

**Framing in Buzz versus Long-tail Journalism: A network
analysis approach for observing setting the media agenda for the acid
rain issue from 1977 to 2009**

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ABSTRACT

The literature argues that the amount of media coverage of issues sets the public agenda. What sets the media agenda appears to largely be governmental communication. It was hypothesized that governmental actors would attract media to the issue of acid rain. Once coverage started, interest groups would push the media bandwagon for wider sectors of society. This creates a climate of “buzz journalism.”

After conflict among interest groups accelerated and the wagon reached optimal speed, governmental actors would brake the issue cycle and media coverage would dissipate. It was further hypothesized that a period of “long-tail journalism” would ensue in which there was little media coverage over the years without this governmental-generated buzz of coverage. The plot of the number of stories per year for the next 25 years showed that there was some coverage but very predictable in its residual factual nature with no hooks to policy considerations. Not until again in 2009 was acid rain connected with a governmental initiative, the “Cap and Trade ”policy” deliberations set in motion by the Obama administration. Coverage of acid rain moved again above the long-tail, although only slightly with weakly organized semantic networks.

To test these hypotheses, coverage of acid rain during 1977—1989 in the *New York Times Index* (459 abstracts) and the *Congressional Quarterly Almanac* (43 articles) were content analyzed to identify co—appearing actors (n=354). These sources were used because electronic access to relevant news documents as not robust. Actor network data

were aggregated by year and actor centrality measured, serving as independent variables in time—series regressions with media coverage as the dependent variable.

The hypotheses were supported. Governmental actors had an elliptical power curve. They appeared to start and stop the media top, but interests groups put the spin on in the middle. Spin, however, was not the only cycle apparent. This suggests a more comprehensive social cleansing model of media agenda setting. What is left after government is done with an issue is the residual core fabric of the content factual content.

Problem Statement

There has been a great deal of attention to the concept of framing in terms of how media represent concepts, actors, and events. In the words of Walter Lippmann, the news is responsible for providing the “pseudoenvironment” upon which we rely to experience and understand events we cannot observe directly. Frames are important in how these events are reported, as they reflect a process of recurring selection and emphasis in communicating perceived reality (Entman, 1993; Gitlin, 1980). Frames present a central part of how individuals cognitively comprehend and file events, and as such, are an important determinant of how a story is told, especially in times of conflicting accounts and factual uncertainty. Framing presents a meaningful, yet in Entman’s (1993) words, fractured, paradigm for communication scholars, as it integrates influences from various disciplines. This is evident in the numerous definitions scholars offer for framing. Despite this widespread attention to framing there is much less attention to what factors influence how the media frame stories and on what sets the media agenda.

Goffman (1974) defines framing as way of classifying that allows users to locate, perceive, identify, and label everyday occurrences. Gitlin (1980) further elaborates on this definition, and understands framing as “persistent patterns of cognition, interpretation and presentation, of selection, emphasis, and exclusion, by which symbol handlers routinely organize discourse” (p.7). A methodologically oriented definition offered by Tankard, Henderson, Silberman, Bliss and Ghanem (1991) conceptualizes framing as “a central organizing idea for news content that supplies a context and suggests what the

issue is through the use of selection, emphasis, and elaboration (p. 6),” while a different one offered by Iyengar (1991) clarifies that framing is a process frequently relying on subtle modifications in the presentation of issues. This research employs the following definition, offered by Entman (1993), for it helps study how different actors and networks of actors converge or diverge on ideological presentations of issues:

To frame is to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described. (p. 52)

Frames can be located in four places in the communication process; within the communicator, the text, the receiver, and the culture itself. In the context of political and mass communication, frames influence how people understand, remember, evaluate, and act upon a problem (Reese, 2001). Therefore, they are particularly important in helping us track and analyze how different actors and networks approach the same political questions.

Given the literature on semantic networks and on seeing framing as based on language choice, it appears fruitful to map framing with semantic-network analysis. Prior to the current investigation, however, only two researchers (Hibbs, 1993; Seidlitz, 2003) have conducted framing studies using semantic networks, both for their thesis research under the author’s direction.

Agenda-Setting & Framing

Framing has been closely connected with media agenda-setting (McCombs & Shaw, 1972; Dearing & Rogers, 1996), but almost exclusively on the influence of news

coverage on audience perceptions of issue importance, not how sources' framing of news affects media framing, or elite media framing influences framing by other media.

Framing has been used to explain why media to audience agenda-setting processes occur (Iyengar, 1987; Entman, 1993; Scheufele, 1999; 2000; Reese, Gandy, & Grant. 2001).

The link between coverage and audience perceptions is based both on story prominence, defined by amount of coverage and closeness to the lead story position, and on how the content is framed. Important to framing is how positive or negative the narrative is how the actors and events are characterized as good and bad.

In addition, researchers' choices of media venues are often limited to the most popular or elite (Reese, Gandy, & Grant. 2001). Such a focus makes sense to the extent that there is a higher-order agenda-setting among media such that once elite media frame a story, other media outlets follow suit (Shoemaker & Reeves, 1996; Miller, Andsager & Riechert, 1998). This can justify studying those media that are most influential in initial framing of stories. Further leading to a limited focus in framing studies is evidence that only a small percentage of news stories are reporter initiated, for example approximately 5% on CNN (Livingston & Bennett, 2003). It is likely, therefore, that framing effects on the media are often stimulated by public relations/public affairs activities (Danowski, 2008). When not reporter-initiated, news stories typically include the originating public relations/affairs message frame.

The current research analyzes a wide range of media documents aided by automated semantic-network analysis tools. We therefore connect with Bainbridge's (2004) assertion that semantic analysis is the most promising way to study cultural

evolution, manifested here in how changes in news story framing are represented by evolution of semantic networks.

Change over time is no stranger in the audience agenda-setting/framing literature given the empirical evidence that news story prominence and framing changes first; after which there are changes in audience perceptions of the issues covered. Nevertheless, the time periods researchers cover are not very long. Studies tend to set the time frame according to the typical story life-cycle, which is of relatively short duration, normally on the order of days or weeks, not years, except in unusual cases such as the O.J. Simpson trial.

The current research assumes that investigating time-series over relatively longer periods, in this case 32 years, is desirable for testing hypotheses about change in framing and also for generating potentially new theoretical insights. With a long time window, it is more likely that changes in frames and related variables are observed. It can also reveal changes in the underlying qualitative form of the relationships.

The value of such a long-term, multi-media, inductive approach as has been exemplified by work such as Entman and Rojecki's (1993) study of framing of the nuclear freeze movement over a three-year period, Hibbs' (1993) study of framing in 10 years of U.S. steel trade policy coverage, and Ashley and Olson's (1998) study of framing of the women's movement over a twenty-year period. The current study examines documents from initial increases in media coverage of a new communication technology, Second Life®, through 25 months of subsequent coverage.

Another factor may account for the short-term focus of prior framing research -- limitations in available tools for profiling story frames, which mostly use human coding.

Longer-term framing studies become more cost-effective with the aid of software that performs some automatic analysis of stories. Large story corpora can be automatically indexed for categorical features such as changes in amount of coverage related to changes in emotionality of coverage, and in changes in the semantic networks constituting frames. Given the importance of negativity in news coverage and deviations from it with introduction of new technologies, changes in story emotionality may mark phase shifts in news framing and coverage. In addition, automatic semantic network analysis for word-pair changes reveals shifts in framing content. Furthermore, node-centric semantic networks tied to a key story word can describe frames in fine-grained detail.

Semantic-Network Approach to Measuring Framing

In contrast to mapping semantic networks, studies of communication campaign effects typically measure the dependent variable using some form of attitude response scales such as Likert-type agree-disagree scales. Media evaluation studies done for quantifying public relations/affairs effects often count only the number of campaign-related stories and their column inches or time length and convert this to what it would have cost if the coverage had been purchased through advertising. Studies of a more academic bent typically measure media content by rank ordering story topics and associating these ranks with audience perceptions of issue importance.

Advancing such approaches may benefit from more refined measures. For example, among the most fine-grained measures of media content are from studies of the linguistic structure of news (Van-Dijk, 1983; Duszak, 1993). Although micro natural language analysis of content moves in the right direction, further improvements can be made by shifting the focus from deterministic analysis of individual news story sentences

to statistical treatment of larger distributions of story content. One way to do this is to perform statistical content analysis of word cooccurrences across a corpus of texts using semantic network analysis. This is useful because it analyzes the full text of documents without selective human coding. Wittgenstein's (1967) conceptualization supports such an approach: "...the word 'meaning' it can be defined thus: the meaning of a word is its use in the language" (p. 20). Firth (1957) characterized Wittgenstein's approach with a similar, although more slogan-like statement: "You shall know a word by the company it keeps!" (p. 179). These conceptualizations support the approach that social, rather than idiosyncratic meanings are recoverable from semantic-networks of word cooccurrences from text without need for discourse with social agents who produced the text or with readers or viewers of the messages to determine cultural and social levels of meaning.

WordLink is the semantic network analysis software used in the current research. It measures the co-occurrence of words within a proximity window. It has been effective in a variety of studies (Danowski, 1988; 1993a; 1993b; 1999; 2007; 2008a; 2008b; 2008c; 2008d; Danowski & Edison-Swift, 1985; Danowski, Gluesing, & Riopelle, 2008; Hibbs, 1993; Lind & Danowski, 1998; 1999; Rice & Danowski, 1991; 1993; Seidlitz, 2003; Zywica & Danowski, forthcoming). WordLink provides a more comprehensive and sophisticated analysis than the "bag of words" model demonstrated by Kostoff, Koytcheff, and Lau (2007b) and most researchers in information science. In using a network rather than distance model like Catpac

One of the most used methods, mainly by its originator and his students, is Catpac (Woelfel, 1993; Doerfel, & Barnett, 1999). When first introduced it used a "bag of words" approach to cooccurrence, treating words as linked if they appeared anywhere in

a document. Later Catpac implemented Danowski's (1993) word proximity approach, after head-to-head tests showed the proximity approach to be superior. After identifying word cooccurrences, Catpac then applies neural network modeling to estimate the probabilities of words being associated or not associated, then performs a hierarchical clustering analysis to identify groups of words, followed by a multidimensional scaling distance model to show words positioned in a three-dimensional space. With such a distance model, two words with similar profiles of links to other words would appear close in space, yet may not be themselves linked. In contrast, a linkage model rather than distance model, such as used by WordLink, Crawdad, and AutoMap (discussed shortly) maps the actual connections among words. This allows use of optimal graphic layout software, such as Netdraw (Borgatti, 2002) based on a spring model (Kamada & Kawai, 1989). This model treats each link among each pair of words as a spring whose strength is the relative frequency of cooccurrence. When all springs are released from a fixed position the nodes move to their optimal locations in a two-dimensional plane based on the net effect of all of the spring forces. Another improvement over distance models is that linkage models show the actual links among words. One could combine both models by computing the shortest network paths among all words, called the geodesic distances, and scaling this measure of linkage in a distance model, but it still would not show the actual linkages among words.

Another approach in communication that we tested is Centered Resonance Analysis (Corman, Kuhn, Mcphee, & Dooley, 2002) as implemented in the program Crawdad. The authors argue that Danowski's approach ignores syntax and is therefore inferior to their approach which implements parts-of-speech parsing of text. Nevertheless,

when WordLink is set to maintain word order of pairs, then aggregate representations of syntax can be recovered. Syntax is not ignored. Optimal messages summarizing text are nearly grammatically correct. Danowski (1993) reports that use of his optimal message creation software using text from 500 responses to an open-ended question about what “customer satisfaction” with a new automobile means. An optimal message is a string of words that would be predicted to move a selected concept, in this case “customer satisfaction” with new automobiles closest to the center of the word-network. The optimal message identified through shortest-path analysis was: “Good—service— new— car--done—right—time—first. All that is needed to smooth this into a grammatical statement is to insert the article “the,” the pronoun “your,” and the preposition “on,” because these categories of words were removed by a stop list in initial processing. One would also flip the order of “time first” to “first time” to produce the statement:

“[Customer Satisfaction is] good service on your new car done right the first time.”

Having a dealer use this statement to describe their service would be predicted to increase their customers’ satisfaction, provided it had enough truth value to maintain acceptance.

Nevertheless, Corman, et al. (2002) analyze only noun phrases and ignore verbs and their modifiers and other words not in noun phrases. Because Crawdad excludes predicate phrases it fails to represent agent actions. Action and its modifiers seem to be important to social meaning and to creation of optimal messages. The output only reports the top 30 noun phrase words and pairs. The graphs of networks that Crawdad produces do not use a standard optimization algorithm and are difficult to comprehend, often looking like a bowl of spaghetti. Functionality is also limited. Crawdad took 116 times as long to run each small 1 megabyte text file as WordLink ((3.5 minutes compared to 1.18

seconds). WordLink's quickly processes files of over 700 megabytes in size, constrained only by available storage space, not by the program operations.

AutoMap (Diesner & Carley, 2004), based on Carley's (1993) theory of concept mapping from text uses Danowski's proximity algorithm. AutoMap has many desirable options, and computes standard network indices. The program's main limitation is its running time, even for relatively small files. Using the same 1 megabyte test files, we found that the program ran overnight and had not yet produced output by morning before we terminated its running.

The WordLink program tabulates the cooccurrences of words appearing within a specified distance from one another in the documents. The optimal word window size has been found to be three words before and after each word in the text for a functional word window size of 7 words. A stop list of 577 words was used that removed articles, prepositions, connectors, and other function words that do not have much semantic meaning. Proper names of individuals or organizations were retained in the analysis.

The word-pair data were input to UCINet (Borgatti, Everett, & Freeman, 2002) and NetDraw (Borgatti, 2002) to map and measuring the structure of the networks. Although these programs were designed for social network researchers to study individuals or higher-level social units as nodes. Instead, we use them to treat words as nodes and their cooccurrences as links, with frequencies of cooccurrences as link strengths. This is valid because network analysis software uses general procedures with origins in graph theory and these are not sensitive to the type of input data.

Semantic Network Evidence for Framing

Research by Hibbs (1993) using WordLink for semantic-network analysis of word cooccurrences across news stories found evidence of a semantic framing effect over 10 years of news coverage about U.S. steel trade policy in national newspapers. This broad category of content was studied over a yearly time series. Framing reduces the variety of associated words and increases their link strength. The concept networks reflected in news stories become more coherent and simple as time passes. There is less equivocality and polysemy in meaning as the range of associations of the key words to others declines. At the same time, the frequency of usage of the key words increases as they decrease in variety of linkage. Such was the effect observed in Hibbs' study.

Whereas Hibbs studied the structure of semantic networks as evidence for changes in framing over time, in contrast, the present study investigates not only the changes in frames but also the semantic content of the frames at the micro-level of two-word phrases. It is possible that semantic framing effects may occur at both macro and micro levels.

In that this study uses a new approach to frame identification it is appropriate to stay within the domain of content analysis of media messages, rather than linking framing to audience perceptions. If this approach to framing is found valid and useful, future research may link semantic-network framing methods to studies of audience's open-ended discussions of the relevant media coverage and use network similarity metrics, such as quadratic assignment procedure (QAP) correlation and regression, to code the degree of correspondence of the networks derived from messages to the networks derived from audience discussions of the content

Hypotheses

Based on the conceptualizations presented above, it is assumed that changes in the relative frequencies of word-pairs in message content indicate changes in framing:

H1: Over a relatively long time period, different frames are observed in coverage

There are numerous studies of media coverage effects on audience agendas. As the literature reviewed later in this paper suggests, a revised agenda for agenda-setting research is warranted. Prior research ignores networks of relationships at several levels. It treats units of analysis atomistically, instead of in terms of networks of relations within and across them. Audience interpersonal networks about topics of interest are not investigated, nor are audience's cognitive networks of issue—relevant domains. Media content is not treated as networks of topics. Rather, issues are looked at list wise in terms of amount of coverage. What topics are treated in relation to what other topics is not considered. Moreover, networks of relations among workers within media organizations are ignored, as are media organizations' boundary-spanning and interorganizational networks.

Another characteristic of agenda setting literature is its audience-centered nature. Although there is a considerable body of literature studying the links between media coverage and audience agenda—setting, there is little treatment of how the media agenda comes about, treating media coverage as the dependent variables. What factors drive the nature of media content over time? It is plausible that some forces emanate from within the media system. These may be based on journalistic norms and values that guide news selection and treatment. Other forces may be exerted largely from external factors. Some of these may derive from actions within audiences. Yet others may originate with actions of media sources.

Sometimes the audience—based forces on media agenda—setting are highlighted by media spokespersons when subject to criticism about their coverage. “We are giving the audience what they want to know about.” This is a sort of audience feed forward process, in that it involves managers anticipating what audiences want. An audience-based factor may also involve actual audience feedback, through phone calls, letters, or audience research used by the media organization.

Media organizations are usually treated as autonomous “black boxes” by communication researchers. Their inputs are largely unexamined. Their interiors are not investigated. Their outputs are taken as given. Moreover, media content is “brown—bagged.” If it is studied, it is usually plainly partitioned into simple packages of topics.

If we open the black box, visible are several classes of potential explanations for what sets the media agenda. One is an explanation that would center on journalistic norms that influence the decisions that reports and editors make about what is news and how to treat it. In this sense news is influenced by internal system factors. These would operate disconnected from audience feedforward or feedback. At the most surface levels, such an effect would come from media monitoring other media to see how they are treating an issue, and then following suite. At a deeper level, basic values and norms accepted by the journalistic profession provide guidance while making decisions about news. From a critical perspective, these norms and values are thought to emanate from a symbiotic relationship with dominant capital interests whose values the media are designed to further and support.

Nevertheless, media may have certain ritualized practices such that once coverage of an issue begins there is a predictable course for later coverage. The media may be self-

correcting, in effect fitting a set of rules or norms to the environment, and producing a standardized body of content. This kind of feedback is different from that obtained from or exerted by the audience on the media. Instead, this feedback is reflexive. It comes from within through media system observing its internal processes.

Besides the reflexive effect, there is the reflective effect. This comes from the media's "objective" reporting of what goes on out there. Another kind of perspective is more exogenous, entering on the influence of organizations and individuals that provide information to the media. It is argued that information agents external to the media, such as public relations or public information officers, exert considerable influence over news content (Mannheim & Alibritton, 1994) Public relations practitioners help direct attention of news organizations to particular issues, and provide background information, sources, and interpretations. Informally, we can call this the "spin doctor" effect.

Specific Focus of this Research

Intuitively, it would appear reasonable for each of these three sorts of explanations---1) external agents, 2) media reflexivity, and 3) audience feed forward and feedback---to operate simultaneously. The goal of this research is to determine whether there are regularities in news coverage over time, which may be due to either the external agent effects, or to the media reflexivity effects. Sorting out the relative external and internal dynamics should proceed only if it is found that there is some significant association between actor networks revealed in the media and subsequent media coverage.

Other problems with agenda-setting research are more methodological than conceptual. There is usually a limited over-time perspective. Many studies are merely cross-sectional, while others that do study phenomena over time do so at only two points

in time. There is little longitudinal research over a period of years, except the work of Rogers, Dearing & Chang, (1991), who studied the AIDS issue through the 1980's.

Similarly, a goal of this research is to study media content about an issue over a period spanning a decade for one phase of the analysis and then for an additional 25 years.

In short, methodological problems of agenda-setting research are that: 1) it generally studies only a few points in time, 2) treats media organizations as black boxes, “ 3) treats content as “brown—bagged” by categorizing issues simply, and 4) operationalizes the process of agenda setting in atomized, instead of network fashion.

Literature Review: Agenda-Setting Research

Agenda-setting was initially studied from a political communication perspective.

McCombs and Shaw (1972) tested the theory by investigating what Chapel, Hill, N.C., “voters said were key issues of the 1968 presidential campaign with the actual content of the mass media used by them during the campaign. Their findings suggest that the media “play an important part in shaping . . . reality. Readers not only learn about a given issue, but also how much importance to attach to that issue from the amount of information in a news story and its position” in a newspaper, magazine or broadcast.

Researchers have treated the dimension of time in agenda—setting, although in quite a limited sense. Kaid, Hale, and Williams (1977) focused on the agenda—setting effects of information presented to the public about a specific event at one point in time. They were unable to successfully find evidence in support of their agenda—setting hypotheses, but offered a rival explanation: The public had already set their own, different agendas. In a more empirical vein, in terms of information about a national election over time, Stone and McCombs

(1981) suggest there is a two-to—Six month period for the transmission .
of mass media agenda to the public agenda. However, they question
whether the transmission is a matter of time “before an issue sinks in,
or if the process is one of redundancy—the continued hammering of media messages.”

Watt and van den Berg (1981) found evidence of strong agenda-setting effects in
the initial stages of a controversy, and found that agenda-setting as a media effect
overtime abates after six months. They suggest that there exists a ceiling of information
that the public can tolerate after which no change in audience behavior occurs due to
information overload. Nelson (1990) offers the notion of Anthony Downs’s “issue-
attention cycle” as a rival explanation. According to Downs, political issues become non-
issues when it becomes evident that the solution to a problem hinges on the economic
sacrifice of the public, or simply “when media coverage begins to bore an ever-restless
public” (Nelson, 1990, p. 84)

Atwood, Sohn, and Sohn (1978) examined the extent to which a newspaper’s agenda
would correlate to a community’s reading and conversational agendas. The content of
five different story types--international, national, state, regional and local
news--revealed that agend-setting effects were strongest in discussion of non-local news.
The researchers noted, however, that they questioned whether their cross-sectional results
indicated media effects or evidence of “uses and gratifications,” referring to the theory
that audiences choose the medium that best responds to their immediate needs. Perhaps
because of these findings, Sohn (1984) elected to investigate the influence of agenda-
setting for an obtrusive issue, one that people in a small community have direct, regular,
and in this case, negative experience. The results supported the agenda-setting theory.

The media admitted they were providing the positive agenda they thought their audience wanted, and the audience followed that agenda despite having contrary experience.

Iyengar and Kinder (1986) similarly found that agenda-setting effects are more powerful when an audience is personally affected by an issue. As for unobtrusive issues, Atwater, Saiwen & Anderson (1985) found only moderate support for the transference of the media agenda to the public agenda.

However, these findings conflict with the earlier research of Weaver, Graber, McCorabs, and Eyal (1981) on the 1972 presidential election. Here strong agenda-setting effects emerged for unobtrusive rather than obtrusive issues (p. 50). The researchers theorize that the public does not require the media to tell them that an issue is important when that issue is one already embedded in their personal agenda. What we can infer from the research of Atwood, Sohn & Sohn (1978), Weaver, Graber, McCombs & Eyal (1981), Sohn (1984), and Iyengar & Kinder (1986) is that issue obtrusiveness varies over time and in light of the social context at a given time (Graber, 1984, p. 106).

The study of obtrusive vs. unobtrusive issues as a variable in agenda-setting presupposes that different publics distinguish these issues. Thus, many researchers have found it necessary to categorize publics along psychological, sociological and demographic lines. Tichenor, Donohue, Olien, and Bowers (1971) suggest that it is difficult to make generalizations about any of these variables in the public makeup because public opinion can be driven by community self-interest in one case, and by socioeconomic status in another case. Similarly, Starum and J. Grunig (1977) could not find support for “the attitudinal notion that individuals will respond consistently across issues If anything, the findings show how unpredictable people are. A conservationist

on the water pollution issue is not necessarily a conservationist when it comes to energy.” Nevertheless, in investigating electoral behavior for instance, Tardy, Gaughan, Hemphill, and Crockett (1961) delineated publics according to their degree of participation in the political process. They found that political participators are less influenced by media agenda-setting than were political inactives. Leff, Proress, and Brooks (1986) *also* found that a public with less knowledge of and less sensitivity to an issue would be more likely to be influenced by subsequent media coverage.

Over the years, Grunig has made several contributions in the task of defining publics in the environmental arena. His 1974 study categorized publics into “decision types.” He suggests that problem solvers are also information seekers, and that information seeking can be correlated with such demographic variables as education, gender, occupation and income. Grunig (1976) further suggests that understanding the interaction of three audience variables--problem recognition, the existence of constraints, and the level of involvement--can facilitate predicting agenda-setting effects. Proceeding on the assumption that different publics evolve from different issues, Grunig (1983) reworked his 1974 categorizations and redefined publics as either active or unconcerned. He theorized that for each environmental issue an active public emerged from two prior stages. A latent public does not recognize an issue as problematic. When this group eventually becomes cognizant of the issue as problematic, it evolves into an aware public, which in turn evolves into an active public when the group organizes to discuss and attempts to resolve the issue. More recently, J. E. Grunig, Nelson, Richburg and White (1988) found support for this generalization of four kinds of publics: 1) Publics active on all issues dealt with in the study; 2) publics apathetic about all issues; 3) publics active on

only one issue that affects nearly all the masses; and 4) publics active on single issues that affect a small part of the population.

Most research on the media and public agendas has been one-directional, focusing on media agenda-setting effects on the public agenda.

The underlying notion in the review of the literature on the public agenda thus far seems to focus on when and why the public is receptive to some messages from the media and unreceptive to others. The research on what drives or impacts on the media's agenda is far lacking in comparison. One reason the study of agenda setting by the media evolved may have been because of the love-hate relationship the United States publics have with the press. The "power of the press" can mean freedom for all to some and brainwashing of the masses to others. The question here is: Where does the media's agenda come from?

Gans (1980) as attempted to shed some light on the multitude of reasons that some stories thrive while others never see print. He has chastised the research community on the lack of focus on what kind of reporter, beat or specialized, cultivates what kind of source, and, in turn, what kind of group cultivates the press, with what agenda (p. 360). The work of Cole (1975), Sachsman (1976), Starck and Soloski (1977), Schoenfeld (1979), and Peterson (1981) are illustrative of research available on the journalist.

Cole (1975) found evidence of an increase in the watchdog function of the press when reporting on science during 1951--1971. Starck and Soloski (1977) examined reporter predisposition, categorizing them according to their feelings about a controversial news event and according to their views on the role of the press in society. The stories judged as most objective, accurate, comprehensive, and fair were produced by

writers who opposed or denied the watchdog function of the press. In exploring what international news gets printed in the developed countries, Peterson (1981) suggests that the Western press exhibits a sort of First World-ethnocentricity in its lack of attention to news from the Third World. She also suggests that the agenda-setting ramifications of this on the public and policymakers are important and worthy of future research.

Interestingly, Cole (1975) also found evidence that science writers were less prone to report the controversies of science than were general staff reporters. Cole theorized that the science writers' allegiance with scientific groups deterred them from breaking controversial stories. Nelson (1990, p. 88) notes that the mass media regularly monitor professional and scientific journals for story leads, and suggests that agenda-setting effects could probably be found in this ignored relationship between journalists and professional outlets. Sachsman (1976) surveyed San Francisco reporters and editors to see where their information for environmental stories originated, and found that a great deal of it came from press releases sent them by government agencies, pressure groups, industry, and other institutions such as universities. We can infer from the Cole (1975) and Sachsman (1976) studies that reporters, who expend much time and effort screening sources, cultivating appropriate ones, and maintaining dependable ones, may find their journalistic ethics challenged at times.

Another aspect of the press implicit in Sohn's 1984 research and noted by Mannheim (1987) is the observation that the dominant media are commercial businesses that attract and sell audiences to advertisers. Attracting desired audiences to be caught, counted, weighed, and sold by the thousand requires some preparation of media content as suitable audience bait. Pollack, Robinson, and Murray (1978) findings supported the

proposition that media serving an area with homogeneous demographics are more likely to cater to those particular needs than media serving an area with a diversity of demographics.

Little agenda--setting research to date has been designed utilizing the mass media as a dependent variable (Rogers and Dearing, 1988). Like research on the media and public agendas, the study of the media and the government or policy--making agendas has centered on media effects. Schoenfeld (1979) for instance found that not only the daily press but specialized environmental periodicals ignored the crucial pending legislation of the National Environmental Policy Act of 1969. The results suggest that, in this instance, Congress had set its own agenda and acted upon it without the input of the media or the public.

Cook, Tyler, Goetz, Gordon, Protess, Leff, and Molotch (1983) examined the impact of the news media on decision makers, and found that governmental policy makers were influenced by media presentations, but that interest group decision makers were clearly not. According to the agenda--setting theory, issue salience can be transferred simply by reporting that a planned event took place. Their findings further suggest that while media reporting of a political story did affect the public agenda, it was not the airing of the story that caused the effect: "Rather, it was the ongoing collaboration of journalists and their sources government staff members" (Cook, et al., 1983). Sachsman (1976) is one of the few researchers to suggest an influence of the government on the media. His aforementioned survey of San Francisco reporters and editors showed that the majority of press releases issued to them and used by them were sent by

government officials and agencies. Gilberg, Eyal, McCombs, and Nicholas (1980) hypothesized that, as the top newsmaker in the United States, the president is in a powerful position to make his agenda that of the media. Their study of Pres. Carter's 1978 State of the Union Address, however, showed that the press may have set the agenda for that message.

There is virtually no research available that was designed specifically to study public relations as a dimension of agenda—setting, so we know little about the impact of internal and external public relations efforts on the media, public, and policy agendas. Although Stocking (1985) expected to find a correlation between public relations efforts and visibility in the media, the results showed no public relations effect on media visibility, or, therefore, the media agenda. However, Sachsman (1976) found that public relations efforts had a very real impact on the amount of press exposure given to environmental issues in San Francisco.

More recently in the study of organizational communication, Danowski, Barnett and Friedland (1987) found a link between organizations sharing public relations counsel and the amount of business press coverage these organizations received. Their network analysis showed that firms more centrally located in an interorganizational network of shared public relations firms enjoyed more press exposure.

Stoltz (1983) suggests that if public relations efforts are to succeed, they must be geared to the formation of public opinion rather than merely being reactive to public opinion. He further opines that only as long as public opinion about a subject is unorganized is there an opportunity to penetrate and shape the public agenda. L. A.

Grunig's 1987 investigation of public relations practitioners' perceptions of their relationships with their various external publics showed that the most autonomous and cooperative one was seen as that between the organizations and the mass media. Perhaps we can infer that if public relations professionals did not think they were being successful in getting their agenda across to the media, this perception might be very different.

Like Cook, et al. (1983), Mannheim and Albritton (1984) suggest that it is a combination of the media and governmental agendas that are passed on to the public. They posit that because of language problems and the inherent dangers of reporting from unstable Third World arenas, the press is dependent upon officials of those governments for information. Conversely, those officials are dependent upon the Western press to disseminate their agenda to the rest of the world. Mannheim and Albritton (1984) noted that between 1974 and 1978, 23 nations contracted with U.S. public relations firms to help improve their images within the American press. The researchers suggest that this not only gives credence to the notion of mutual manipulation between the Western press and the Third World, it implies yet another agenda--that of the public relations counsel. These studies have addressed the issues of agenda--setting theory, different publics, and different types of agendas. It has been theorized that agenda-setting entails the interaction of a triad of agendas--that of the media, the public, and policymakers (Mannheim, 1987). It has also been suggested that public relations may impact on these agendas (Mannheim & Albritton, 1984). However, as noted earlier, a good deal of the research has concentrated on media effects rather than on what part, if any, the agendas of the policymakers play in driving the media agenda.

Another dimension considered in this research is the notion of "spin doctors," a phrase

which Safire (1986, p. 8) credits the *New York Times* with coining during coverage of a Reagan--Mondale debate in October, 1984. Spin doctors are typically communication specialists or advisors, who are employed by various government agencies or who support special interest entities. It is a generally accepted concept today that the job of spin doctors is to impart a timely twist or spin on a news story, which will afford the story optimal placement within the electronic or print press.

More importantly, the efforts of the spin doctor will result in a story that will redirect negative press to a more favorable representation of that agency or interest group. Smith's (1988, p. 410) depiction of the spin doctor is told through an interview he had with Sam Donaldson, former ABC White House correspondent during the Reagan administration. According to Donaldson, whenever David Gergen, then Reagan's director of communications, sensed through his contacts, that a negative story was in the offing, he would phone Donaldson at deadline to impart a favorable slant to the story, which Donaldson felt compelled to report. Although no formal "Spin Theory" has yet been developed, nor any model proposed of the role spin doctors play in the flow of information, the research here assumed that network analysis of organizations and individuals in news stories can aid in exploratory analysis toward formalizing such a theory.

Hypotheses

A recurring theme in the literature for which there is not a widely accepted answer appears to be the question: "What stimulates media coverage?" The findings of Pollack, Robinson, and Murray (1978) and Sohn (1984) suggest that there are times when media coverage may be seen merely as a reflection of the media reporting what they think their

audiences want to hear or see. The functionary role of the media as a conduit for the agendas of others may also be inferred from the collaboration between journalists and government sources found by Cook, et al. (1983), Sachsman (1976), and Manheim and Albritton (1984), as well as from the collaboration between journalists and professional outlets noted by Nelson (1990, p. 88). It has also been suggested by Manheim and Albritton (1984), Sachsman (1976), Stoltz (1983), L. A. Grunig (1987), and Danowski, Barnett and Friedland (1987) that a causal link exists between the public relations community and the amount of media coverage.

Further, a function of the press in the United States is to inform the people about the goings on of the government. Although Watergate and the Vietnam War are instances where the press and government were polarized, the government generally enjoys the cooperation of the media in reporting to the people, as most visible in the reporting of the military actions of the U.S. in Grenada, Panama, and the Desert Storm campaigns.

Speaking more generally, Gans (1980, p. 291) goes so far as to say that, “The *New York Times*, the Washington Post, The Wall Street Journal, and a handful of other print media are...professional newsletters for public officials.” Nevertheless, the importance of governmental officials as sources of information to the press has been supported here by the findings of Sachsman (1976), Cook, et al. (1983), and Manheim and Albritton (1984). Danowski (1988) has used automated network analysis to identify key actors in news stories, and network analysis should enable us to delineate non-media actor networks and trace the direction of their respective agendas. Therefore, it is posited that:

H2: The more central governmental actors are in the network, the greater the increase in media coverage.

As Grunig's 1977 and 1983 studies showed, different publics emerge for each environmental issue. And, as with any public issue, there are "different sides" to an environmental issue regardless of whether one's agenda is that of the media, publics, or the government. An axiom stressed by the U.S. media culture and expected from them by the public is that the press present both sides of a story. Despite the suggestion underlying the findings of Peterson (1981), Starck and Soloski (1977), Cole (1975), and Sachsman (1976) on media sources and reporter predisposition, whether purposefully or not, the public may not always be getting all sides of an issue. It is expected that as the degree of balance between sides of an issue increases, media coverage increases. Therefore, it is also posited that:

H3: The closer the ratio of policy actor centrality to other agenda group centrality, the greater the media coverage.

After the withdrawal of governmental actors from a news domain, we conversely expect that the story for practical purposes "dies" and that there is only cursory residual coverage after that has occurred. This can last for long periods of time. Here we examine a 25-year period and plot the number of unique words in stories about "acid rain" over the time-span. We expect the number of unique words to decline. This would result in stories that repetitively use the same residual words, functioning as journalistic facts created during the buzz period of journalistic coverage when there were large numbers of stories about the topic, framed by the governmental actors, then left as the residue of period of activity once government and policy actors had withdrawn from the buzz period. The media can be expected to reproduce these residual story contents as brief "givens" about the topic, while there is no subsequent infusion of governmental

activity regarding the topic. Only when that occurs can we expect a change in the reproduction of the residual frame of the basic facts about the concept.

H4: After governmental actors have withdrawn from the buzz period of journalistic coverage, a long-tail of low levels of coverage occurs in which a brief residual journalistic fact frame is reproduced over time.

METHODS

Sample

The environmental issue chosen for study was acid rain because the notion was first raised in the late 1960s and there was ample media coverage during 10 years for analysis. The basic research design was, therefore, longitudinal with data collected for content analysis from 459 abstracts found in the *New York Times Index* (1977-1989) and 43 articles in the *Congressional Quarterly Almanac* (1977—1989). A survey of the *New York Times (NYT) Index* for the years 1970-1989 shows that it was not until 1977 that the Index distinguished coverage of acid rain as a separate issue from the category called “Environmental.”

A similar survey of the *Wall Street Journal Index* reveals that acid rain coverage is still indexed under the environmental umbrella with water pollution, ozone depletion, and other like issues. Although the numbers of articles in the *Wall Street Journal* were noted, a pragmatic content analysis to see if we could infer exterior causes and effects was deemed unreliable for the above reason. Further, while abstracts of the

Congressional Record are accessible, the researchers elected to examine the full articles available in the *Congressional Quarterly Almanac*.

The *New York Times Index* and the *Congressional Quarterly Almanac* were chosen as artifacts for analysis for additional reasons: (1) the reputation of the *New York Times* as a primary source of news to the country is exemplified by the fact that other print and electronic media use it as a source for leads on what is to be published or broadcast to the public; (2) its circulation is large and national; and (3) it was among the first major metropolitan dailies to engage environmental writers. Finally, as an annual compendium of the business of Congress, the *Congressional Quarterly Almanac* is an appropriate measure of the policy-making agenda as it pertains to the issue of acid rain.

For the 25 year analysis portion of this study, conducted after online databases were robust sources of content beginning in 1984, the Lexis/Nexis database was used and all stories containing the phrase “acid rain” were downloaded year by year through October 2009. These stories were analyzed by WORDij 3.0 (Danowski, 2009) to compute the number of unique words in each time period. This is taken as a measure of the extent to which the media content became routinized, as the reproduction of the journalistic factual residue frame became dominant after the withdraw of governmental activity. In 2008 and 2009 governmental activity again was observed regarding acid rain and the diversity scores changed accordingly. To illustrate the differences in the word networks, these were rendered for 1984, 2007 (exemplary of the long tail without governmental involvement, and 2008, and 2009 when it re-emerged.

Content Analysis and Network Analysis

Media coverage in the pragmatic content analysis was measured by a manual count of the number of stories on acid rain per year in the sample and plotted to identify peaks and nadirs of coverage (shown in Figure 3, Line Graph of Acid Rain Articles)

Figure 3

Insert Line Graph of Acid Rain Articles About Here

The content of all abstracts from the *New York Times* Index was assigned story code numbers, and the full texts of the abstracts were entered in machine readable ASCII file. Textual data were analyzed with the WORDij word-network analysis software (Danowski, 1988; 1992), and through the NEGOPY Network Analysis Program (Richards, 1986).

The researchers developed a master file of all actors identified by NEGOPY to code and measure the number of actors (n=261), the agenda group to which each actor belonged, and the entry and exit of actors longitudinally. The Congressional Quarterly Almanac articles were manually content analyzed to identify additional actors (n=73) not found in the *New York Times* Index, and agenda groups assigned to these actors along with their entry and exit during the sample period. Of the total number of actors (n=334) in the master file depicted in Figure 4, Actor Master File below, 56 actors co-appeared in both the *New York Times* Index and the Congressional Quarterly Almanac.

INSERT FIGURE 4 ABOUT HERE

Another file of agenda groups was generated to measure the number of agenda groups, and the number of actors in each group per year. Seven agenda groups emerged:

1. Policy actors were defined as elected or appointed individuals or organizations representing domestic or international governments (i.e., Sen. Daniel P. Moynihan or the

U.S. Energy Department).

2. Special interest actors were defined as private individuals, commercial enterprises, or formally organized non—governmental entities with a direct concern about the issue of acid rain (i.e., Michael Oppenheimer of the Environmental Defense Fund or the National Coal Association)

3. Media actors were those writers, reporters or editors identified within the text of any abstract (i.e., Tom Wicker or Nelson Bryant).

4. Education actors were defined either as institutions of higher learning or individuals representing such institutions (i.e., Dr. Carl Schofield of Cornell University or Abraham Rotstein of the University of Toronto)

5. Research actors were individuals or organizations engaged in study of the acid rain issue (i.e., Electric Power Research Institute or the biologist, Thomas Brydes)

6. Expert witness actors were defined as individuals summoned to appear before such congressional committees as the Senate Environmental and Public Works Committee (i.e., Dr. James Galloway).

7. Geopolitical actors were defined as domestic or international geographical areas (i.e., Middle Western States, United States, or Canada). These seven agenda groups are illustrated in Table 2 below.

Table 2 Number of Actors in Each Agenda Group

Hypothesis 1 Test

Figures 7-12 show the semantic networks for the acid rain content of the New York Times for years in which there were major framing changes from 1984 forward. Frequencies of word pairs greater than 10 are shown. The figures reveal changes in the semantic networks that are indicative of changing frames in the media content over time. Hypothesis 1 is supported. [significance tests of the differences in relative frequencies of the word pairs between the networks are available from the authors on request: jdanowski@gmail.com]

Hypothesis 2 Test

Conceptually defined, centrality is an inverse function of the average minimum path distance for a node (actor) to reach all other nodes (actors) in the network through direct or indirect links. Centrality is not the same as frequency of mention, which is not strongly correlated with centrality. Rather, centrality is a measure of structural power. Sometimes powerful actors are mentioned frequently, but under some conditions they are not. This is why mere frequency of mention is not as good a measure of actor potency as actual structural position in a network of actors.

To test the hypothesis that actor centrality is associated with an increase in media coverage, for each agenda actor group the mean centrality was calculated for a each year from 1979-1989. In other words, if NEGOPY identified more than one network group per year, the mean of these standard distances was calculated to arrive at a single centrality score per agenda group per year.

The first analysis was to determine if there were any linear relationships between centrality and coverage in the synchronic mode, and also diachronically through a series of time lags. The results of these correlations appear in Table 3. Geopolitical actors are

the only group with a linear synchronous significant correlation, with $r=.76$ ($p < .01$). This means that within a year, as geopolitical actors are more central in the network of actors across all news stories for that year, there is more media coverage. Centrality of geopolitical actors accounts for 58% of the media coverage, during the time of that coverage, on a year by year basis. There are no significant linear lead or lag relationships for any geopolitical actors.

Because there may be cyclical effects, rather than linear effects, additional analysis was performed. There were not sufficient observation points, only 10, to conduct quantitative non-linear statistical analysis. So, a qualitative analysis was the only alternative. Such analysis is speculative given the scarcity of observations. So, any points made should be taken as suggestive of future hypotheses to be more systematically and validly tested.

The qualitative interpretations were made by examining the lags of media coverage and actor centrality on a series of pairs of comparisons. The direction of the relationship was noted for successive pairs. As the direction changed, the interpretation changed. Figures 5 and 6 were used. These plotted actor centrality by media coverage on a yearly series.

INSERT FIGURES 5 & 6 ABOUT HERE

Examination of Figure 5 suggests that policymaker centrality was associated with an increase in media coverage with a one-year lag at the beginning of the sample period 1979 until 1982. After that, a qualitative change in the nature of relationships appeared. As special interest actors became more central during the years 1982-86, they lead increases the following years in media coverage for that time. Then as policymakers

again became more central in 1987--1988 media coverage declines. This suggests that policy actors may have influence in starting and stopping media coverage of an issue, while special interest actors may have more influence in the intervening period. In short, this analysis suggests that a revision of our initial hypothesis may be in order, for it was not supported in the linear model.

Hypothesis 3 Test

To test whether an increase in media coverage would result if the ratio of policymaker coverage to other agenda group coverage were closer, the researchers first assigned agenda group membership to each actor in a network group as identified by NEGOPY for the years 1979-1989. The average centrality of policymaking actors was then compared to that for each of the remaining six agenda groups per year to arrive at ratios of the amount of coverage afforded all agenda groups. As the centrality of policymakers and special interests became more equal, media coverage significantly increased two years later. No relationships at other time frames were found. A similar pattern was observed for the ratio of policymaking centrality to that of research actor and expert witness centrality in relation to media coverage two years later, but these relationships were not statistically significant due to the small number of observations, 10 years.

Hypothesis 4 Test

Semantic networks from 1991 through 2007 were in a long tail of low frequency news coverage of the issue, except for the renewed governmental consideration of possible legislation concerning

The “American Clean Energy and Security Act of 2009 (ACES)”, commonly referred to as the “Cap & Trade” bill. The bill would have established an emissions trading process like the European Union Emission Trading Scheme. Although the bill was approved by the House it was defeated in the Senate (Wikipedia, retrieved March 24, 2013 from http://en.wikipedia.org/wiki/American_Clean_Energy_and_Security_Act).

DISCUSSION

Summary of Findings

The participation of policymakers appeared associated with a one-year later change in media coverage at the beginning of the sample period, until changes in special interest actor centrality preceded further changes in media coverage during the middle portion of the coverage cycle. The sample period ended with the resumption of an increase in policymaker centrality, and a decrease in media coverage. The results also revealed a significant linear two—year lagged correlation between the ratio of policymaker centrality in the actor network and that of special interest groups.

Geopolitical actor network centrality appears to have a direct short—term association with media coverage of the issue, with a strong non-lagged linear relationship between their centrality and amount of media coverage. It is not clear from the analysis whether this geopolitical actor relationship has any causal production linkage to media coverage, or is a derivative of it. Further research should address this question: why do changes in media coverage appear directly linked with changes in the centrality of geopolitical actors, but not other actors?

Limitations

One limitation results from the selection of content focused on acid rain. It is not known how generalizable results are from this limited content area to others. Another limitation is that the content analysis identified actor networks only. Substantive content of messages was not analyzed. Hence, the relative orientations of different actors to different positions regarding substantive issues were not measured. Moreover, only actors appearing in news stories were observed. Actor networks occurring outside media coverage, yet having possible effects on it, were inaccessible in this study. Furthermore, we do not have data on what motivates policy makers to initiate media agenda-setting.

Interpretation of the Findings Toward a Social Cleansing Media Theory

Interpretation of the over time data in this study leads us to some tentative propositions which we hope will be tested in future research. One notion suggested by the results is that “spin” can be conceptualized at more than one level. Besides the commonly recognized specific story—level spin, there is the more macro—level spin of the overall media “top” as it travels through media space over time. The contours of coverage changes define this spin. Moreover, it appears that “spin” is not the only cycle in media agenda-setting. There are other cycles suggested by the data. These notions can be summarized as a social cleansing model of media agenda-setting.

We can conceptualize the social processes of media as performing a social cleansing function. A metaphor is that the media are a public issue laundromat. Public officials most often initiate a trip there. They decide what issues require social cleansing. They sort the issue “garments” into piles based on related colors of public opinion. Then, they take them to the laundry by holding press conferences, giving interviews, making

speeches, distributing releases, or leaking stories to the press. Government actors select which machines to use, often the *New York Times*, or other elite media, and fill them with issue garments. Then, governmental actors start the machines, adding as detergent some socio-political values that have currency and touch currently sensitized emotions.

As the number of stories rises to fill the media tub—the short—term news hole—the agitation cycle begins. It is at this cycle when the interest groups wishing to participate in the public opinion laundering process emerge most visibly and forcefully. They set the media machines' agitator blades moving back and forth, as point and counterpoints are made by agents of various interest group agendas-. This agitator cycle serves to flush out an assortment of opinion particles from the issue fabrics. Then, after agitation has reached threshold, the spin cycle begins. At this stage, the assortment of opinion particles is interpreted into some coherent explanation or “story” that ties key opinion particles together.

At this point, coverage volume accelerates as a shared meaning or interpretation develops for the collection of issue—relevant information that agitation has brought forth. Once this common interpretation starts to emerge, spin increases. The greater the shared interpretation, the faster the spin and the more the media coverage per unit of time that reflect these perspectives. Then, spin reaches a peak at social consensus among actors, and winds down to the rinse cycle.

At rinse, the interest groups actors introduce clean water, in the form of a renewed output of news releases and other such information. These seek to reposition the groups in the wake of the prior spin cycle.

Following this is another spin cycle, less dramatic and less fast than the penultimate one. After the second spin cycle, governmental actors again exert a dominant role in resolving the issue, drying the *issue* garments, ironing some, folding them and putting them away through eventual policy, executive or legislative programs and actions. The social cleansing process is completed for a time. The story theme is hung out to dry on the “clothesline,” a relatively flat line of coverage with reach from the ground.

Conclusion

This research has taken a network approach to examining agenda—setting effects in media. Content analysis was performed to identify all pairs of actors linked in news stories over a 10 year period for the issue of acid rain. Year-by-year network analysis was performed on these actors. A structural property of the network, actor centrality, was measured for each of seven types of actors. Time—series analysis was then conducted linking actor group centrality and media coverage.

Results supported the interpretation that governmental actors exert influence over the cycle of media coverage for an issue, in this case Acid Rain. Also, the more balanced the centrality of governmental and interest group actors, the greater the later media coverage.

Qualitative interpretation of the data led us to suggest a spin theory of media agenda setting. This model, having more cycles than simply spin described a hypothesized process of media agenda setting that fits a social cleansing model. Media may be characterized as serving as a political Laundromat. the system. Primary

responsibility and duties for laundering rest with governmental actors, but interest groups assist once the machines are loaded and started, until governmental actors decide adequate cleaning has been completed. Future research may empirically test a new and improved social cleansing model of media agenda-setting. Results may be cleaner and brighter.

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Figure 1.

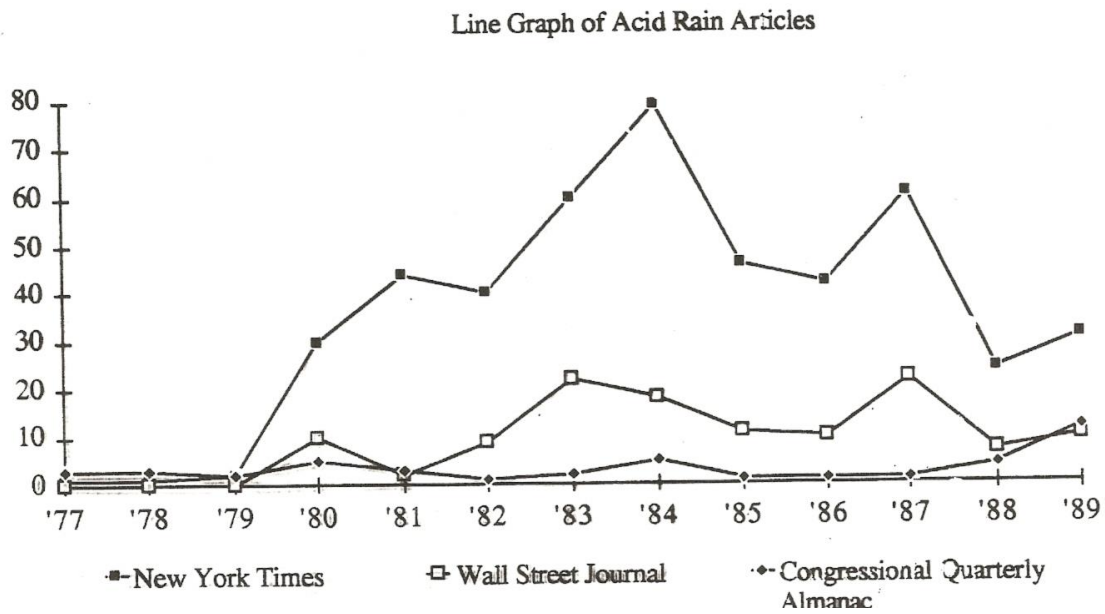


Figure 2.

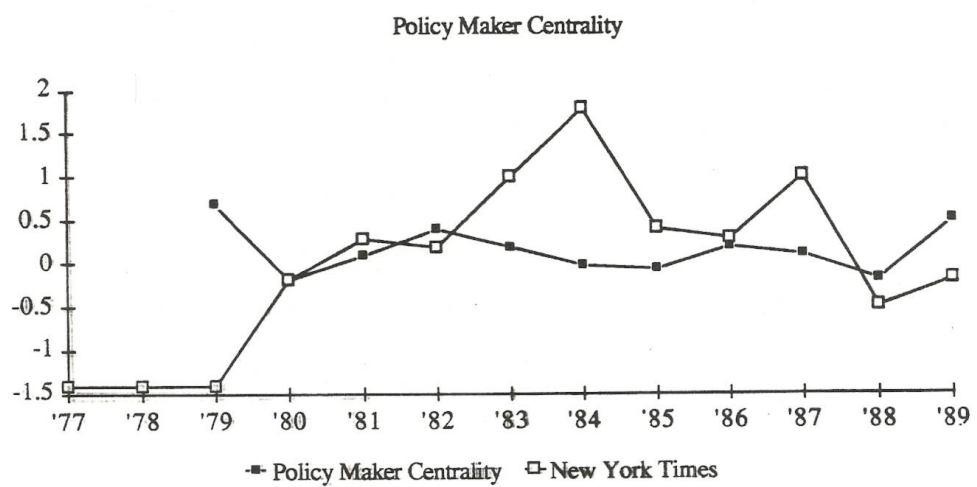


Figure 3.

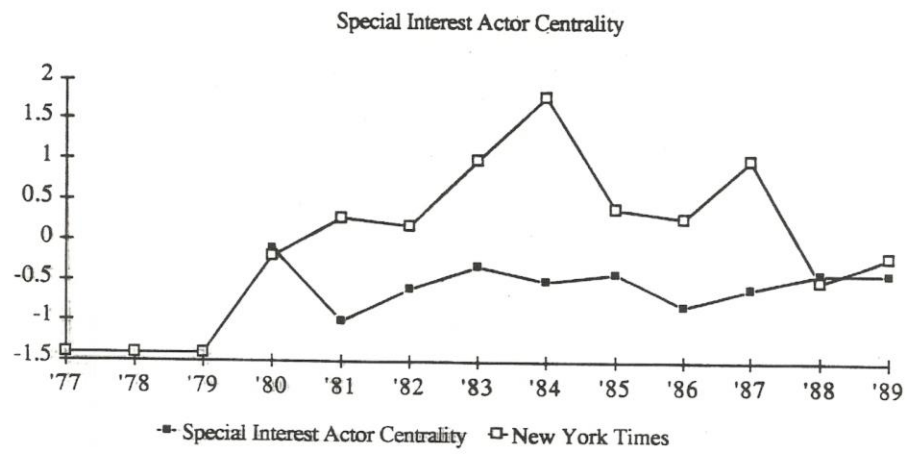


Figure 4.

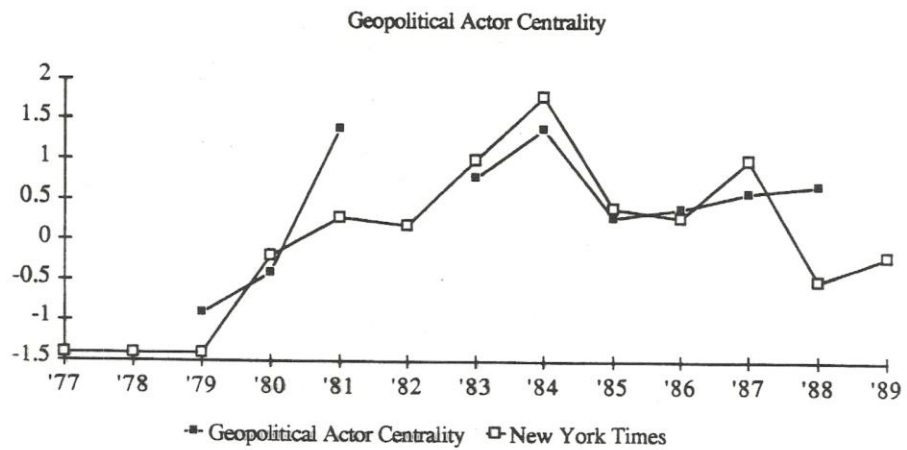
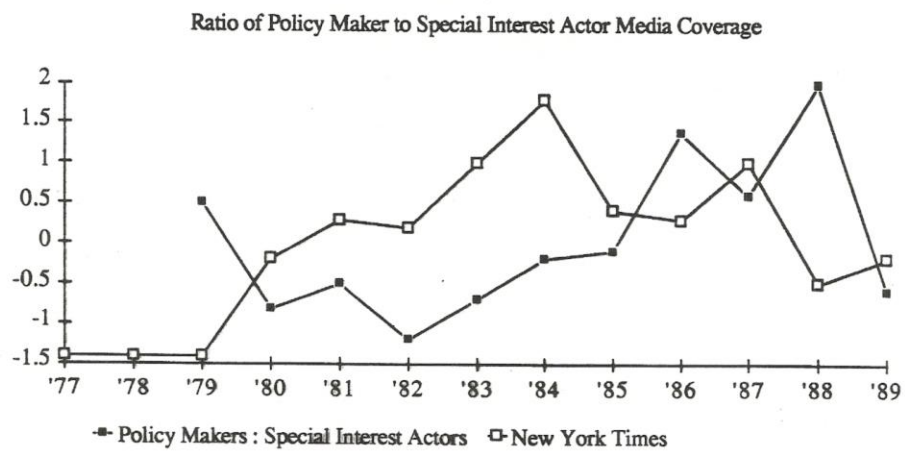


Figure 5.



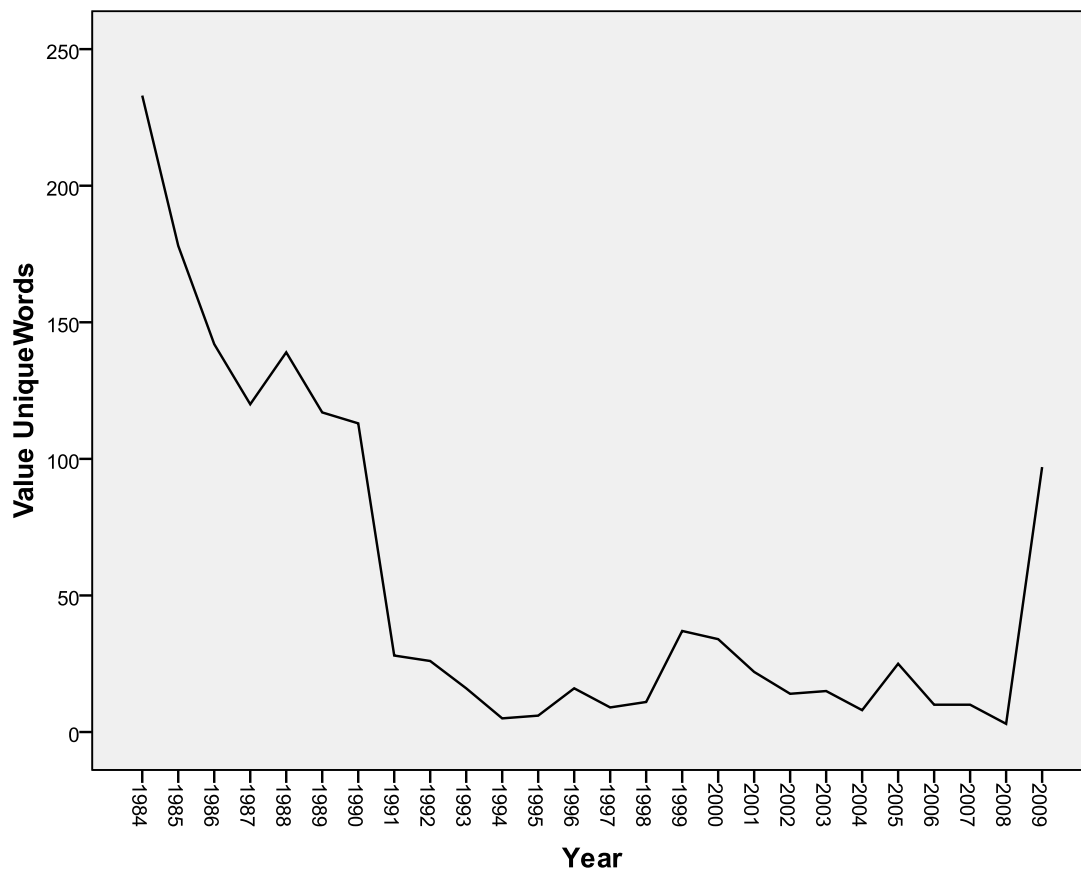


Figure 6. Number of Unique Words within Five Steps of "Acid Rain"

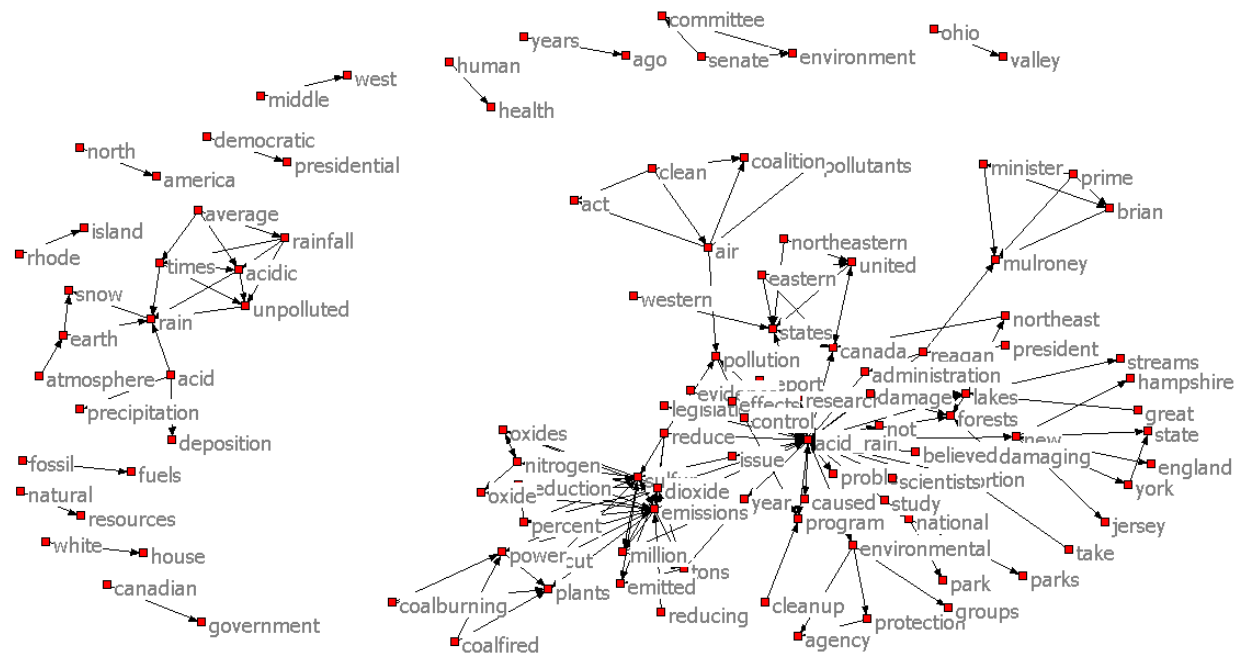


Figure 7. 1984 *New York Times* Coverage, Frequencies GE 10

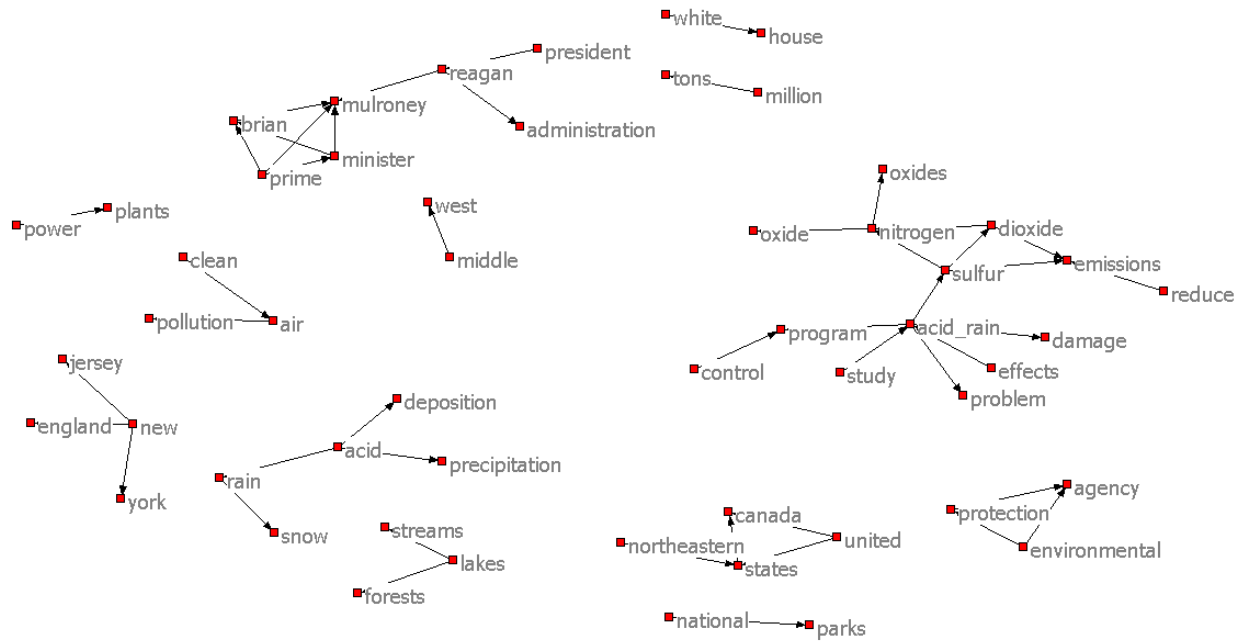


Figure 8. 1985 *New York Times* Coverage, Frequencies GE 10

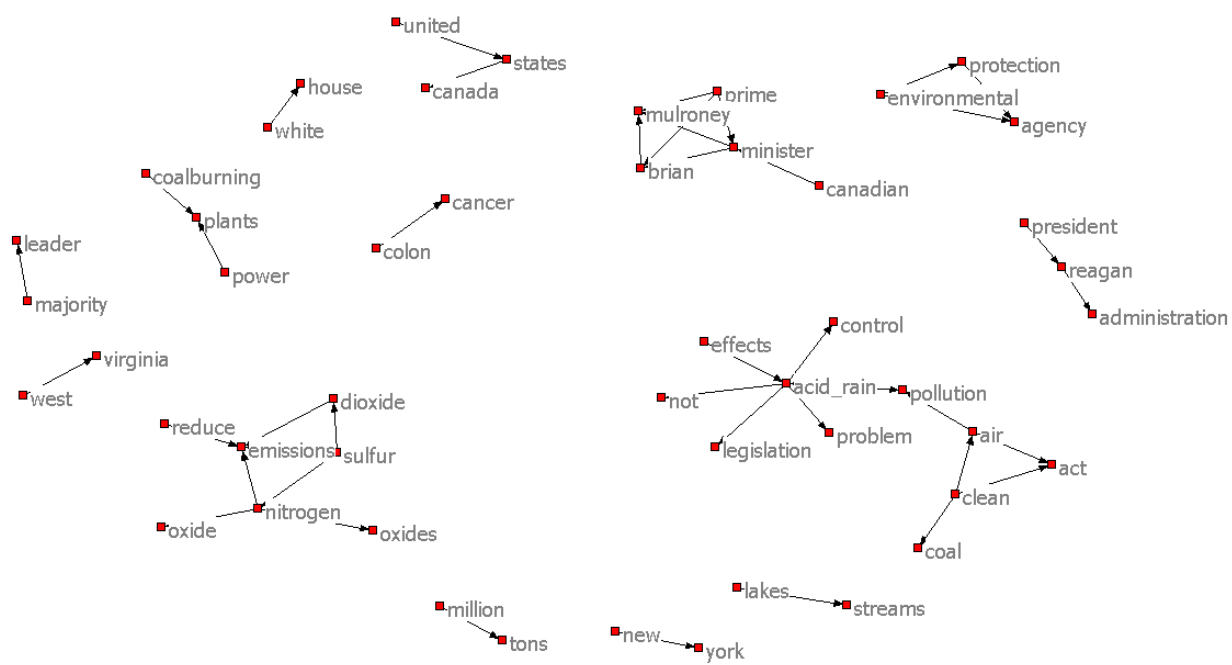


Figure 9. 1988. *New York Times* Coverage, Frequencies GE 10

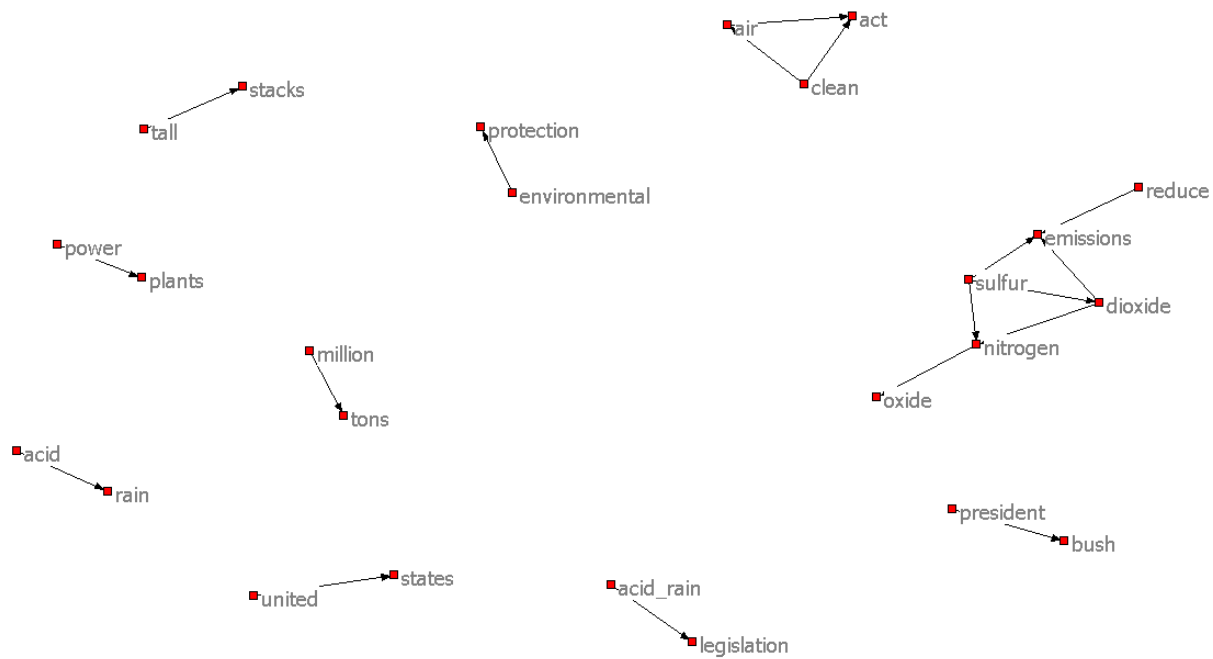


Figure 10. 1989 *New York Times* Coverage, Frequencies GE 10

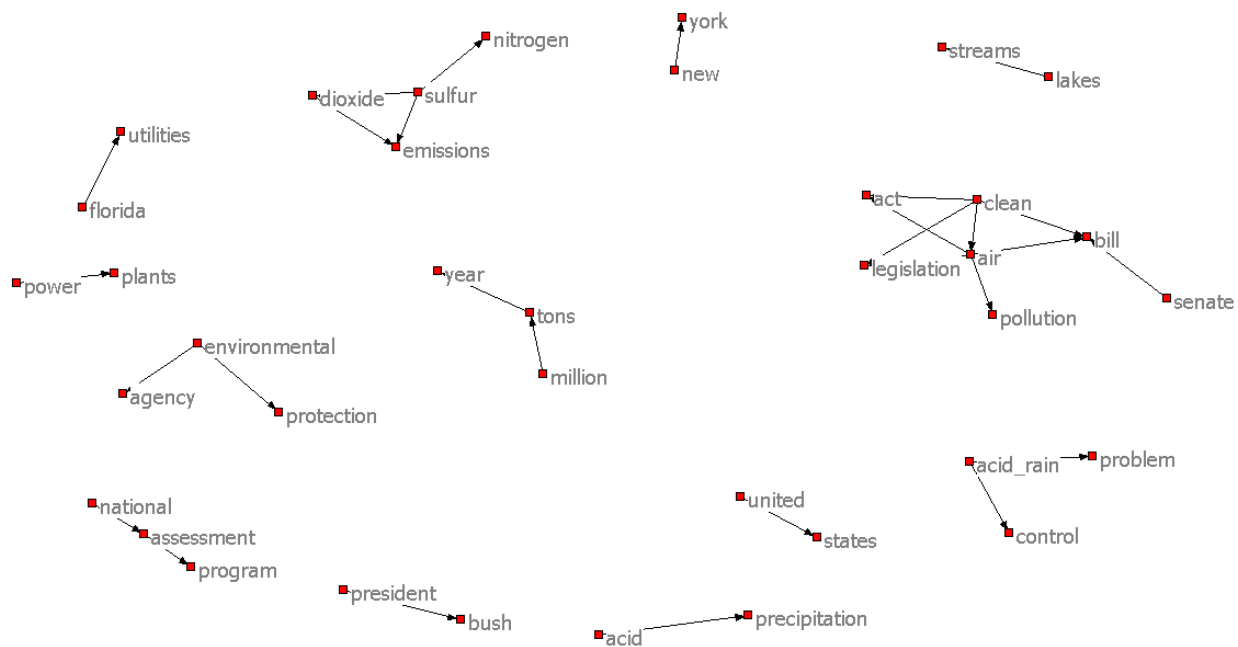


Figure 11. 1990 *New York Times* Coverage, Frequencies GE 10



Figure 12. 1991 *New York Times* Coverage, Frequencies GE 10

Table 1. FLOW BETWEENNESS CENTRALITY MEASURES: 1984 *New York* DESCRIPTIVE STATISTICS

		Normalized FlowBet

1	Mean	0.446
2	Std Dev	2.059
3	Sum	103.912
4	Variance	4.241
5	SSQ	1034.533
6	MCSSQ	988.191
7	Euc Norm	32.164
8	Minimum	0.000
9	Maximum	27.406
		Normalized FlowBet

1	acid	27.406
19	rain	13.125
2	new	5.789
7	not	5.337
10	environmental	2.806
23	states	2.278
145	reagan	2.181
97	forests	1.718
5	national	1.671
6	no	1.474
20	emissions	1.398
129	canada	1.302
8	president	1.236
31	sulfur	1.111
156	percent	0.986
55	report	0.962
36	lakes	0.952
44	water	0.952
24	state	0.924
196	earth	0.845
9	plants	0.788
128	administration	0.764
40	air	0.757
67	research	0.714
53	program	0.692
75	coal	0.647
43	fish	0.633
131	dioxide	0.628
29	northeast	0.623
17	united	0.620
174	reduce	0.616
102	canadian	0.577
119	federal	0.567
60	problem	0.565
121	agency	0.542
113	washington	0.528

188	particles	0.521
4	city	0.500
45	believed	0.488
27	power	0.452
133	year	0.446
78	west	0.441
160	concern	0.416
79	toxic	0.407
132	gas	0.398
38	pollution	0.396
123	added	0.392
25	years	0.384
201	budget	0.374
148	environment	0.365
14	if	0.363
195	atmosphere	0.359
143	clean	0.340
72	made	0.329
165	issues	0.326
197	acidic	0.312
50	must	0.310
167	conference	0.302
41	damage	0.293
135	areas	0.280
57	major	0.276
88	crops	0.275
68	government	0.266
200	scientific	0.248
186	governors	0.238
86	snow	0.226
77	effects	0.214
108	perlez	0.208
224	mondale	0.207
42	studies	0.198
184	today	0.198
73	impact	0.194
13	study	0.190
163	oxides	0.190
83	philip	0.188
30	effect	0.187
176	spending	0.186
62	killing	0.179
118	cost	0.177
194	nitrogen	0.176
115	time	0.168
107	jane	0.158
101	forest	0.153
92	policy	0.148
127	curb	0.142
3	late	0.141
144	act	0.141
69	issue	0.136
65	million	0.134
91	growing	0.130
81	precipitation	0.125
166	week	0.124
74	legislation	0.123

126	including	0.123
169	people	0.122
193	suspected	0.122
34	fall	0.113
82	threat	0.108
33	pollutants	0.107
11	officials	0.104
207	administrations	0.103
146	action	0.100
54	found	0.095
21	nuclear	0.093
22	needed	0.091
39	controls	0.091
209	ruckelshaus	0.091
116	called	0.088
125	efforts	0.088
157	support	0.084
137	evidence	0.082
80	required	0.077
84	shabecoff	0.074
172	days	0.073
189	considered	0.073
95	crisis	0.071
104	eastern	0.070
48	decline	0.066
162	burning	0.064
177	congress	0.063
87	damaging	0.061
226	reagans	0.059
170	law	0.057
206	statement	0.056
37	control	0.053
168	position	0.052
46	part	0.050
114	office	0.050
61	natural	0.045
204	scientists	0.044
16	waste	0.043
12	plan	0.041
182	country	0.040
225	prime	0.040
210	doubt	0.039
122	money	0.034
141	programs	0.033
85	falling	0.031
142	begin	0.031
180	address	0.030
56	problems	0.029
185	nation	0.028
217	england	0.028
63	killed	0.027
147	against	0.027
140	reduction	0.026
76	reports	0.025
139	produce	0.024
175	decision	0.023
98	destroying	0.022

202	coalition	0.022
159	fact	0.020
70	effort	0.017
154	responsible	0.017
93	produced	0.015
94	expensive	0.015
96	blamed	0.015
130	clear	0.015
190	dealing	0.015
28	falls	0.014
35	high	0.014
90	deposition	0.013
105	causing	0.013
220	agreed	0.013
222	learned	0.013
32	widely	0.012
59	caused	0.011
58	michael	0.009
99	sponsored	0.009
152	asked	0.009
153	suit	0.009
134	acidity	0.008
192	agencys	0.008
208	vulnerable	0.008
181	solution	0.007
221	nations	0.007
64	reducing	0.006
203	chemicals	0.006
199	information	0.005
215	shows	0.004
120	south	0.003
228	miners	0.003
18	local	0.002
26	gases	0.002
52	similar	0.002
71	level	0.002
124	decade	0.002
151	thought	0.002
179	deal	0.002
191	chief	0.002
100	stop	0.001
103	canadians	0.001
112	fuel	0.001
117	urged	0.001
149	known	0.001
198	present	0.001
15	identified	0.000
47	increasing	0.000
49	forms	0.000
51	contamination	0.000
66	edward	0.000
89	threatening	0.000
106	clouds	0.000
109	rains	0.000
110	affects	0.000
111	harming	0.000
136	sensitive	0.000

138	controlling	0.000
150	affected	0.000
155	results	0.000
158	concerned	0.000
161	questions	0.000
164	contribute	0.000
171	end	0.000
173	steps	0.000
178	role	0.000
183	effective	0.000
187	sulfuric	0.000
205	component	0.000
211	discuss	0.000
212	persuade	0.000
213	debate	0.000
214	limit	0.000
216	blame	0.000
218	neutralize	0.000
219	protest	0.000
223	curbing	0.000
227	soils	0.000
229	academy	0.000
230	passage	0.000
231	threatened	0.000
232	cure	0.000
233	inaction	0.000

Network Centralization Index = 27.076%

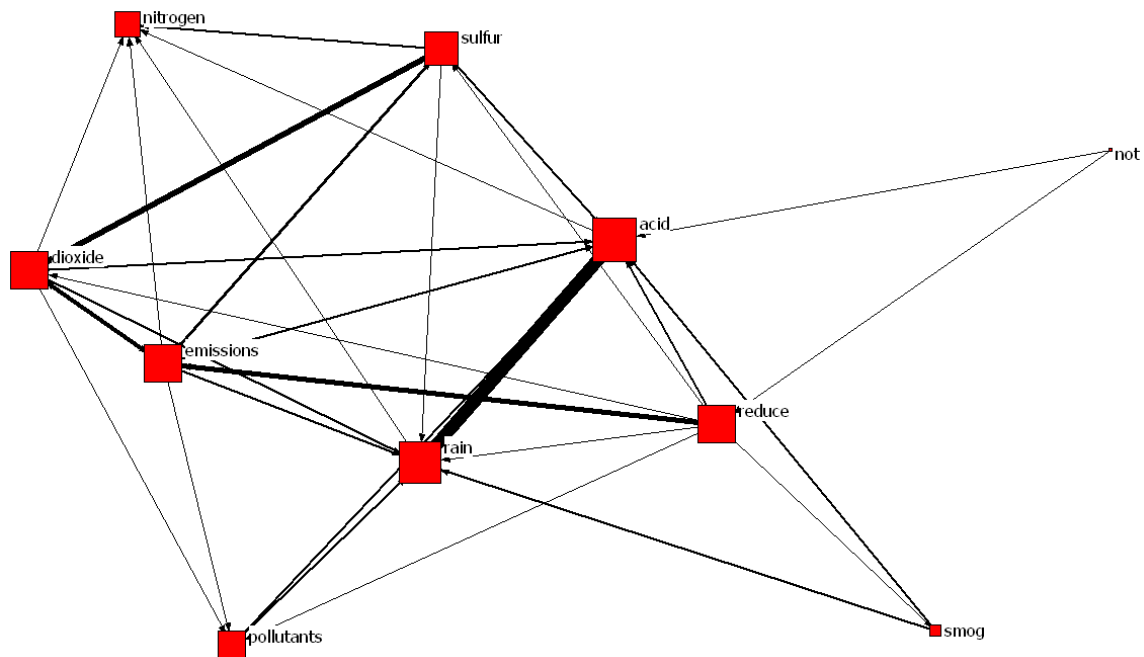


Figure 8. 2007 *New York Times* Coverage, Frequency GE 10

Table 2. FLOW BETWEENNESS CENTRALITY MEASURES: 2007 *New York Times*-----
DESCRIPTIVE STATISTICS

		nFlowBet

1	Mean	1.787
2	Std Dev	2.724
3	Sum	17.871
4	Variance	7.422
5	SSQ	106.164
6	MCSSQ	74.225
7	Euc Norm	10.304
8	Minimum	0.000
9	Maximum	8.023
		Normalized FlowBet

5	reduce	0.794
1	acid	0.890
10	pollutants	0.780
3	sulfur	1.035
9	smog	0.130
2	emissions	8.023
4	dioxide	6.219
6	not	0.000
7	rain	0.000
8	nitrogen	0.000

Network Centralization Index = 6.929%

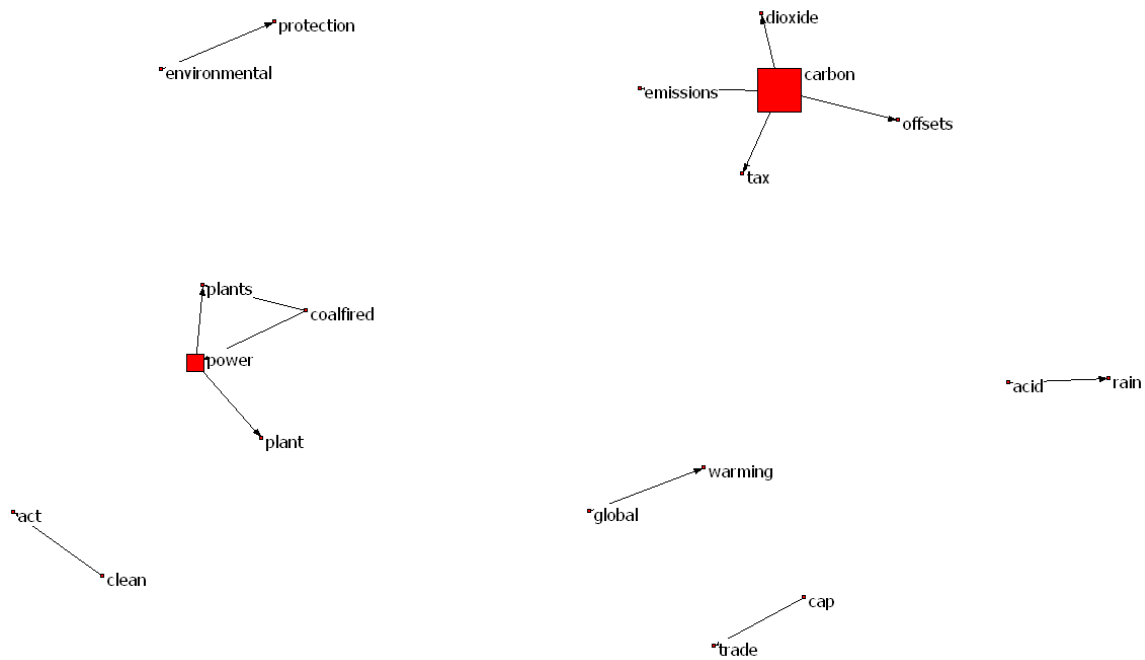


Figure. 2009 (January through October) *New York Times* Coverage, Frequency GE 10

Table 3. FLOW BETWEENNESS CENTRALITY MEASURES: 2009 *New York Times*-----
DESCRIPTIVE STATISTICS

	Normalized FlowBet	

1	Mean	0.209
2	Std Dev	0.710
3	Sum	20.250
4	Variance	0.504
5	SSQ	53.084
6	MCSSQ	48.856
7	Euc Norm	7.286
8	Minimum	0.000
9	Maximum	4.191
		2
		nFlowBet

4	power	2.006
5	plants	4.191
6	coalfired	0.016
7	regulations	0.000
8	rules	0.000
9	study	0.000
10	measure	0.000
11	not	4.173
12	national	0.000
13	tax	0.007
14	burning	0.000
15	states	0.000
16	air	0.264
17	pollution	0.935
18	emissions	1.066
19	act	0.000
20	coal	0.376
21	waste	0.000
22	ash	0.000
23	environmental	0.932
24	carbon	3.145
25	pose	0.000
26	global	0.000
27	warming	0.000
28	gases	0.000
29	damage	0.000
30	protection	0.000
31	agency	0.000
32	groups	0.000
33	policy	0.000
34	plant	0.181
35	landfills	0.000
36	clean	0.401
37	water	0.156

38	nation	0.000
39	companies	0.000
40	china	0.186
41	technology	0.000
42	scrubbers	0.000
43	wastewater	0.186
44	technologies	0.000
45	violated	0.160
46	control	0.000
47	efficiency	0.008
48	built	0.000
49	smog	0.000
50	acid	0.011
51	sulfur	0.000
52	dioxide	0.278
53	rain	0.000
54	emitted	0.000
55	atmosphere	0.000
56	program	0.000
57	should	0.000
58	energy	0.000
59	gas	0.000
60	cleaner	0.000
61	scrubber	0.000
62	monongahela	0.000
63	percent	0.000
64	electricity	0.000
65	permits	0.373
66	system	0.000
67	mr	0.000
68	offsets	0.000
69	capandtrade	0.387
70	taxes	0.000
71	number	0.000
72	coalburning	0.000
73	reduce	0.000
74	problem	0.000
75	officials	0.000
76	limit	0.000
77	long	0.000
78	time	0.000
79	emit	0.000
80	cap	0.197
81	regulating	0.000
82	greenhouse	0.000
83	mercury	0.000
84	trading	0.000
85	buy	0.000
86	plan	0.000
87	sell	0.000
88	incentive	0.000
89	work	0.000
90	begun	0.000
91	emission	0.000
92	trade	0.000
93	tradable	0.000
94	supported	0.000

95	building	0.000
96	efficient	0.000
97	achieve	0.000

Network Centralization Index = 4.024%