.112	15.892
DWINNERCLINTON	0.116	16.347	GOVERNOR	0.112	15.77
YEAR	0.116	16.468	HELP	0.112	15.798
BILLION	0.115	16.284	LOST	0.112	15.803
LITTLE	0.115	16.208	NUMBER	0.112	15.845
PERCENT	0.115	16.246	PRIVATE	0.112	15.779
AMERICA	0.114	16.105	SCHOOL	0.112	15.791
CONGRESS	0.114	16.06	SCHOOLS	0.112	15.792
FOUR	0.114	16.129	ANSWER	0.111	15.676
JOB	0.114	16.19	ECONOMY	0.111	15.751
KEEP	0.114	16.062	INSURANCE	0.111	15.689

analyses reported here resulted in two primary clusters, and in differentiating electoral winners from losers. The exceptional years were 1992, when the debates involved three candidates, and 2000, when the loser (Gore) was more semantic networked with key concepts than was the eventual victor, George W. Bush. Statistical tests of the semantic networks also indicated that semantic networks differentiated winners versus losers in the presidential debates.

Discussion

Semantic network analysis of U.S. presidential debates transcripts from 1960 to 2004 uncovered some curious patterns. For one, the eventual winner's semantic networks, regardless of specific topics, contained repeated and interrelated themes that were used to frame answers throughout the debate. These results allow a cautious claim regarding the importance of centrality, achieved semantically with both repetition and linking or networking key messages throughout various aspects of debate communication content. Analyses showed that through the years, the winners were semantically linked to the topics that reflected the times (e.g., anticommunism in the 1960 debates), and the losers were consistently more peripheral to any of the key concepts discussed. Findings also support the hypothesis that the more central candidates in the semantic networks were the eventual electoral winners while the losers were more peripheral. On close inspection of the year-by-year analyses, two exceptions were 1992, when three candidates participated in the debates, and 2000, when the popular vote winner was different from the electoral college winner. With regard to the actual semantic structure of the debates, the semantic networks illustrated a consistent pattern of winners and losers. Next, these findings are discussed in terms of their implications for political communication and networks scholars.

Semantic Networks and U.S. Presidential Debates

Decades of study of debate viewing have shown that debate content has very little influence on citizen voting behavior (see McKinney & Carlin, 2004). In other words, debate viewers do not make their vote choice based on candidates' debate performance. Similarly, these findings do not point to a causal link between debate content and election outcomes. Yet, these findings do suggest something important to debate scholars. While other theoretical approaches to debate content, such as functional theory and argumentation theory, encourage scholars to examine the intricacies of and rhetorical moves in debate messages, semantic network theory encourages scholars to determine if there are structural patterns in discourse. Indeed, Carlin (1992) argued that a candidate's debate dialogue is reflective of his larger campaign message. If that

DOI: 10.1002/asi

TABLE 8. 1996 Clinton versus Dole eigenvector centralities.

Concepts	Eigenvector	Normalized	Concepts	Eigenvector	Normalized
AMERICA	0.149	21.05	OUGHT	0.08	11.293
PRESIDENT	0.149	21.066	RIGHT	0.08	11.383
AGAIN	0.148	20.998	GOOD	0.077	10.925
AGO	0.148	20.93	NEED	0.077	10.913
AMERICAN	0.148	20.963	OVER	0.074	10.453
BETTER	0.148	20.963	CARE	0.073	10.33
BILL	0.148	20.948	ECONOMY	0.073	10.34
BUDGET	0.148	20.948	LAST	0.073	10.344
CENTURY	0.148	20.954	CHILDREN	0.072	10.214
CHILD	0.148	20.943	ECONOMIC	0.072	10.167
COUNTRY	0.148	20.888	BIG	0.071	10.018
CUT	0.148	20.966	BILLION	0.071	10.104
DWINNERCLINTON	0.148	20.994	PLAN	0.071	10.056
FAMILY	0.148	20.93	DOWN	0.07	9.941
FIRST	0.148	20.971	FUTURE	0.07	9.965
FOUR	0.148	20.956	MONEY	0.07	9.912
GOVERNMENT	0.148	20.98	WE'LL	0.07	9.891
JOBS	0.148	20.978	WORLD	0.07	9.846
KEEP	0.148	20.972	ADMINISTRATION	0.069	9.697
LET'S	0.148	20.942	CONGRESS	0.068	9.652
LOOK	0.148	20.975	HEALTH	0.068	9.598
MEDICARE	0.148	20.944	INCREASE	0.068	9.548
MILLION	0.148	20.952	TONIGHT	0.068	9.578
PERCENT	0.148	20.946	PAY	0.067	9.536
RECORD	0.148	20.953	UNDER	0.067	9.448
REFORM	0.148	20.941	WHETHER	0.067	9.46
SENDOLE	0.148	20.991	WORKED	0.067	9.508
TAX	0.148	20.97	KIDS	0.066	9.276
THANK	0.148	20.937	POLICY	0.066	9.312
TWENTY	0.148	20.929	SECURITY	0.066	9.326
WELFARE	0.148	20.925	DRUG	0.065	9.138
WORK	0.148	20.951	AGAINST	0.064	9.007
WORKING	0.148	20.934	SCHOOL	0.064	9.097
YEAR	0.148	20.966	SOCIAL	0.064	9.105
YEARS	0.148	20.994	YOUNG	0.064	9.108
EDUCATION	0.147	20.853	DRUGS	0.063	8.951
HELP	0.147	20.848	SCHOOLS	0.063	8.945
RLOSERDOLE	0.092	12.997			

is the case, and if the current study's findings are considered within the broader campaign context, then one implication of these findings is that the candidate who has developed a coherent, centrally structured campaign message, an appeal that is reiterated and reflected in their debate dialogue, seems to be victorious come presidential election day. That broader hypothesis remains a testable proposition for future research.

These results also provide some empirical evidence to support the contention that candidates may be wise to "stay on message." Recall that the eventual electoral winners in all campaigns examined in this study (with the two exceptions noted earlier) consistently used similar words together across their particular election-year's debates. Conversely, eventual electoral losers did not. In other words, what distinguished eventual winners from losers, in terms of debate content, is their ability to create a common, consistent linguistic thread in their public messages over the course of their debates. They semantically networked themselves to the issues. This finding complements Hart and Jarvis's (1997) contention that debates force candidates to be focused in their messages. The finding also says something more. From a semantic networks perspective, winning candidates engaged in multiple ways of talking about the current debate issues and referred back to topics in several ways with varied words and clusters of words (that represent topic themes). By discussing the key topics with consistent words and framing with like-word clusters, the winning candidates were more central in the structure of debates.

Another implication of this study relates to the contributions that semantic network theory and analysis can make to political communication research. Semantic networks offer scholars a solid theoretical base for investigating debate discourse and political discourse more broadly, both during campaigns and during governance. Several communication scholars (e.g., Jang & Barnett, 1995; Corman, Kuhn, McPhee, & Dooley, 2002; Danowski, 1982; Doerfel, 1999; Monge & Eisenberg, 1987; Rice & Danowski, 1993; Woelfel, 1993a,b; Woelfel & Fink, 1980; among others) pointed to semantic networks as a way of representing meaning in texts. Clearly, scholars who have employed content analysis and

DOI: 10.1002/asi

TABLE 9. 2000 G.W. Bush versus Gore eigenvector centralities.

Concepts	Eigenvector	Normalized	Concepts	Eigenvector	Normalized
DLOSERGORE	0.133	18.745	SOMETHING	0.108	15.27
AMERICA	0.131	18.494	DIFFERENCE	0.107	15.143
CARE	0.131	18.503	REFORM	0.107	15.089
Children	0.131	18.473	SENIORS	0.107	15.086
Country	0.131	18.477	STATE	0.107	15.155
Example	0.131	18.477	SUPPORT	0.107	15.068
First	0.131	18.519	TELL	0.107	15.142
HEALTH	0.131	18.48	**TEXAS**	0.107	15.165
HELP	0.131	18.461	UNITEDSTATES	0.107	15.062
JIM	0.131	18.479	BIG	0.106	14.952
MEDICARE	0.131	18.506	LAST	0.106	14.988
National	0.131	18.511	LOOK	0.106	14.96
Put	0.131	18.49	PRESCRIPTION	0.106	14.922
Right	0.131	18.57	STRONG	0.106	14.952
SECURITY	0.131	18.463	SYSTEM	0.106	14.997
Sure	0.131	18.519	WORK	0.106	14.936
Tax	0.131	18.524	WORLD	0.106	14.972
CUT	0.13	18.426	AMERICAN	0.105	14.918
DOWN	0.13	18.446	BILL	0.105	14.793
EDUCATION	0.13	18.451	ISSUE	0.105	14.795
MIDDLE	0.13	18.434	KEEP	0.105	14.875
PARENTS	0.13	18.428	PRESIDENT	0.105	14.861
PAY	0.13	18.45	SCHOOL	0.105	14.909
SCHOOLS	0.13	18.448	SOMEBODY	0.105	14.851
SOCIAL	0.13	18.441	WASHINGTON	0.105	14.917
YEAR	0.13	18.455	ADMINISTRATION	0.104	14.699
YEARS	0.113	15.959	INSURANCE	0.104	14.769
MONEY	0.112	15.808	LAW	0.104	14.766
NEED	0.111	15.671	MEANS	0.104	14.769
PLAN	0.111	15.651	MILITARY	0.104	14.719
RWINNERBUSH	0.111	15.658	NATION	0.104	14.676
GOVERNMENT	0.11	15.5	PUBLIC	0.104	14.776
BETTER	0.109	15.395	VP	0.104	14.765
FEDERAL	0.109	15.462	WHETHER	0.104	14.713
GOVERNOR	0.109	15.44	KIND	0.103	14.594
OUGHT	0.109	15.404	NEEDS	0.103	14.567
UNDER	0.109	15.361	WAR	0.103	14.539
GOOD	0.108	15.323			

rhetorical analysis to examine campaign texts also are interested in meaning, and those studies reveal much about the nature of political discourse (e.g., Hart, 2000; Hart & Jarvis, 1997; Jarvis, 2005). The current study, however, points to the merit of incorporating semantic network theory and method into political debate research. This study shows that semantic networks, both as a theoretical and a methodological approach, are particularly useful in examining how language use and the enactment of symbols differentiate candidates, in this case, during debates. Whereas previous research on debate content has enhanced understandings of (a) the nature and degree of candidate argument and clash (Carlin et al., 1991; Carlin et al., 2001), (b) the extent to which candidates acclaim, attack, or defend during debates (Benoit et al., 2003; Benoit et al., 2002), and (c) the linguistic dimensions/properties of language candidates use during debates (Hart & Jarvis, 1997), semantic networks enable scholars to explore another aspect of debate content: the underlying patterns or invisible structures (Lievrouw et al., 1987) of meaning in debate discourse. Indeed, semantic networks' focus on the structure of language use provides one way in which scholars may explore (in)consistency across messages. That is, semantic networks unearth how candidates might have repeated and/or linked specific themes in their discourse. Semantic networks also enable scholars to explore relationships among actors (candidates) and their language use on a more macro level than other content analytic approaches permit. In so doing, semantic network analyses serve to complement the detailed interrogation of language and other symbolic forms achieved through rhetorical and other content analytic methods.

Extending Social Network Theory to Semantic Networks

This study also extends social network theory to the realm of semantic networks. Research on centrality posits that more centrally networked entities have more social influence, are more powerful, and enjoy better reputations than their peripheral counterparts. This study showed that advantages of centrality also can be extended to semantic

DOI: 10.1002/asi

TABLE 10. 2004 G.W. Bush versus Kerry eigenvector centralities.

Concepts	Eigenvector	Normalized	Concepts	Eigenvector	Normalized
AMERICA	0.132	18.661	FACT	0.108	15.22
DLOSERKERRY	0.132	18.598	HEALTH	0.108	15.29
PRESIDENT	0.132	18.616	HELP	0.108	15.293
ABLE	0.131	18.555	JOBS	0.108	15.209
AMERICAN	0.131	18.532	LAST	0.108	15.258
BETTER	0.131	18.546	MONEY	0.108	15.283
COUNTRY	0.131	18.573	PUT	0.108	15.344
IRAQ	0.131	18.481	YEAR	0.108	15.282
JOB	0.131	18.49	PAY	0.107	15.177
LEAD	0.131	18.474	SURE	0.107	15.197
NEED	0.131	18.54	TELL	0.107	15.141
NEVER	0.131	18.512	COST	0.106	14.945
OVER	0.131	18.537	FOUR	0.106	14.944
PERCENT	0.131	18.596	GOOD	0.106	15.052
PLAN	0.131	18.593	KEEP	0.106	15.024
SECURITY	0.131	18.514	OPPONENT	0.106	14.951
STRONG	0.131	18.499	OUGHT	0.106	15.061
TALK	0.131	18.537	PROTECT	0.106	15.039
TERROR	0.131	18.468	RESPECT	0.106	14.995
THANK	0.131	18.497	**TROOPS**	0.106	15.025
UNITEDSTATES	0.131	18.555	WEAPONS	0.106	15.01
WAR	0.131	18.493	AGAINST	0.105	14.851
WE'LL	0.131	18.51	BEST	0.105	14.807
WORLD	0.131	18.462	CONTINUE	0.105	14.852
WRONG	0.131	18.472	FREE	0.105	14.781
RIGHT	0.113	15.925	GREAT	0.105	14.866
RWINNERBUSH	0.113	15.922	SAYS	0.105	14.901
YEARS	0.111	15.679	TAXES	0.105	14.886
BILLION	0.109	15.426	VOTED	0.105	14.849
CARE	0.109	15.415	HUSSEIN	0.104	14.652
CUT	0.109	15.431	KOREA	0.104	14.644
DOWN	0.109	15.369	NORTH	0.104	14.692
FIRST	0.109	15.465	NUCLEAR	0.104	14.687
MILLION	0.109	15.352	SADDAM	0.104	14.696
TAX	0.109	15.483	THREAT	0.104	14.692
TODAY	0.109	15.345	BIN	0.103	14.603
WORK	0.109	15.41	LIFE	0.103	14.621
AMERICANS	0.108	15.226			

network theory. Examining purely competitive outcomes—winners and losers in U.S. presidential campaigns—enables scholars to capture the theoretical assumptions originally tested in the social networks literature. Throughout their campaigns, winners operate in ways that *socially influence* the electorate to cast a vote in their favor; by virtue of winning the general election, winners are more *powerful*; and without a more favorable *reputation* than their competitors among the majority of voters, they would not have won.

Analyses revealed two years that did not follow this general pattern of centrality differentiating winners versus losers. In 1992, Clinton (D), G.H.W. Bush (R), and Perot (I) shared the debate stage. Perot emerged as most central, and concepts that positioned him were those that he focused on no matter what the discussion topic—for example, finance (Doerfel & Marsh, 2003); however, the election-year winner, Clinton, was more semantically central than was his Republican counterpart (Bush). Campaign 2000 was contentious, with the election going to G.W. Bush after weeks of vote recounts in Florida. Interestingly, the ambiguity of the election outcome was not reflected in the semantic networks of the debates. Instead, the more semantically central Gore clustered with issues related to national concerns while Bush did not. Perhaps some would interpret this as reinforcing the argument that the popular vote is a more valid indicator than is the electoral college count. All other years, however, indicated with statistical support that centrality in semantic networks yields similar benefits as centrality in social networks.

It is evident that the semantic structure of competition is one in which the competitor ties her- or himself consistently and repeatedly with the keywords, semantic networking her- or himself to the center of the key issues of the particular election year. A *semantic* theory of debates, then, asserts that the candidate needs to invest in the whole network, not just single-issue linkages. Thus, in responding to questions by the moderator, audience member, or panel member, the candidate, to be central in the semantic network, will link the

DOI: 10.1002/asi

TABLE 11. Bonacich's eigenvector centralities of debaters by year.

Year	Participants (party, winner/loser)	Normalized eigenvector centrality	(variance explained)
1960	John F. Kennedy (D, Winner)	21.13	
	Richard M. Nixon (R)	8.85	(46.75%)
1976	Gerald R. Ford (R)	13.45	
	James E. Carter (D, Winner)	20.31	(12.76%)
1980	James E. Carter (D)	15.92	
	Ronald W. Reagan (R, Winner)	19.35	(2.54%)
1984	Ronald W. Reagan (R, Winner)	19.63	
	Walter F. Mondale (D)	14.32	(5.77%)
1988	George H.W. Bush (R, Winner)	18.82	
	Michael S. Dukakis	16.75	(1.13%)
1992	George H.W. Bush (R)	16.02	
	William J. Clinton (D, Winner)	16.35	(8.66%)
1996	William J. Clinton (D, Winner)	20.99	
	Robert J. Dole (R)	13.00	(30.85%)
2000	George W. Bush (R, Winner)	15.66	
	Albert A. Gore, Jr. (D)	18.75	(2.74%)
2004	George W. Bush (R, Winner)	15.92	
	John F. Kerry (D)	18.60	(2.68%)

words of his or her campaign theme throughout each answer. These results suggest that winners' semantic networks were more connected to key issues. Intentional or not, the way winners discussed the issues in debates tied them to key issues with the common set of words and themes used throughout their answers.

Limitations

This study does not intend to demonstrate direct causality between semantic networking and election outcomes. Clearly, there are other factors at work in determining who wins elections. For example, voters' interpretations of messages, turnout, and other campaign messages besides debate content, such as advertising, stumping, and the Internet, all have been shown to matter during campaigns. In addition, research has revealed that debate viewers tend not to make their vote choices based on candidates' debate performance (see McKinney & Carlin, 2004). That said, however, debates can be seen as forums for unearthing key issues of a campaign year, and so manifest the candidates' articulation of those issues. It is no secret that candidates are seriously prepared, briefed, and practiced prior to participating in this unfiltered forum. Therefore, it is important to note patterns in debate discourse and consider those patterns within the larger context of campaigns in future research. Similarly, future research also could attempt to link voters' perceptions of candidates with this type of structural analysis of debate content and concept patterns.

Another limitation of the method is its focus solely on spoken messages; it does not take into account visual or nonverbal aspects of debates. This shortcoming is balanced by the advantages of using an unobtrusive analysis technique that captures dominant themes within an extremely large corpus of data. These data included over 500 pages of single-spaced, 11-point-font text. Moreover, the method complements the network theory framework that enables identifying patterns that might not normally emerge from other content analytic approaches (e.g., Barnett & Danowski, 1992; Jang & Barnett, 1995; Lievrouw et al., 1987).

Conclusion

Despite the limitations, these data—the *population* of televised U.S. presidential debate messages, thus large and complete—shift scholars' focus from the intricacies of the debate content to the aggregate structure of language. These findings contribute to ongoing conversations of debate content by showing that regardless of the issue being discussed, so long as the candidate uses the same words and phrases and ties those specific words and phrases to whatever topic, his or her centrality appears to be advantageous. Although these findings might seem cynical to some, they do, indeed, offer unique contributions in three ways. First, in terms of campaign strategy, this study offers empirical evidence that candidates must find a message that can be linked to the variety of topics that can be discussed in the duration of the (often several hours of) debating in the course of a campaign season. Results bolster campaign strategists' contention that debaters need to integrate on-message themes regardless of the topic raised in the debate questions. Future research should continue to look at the nature of messages and the extent to which appeals resonate with voters. Second, identifying emergent communication patterns using *semantic* network analysis enabled an extension of theories of centrality, which to date have shown advantages of centrality in *social* networks. Finally, this aggregation of data enables a more abstract level of understanding about debates. The semantic network of debates is created based on words-as-nodes; yet collectively, although the dominant themes and keywords change from year to year, the results remain stable—the eventual winners use words that make them more central in the semantic networks while the losers use words that leave them more peripheral.

Acknowledgment

The authors are indebted to Albert D'Avanzo, Dr. Don Kraft, Dr. Ron Rice, Dr. Steve Borgatti, Dr. Jennifer Neville, Dr. Kathleen Hall Jamieson, and the reviewers for their support and guidance on this article.

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DOI: 10.1002/asi

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DOI: 10.1002/asi