

Intermedia Agenda Building of the Blogosphere:
Public Relations Role in the Network

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June 15, 2013

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A paper submitted to the Institute of Public Relations

For the 2012 Ketchum Excellence in Public Relations Research Award

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For some time researchers have pondered how blogs influence public relations practice (Kelleher, 2009; Kent, 2008; Sweetser & Metzgar, 2007; Wright & Hinson, 2008). The primary appeal of blogs—and social media in general—for public relations practice is the ability for organizations to directly reach publics (Kelleher, 2009). In theory, blogs and social media allow organizations to bypass the media who have been characterized as the gatekeepers of the information publics receive. Yet, researchers have found that only a limited number of organizations have blogs or regularly update their blogs (Wright & Hinson, 2011). Another way of considering blogs' influence on public relations practice is by examining how blogs—specifically *news blogs*—report information about organizations. Generally speaking, media relations has adapted to the addition of blogs in the media mix with practitioners trying to place stories in blogs much like the practice has in traditional media.

Blogs provide information to publics and practitioners try to ensure that the information on blogs represents their clients in the best manner (Smith, 2011). Blogs have not replaced how individuals consume news but have changed how news is shared. With mobile devices and news aggregating services, people can be updated immediately when a new blog is posted. News blogs are unique from traditional media because of their ability to hyperlink to other blogs, which creates a blog network. Blog networks have emerged as topic-specific (Kent, 2008), making blogs ideal venues for practitioners to target pitches. Just like traditional media, blogs must compete with other blogs and online news outlets to attract visitors and readers by staying abreast to the topics their competitors are posting. This competition checking may lead bloggers to post about a topic found on another blog. The process is known as intermedia agenda building.

Agenda building theory—an extension of agenda setting theory—has emerged as a framework for explaining how public relations efforts builds the media’s agenda (Ohl, Pincus, Rimmer, & Harrison, 1995). Carroll and McCombs (2003) defined corporate agenda building as “the aggregate of discourse by a firm including attempts through public relations strategies to influence the media with a variety of information subsidies” (p. 42). The research of agenda building through organizational blogs has focused on how organizations use blogs to help build an agenda directly to their publics (Carroll, 2010). Public relations researchers have yet to explore agenda building when practitioners pitch stories to organizations and how pitched stories are transferred within a network of blogs to increase the reach of stories to targeted publics.

This investigation takes a network perspective by recognizing that blogs do not stand alone as information sources—they are connected. Public relations research must also consider that blogs do more than reach publics, they also reach other blogs. Public relations practice can benefit from an understanding of the interaction between blogs. A network perspective examines objects and the relationships that connect them, which forms a network (Monge & Contractor, 2003). In this case, blogs are seen as the objects and the hyperlinks between them are the relationships. Just like with human relationships, the more popular blogs will receive more hyperlinks (relationships) directed at them by others. Receiving more hyperlinks places a blog at a more central point in a network. What is unclear—as the literature review will illustrate—is how a blog’s network position affects how stories transfer to other blogs in the network. Such research is an important departure from the agenda-building scholarship as it explores the understudied area of intermedia agenda building process of blogs (Meraz, 2011). The research presented here provides practitioners with greater insights into selecting and communicating with appropriate blogs based on the blog’s network position. A blog’s network position can be one of

the factors for measuring its influence—a concept that has received much attention by practitioner researchers (Mittenberg, 2013).

This paper begins with an overview of the theoretical framework—agenda setting and agenda building. Within this framework, the issue of intermedia agenda-building research is explored. Research exploring the online aspects of agenda building through blogs and websites is considered. Recent research employing hyperlink analysis is integrated into a consideration of how the relationships between blogs influences how content is shared between blogs. Research questions are then posed to guide the current study. The second portion of the paper details the method used to address the research questions. Particular attention is given to how practitioners can use hyperlink network analysis to identifying influential blogs in a network. The results of the hyperlink analysis and content analysis of four blog networks are then presented. The discussion section applies the findings to public relations professionals who regularly pitch stories to bloggers and online journalists.

Agenda-Setting and Agenda-Building Framework

Since the 1970s, agenda-setting theory has become one of the most researched theories in mass communication (Bryant & Miron, 2004). In short, agenda setting looks at how the media set the public's agenda while agenda building, on the other hand, looks at how organizations contribute to building the media's agenda through public relations documents (e.g. news releases, statements, speeches, etc.). Together, agenda setting and agenda building are both interested in the transfer of salience of objects and attributes from organizations to media outlets and on to the public. The theories are explained in more detail in the following sub-sections.

Agenda setting. McCombs and Shaw (1972) sought to empirically test Cohen's (1963) notion that “the press may not be successful much of the time in telling people what to think, but

it is stunningly successful in telling its readers what to think about" (p. 13). To investigate Cohen's claim, McCombs and Shaw correlated the patterns of news topics covered by the media in Chapel Hill to the issues the city's public saw as the most pressing. They found that the most covered topics in the media were also the public's most highly ranked issues. The scholars purported the idea that the media set the public's agenda by transferring the salience of certain objects (i.e. political topics, political candidate, organizations, etc.).

From McCombs and Shaw's (1972) study, an entire line of research has developed the theory in a number of different contexts, countries, and mediums (McCombs, 2005). In fact, researchers have moved beyond merely looking at the transfer of object salience and developed a two-level model of agenda setting. First-level agenda setting is the traditional examination of object salience transfer. Second-level agenda setting is the transfer of an object's attributes. This concept builds on the idea that the media can also tell a public how to think about an object. Attributes are the "property, characteristic, or quality that describes an object" (Kiousis, Poescu, & Mitrook, 2007, p. 151). In essence, the media give attention to particular attributes that influences how a topic, organization, or candidate is framed.

Agenda setting theory is most applicable to the environmental scanning activities of public relations practitioners. The theory suggests that practitioners can infer that the most pressing issues perceived by a public are those covered most often by the media. When the media frequently give attention to an organizational crisis, the economy, or new government regulations, it is likely that the general public will identify the same issues as the most pressing. The same logic applies to target publics by looking specifically at their information psychographics. If the target public consumes a particular set of media (i.e. talk radio), agenda setting theory argues the public would label the most covered issues by the specific media as the

most pressing. In the online context, if individuals visit a certain blog repetitively then the issues that blog covers will likely influence the issues the reader sees as the most important.

In the abstract, agenda setting theory conceptualizes the role of public relations as passive. Yet, public relations should not be seen as a bystander in the *overall* agenda setting process. Public relations' role is highlighted when the focus moves to the antecedents of agenda setting. After a plethora of agenda setting research, scholars such as Gandy (1982) began to look at the antecedents and asked: who sets the media's agenda? The next section presents the research on public relations role in building the media's agenda.

Agenda building. Gandy (1982) characterized information as a commodity that media organizations consume for their stories and he pointed to public relations practitioners as the producers of the commodity. This market-oriented understanding of information gave way to what is known as *information subsidies* that public relations practitioners supply to journalists. Through information subsidies such as news releases, statements, and news conferences, public relations practitioners aid in the formation of the media's agenda. Curtin (1999) wrote that agenda building occurs when "practitioners can obtain media placement of their [information] subsidies, then they influence the media's agenda, which in turn can influence public opinion and the public agenda" (p. 54). Both an object and its attributes can be purported within information subsidies. Kim and Kioussis (2012), describing the two-level model of agenda *building* for public relations, explained, "agenda building refers to the salience of the issues that the organization is communicating about (or the organization itself), while the attribute level refers to the salience of attributes that the organization emphasizes regarding the issue (or the organization)" (p. 658). The extant research provides evidence supporting the two-level model of agenda building.

Agenda building research has predominately been investigated in the context of political public relations (Kiousis, Mitrook, Wu, & Seltzer, 2006; Kiousis, Popescu, & Mitrook, 2007; Kiousis & Strömbäck, 2010). For example, Kiousis and colleagues (2006) studied the 2002 Florida gubernatorial campaign by looking at how certain topics and the topics' attributes found in campaign materials such as press releases were transferred to the media coverage. Their analysis found that the media published topics and attributes more frequently from one campaign's public relations materials and that the public recognized more topics and attributes from that campaign. The study demonstrated the complete process of agenda building from the organization building the media's agenda to the media setting the public's agenda. Other research has begun to explore agenda building in the context of business communication (Kim & Kiousis, 2012; Ohl, Pincus, Rimmer, & Harrison, 1995; Ragas, 2012; Ragas, Kim, & Kiousis, 2011). Ragas et al. (2011), for example, studied the 2008 proxy contest between Yahoo! and Carl Icahn for control of the board of directors. Their research found that Yahoo! and Icahn led the financial media on the issues that were discussed about the proxy contest. Agenda building research in political public relations has found public relations efforts influence the issues and attributes the media report on, which in turn influences the salience of issues and attributes in the eyes of the public.

Economic constraints have further elevated public relations role in the agenda building process. Media outlets use public relations materials in stories as a way to reduce production costs (Bajkiewicz, Kraus, & Hong, 2011; Curtin, 1999). Blogs face similar economic challenges. Few would argue that blogs have access to the same resources as media organizations; therefore, it is logical to assert that bloggers are just as likely as journalists to use public relations materials when drafting a story. However, suggesting that bloggers only use materials directly from public

relations practitioners does not paint an accurate picture. Intermedia agenda building explains that media look to their competitors for stories, and is reviewed in the following section.

Intermedia agenda building. In the market-driven media environment, it is theorized that organizations or political candidates are not the only agenda builders; media organizations themselves build one another's agendas (Denham, 2010). Due the competitive nature of reporting, media desire being the first to break a news story, which draws reporters and bloggers to see what their competition is reporting. This is known as intermedia agenda building. Ragas (2012) defined intermedia agenda building as the "influence of media outlets on the news content of each other" (p. 94). Intermedia agenda building stems from Reese and Danielian's (1989) study that found the *New York Times* acts as the agenda builder for other media outlets.

Denham (2010) spoke to the intermedia agenda building relationship between traditional media and blogs. Research on the transfer of agendas between the two has revealed that traditional media often appear to set the blogs' agenda but that traditional media are averse to making such relationships visible. Denham explained that traditional media are "reluctant to report on matters that might offend advertisers, but they seem willing to 'report on a report'" (2010, p. 315). Blogs are increasingly becoming a source for mainstream media reports. Lariscy, Avery, Sweetser and Howes' (2009) survey of business journalists found that a majority of those using social media when drafting a story first turn to blogs for reference on a topic. Unfortunately, bloggers' reporting practices have not received the same attention as journalists' in the research literature. Nonetheless, it is assumed here that bloggers engage in similar reporting practices as journalists. The established research on intermedia agenda building supports such an assumption.

Ragas and Kiouisis (2010) studied the intermedia effects between partisan media, activist groups, and the 2008 Obama campaign. The researchers found evidence of first-level intermedia agenda setting effects but little support suggesting that issue attributes were transferred between the media. In a similar study, though more directly related to blogs, Sweetser, Golan, and Wanta (2008) studied the intermedia process between television, advertisements and candidates' blogs in the 2004 presidential election. Using cross-lagged correlations, the researchers found an intermedia agenda building effect where the media built the agenda for candidates' blogs. The authors described the candidates' blogs as reactionary to the media's agenda.

In summary, the literature on agenda setting, agenda building, and intermedia agenda building suggests some important points for public relations practitioners to take away. Agenda setting is a framework for understanding the likely issues most salient within a public are based on the media's agenda. Agenda building theory asserts that public relations has a role to play in formulating the media's agenda. Intermedia agenda building is a way in which the media outlets build each other's agenda. To this point, research has primarily studied organizational or candidate blogs. There are a number of different types of blogs—personal, political, news, etc.—besides organizational blogs. News blogs, the type most relevant to this study, report information about topics that visitors read, comment on, and share with others. Kent (2008) wrote that news blogs “often focus on specialized areas, which make them excellent places for professionals and experts to keep abreast of trends, relevant legislation, and general issues of importance” (p. 34). The specialization of news blogs also makes them attractive venues for practitioners to pitch topic-specific stories (Smith, 2011). What remains unknown are the intermedia agenda building processes of blog networks: how does content within a blog network get shared between blogs?

Building from the agenda setting and agenda building theoretical frameworks, this study investigates the intermedia agenda building effects of blog networks. From the intermedia agenda building research, it is theorized that when a public relations practitioner pitches to one blog in a network, that through intermedia agenda building other blogs might also report on the stories. The stories disperse through the blog network and are seen by more individuals. However, it is unclear how well stories are transferred between blogs. Such research is relevant to public relations practice as it directs practitioners to identify the influential blogs based on blogs' network position. The following section presents research that has explored how content diffuses through networks.

Media Diffusion Through a Network

Researchers from a number of social science disciplines—including communication science—have recognized the benefits of using a social network perspective (Monge & Contractor, 2003). The social network perspective calls on researchers to study the relational aspects between actors by recognizing that actors are interdependent and that actors' relationships with others provide opportunities and constraints (Wasserman & Faust, 1994). Network theories have developed by considering that an actor's position within a network of relationships influences their ability to gain access to or share information and resources. Internet based communication technologies like blogs and social media have illustrated the significance of social networks. The social network perspective and network theories have been adapted to study online phenomena. Yet, a limited amount of research has taken a social network perspective within the agenda building framework (Meraz, 2011, 2013; Ognyanova & Monge, 2013). Other researchers have operated outside the framework but also studied how content

diffuses through blog networks (Cha, Perez, & Haddadi, 2012; Rosen, Barnett, & Kim, 2011; Tremayne, Zheng, Lee, & Jeong, 2006; Woo-young & Park, 2012).

In their overview of social networks and the production of news content, Ognyanova and Monge (2013) contended the threshold and cascade models as the two most applicable frameworks for studying how content diffuses through media networks. The *threshold model* suggests that a blogger (or media producer) decides to post on a topic depending on how many of its connections are discussing a specific topic. A blogger joins a topical conversation once the threshold is met. The *cascade model*, on the other hand, describes the diffusion of content as an infection that spreads from closely connected blogs. Some might argue that the threshold model is most relevant to the current study; however, it is argued here that measuring the number of connections, or threshold, does not truly encompass the significance of a blog's network position in the diffusion of content. In the abstract, the cascade model encompasses the importance of a blog's network position by suggesting that content is diffused when blogs are closely connected to the source or original blog to post on the topic. Few researchers have used the cascade model in the context of blogs. Instead, Granovetter's (1973) concept of strength of weak ties has been used to study the diffusion between blogs.

Granovetter (1973) challenged the common notion that the people closest to us—our strong ties—are the most influential in offering opportunities such as jobs or access to information. His research found that individuals' strong ties provide redundant information whereas weak ties offer new information. The common explanation of the strength of weak ties theory is that one is more likely to hear about a new job opportunity or a new piece of useful information from their distant, weak ties. An individual's strong ties are often connected to one another and provide the individual with redundant information. Typically, weak ties are not

connected to an actor's strong ties and therefore provide the individual with access to new or non-redundant information. Returning to the context of the current study, the strength of weak ties theory would suggest that topics disperse between highly connected blogs. Blogs with more weak ties or ones that have more connections to blogs across a network gain access to new information and topics. The weak ties introduce the new information to a blog that then share the new information with its strong ties.

Meraz (2011, 2013) is one of the few mass communication researchers to look specifically at the intermedia agenda setting processes between blogs and traditional media. Through a time series content analysis, Meraz (2011) correlated three issues between blogs, traditional media online news articles, and traditional media's blogs. The results indicated that political blogs in fact influence the traditional media's online news articles and blogs. Meraz (2013) tested Granovetter's (1973) strength of weak ties theory using hyperlink analysis and hypothesized that politically moderate leaning blogs bridge left and right leaning blogs. Meraz used the betweenness centrality measure (c.f. Freeman, 1977, 1979) to assess the weakness of ties given that the measure "refers to a [blog's] ability to control the flow of connections: [blogs] with high betweenness often sit at intermediary locations, acting as gatekeepers through their bridging of connections among diverse intragroup networks" (p. 195). The results found that moderate blogs had a central position in the network and were postulated to broker an exchange of information between left and right leaning blogs. Other researchers have postulated that centrality increases a blog's ability to facilitate information exchange between blogs (Rosen, Barnett, & Kim, 2011). Centrality is when an actor, or in this case a blog, is highly involved with others in the network and receives and sends an extensive amount of connections (Wasserman & Faust, 1994). Unfortunately, these researchers did not combine hyperlink analysis and content

analysis but called on future researchers to do so in order to more accurately study how content flows through a blog network. Woo-young and Park's (2012) study of the Korean blogosphere combined the methodologies and found that as blogs take a central position in a network, they are able to set the agenda for what other bloggers discuss. For public relations, this research suggests that influencing the most central blog in a network should be the primary focus for practitioners. Influencing one blog would influence the content of many.

Previous research suggests that the structure of the network influences how content is transferred through a blog. When a blog network is highly connected, or what network research calls *dense*, it is likely that content is more likely to be shared. Similar to that point, a central blog in a network has influence and may be a source of topics for other blogs.

Research Questions

Public relations must understand how the network influences how bloggers cover stories and discuss topics. The first research question recognizes that the structure of a network blog positions blogs differently. Other researchers have found it necessary to account for the network structure (Meraz, 2013; Woo-young & Park, 2012). In basic terms, the network structure provides an indication of how connected blogs are to other blogs. Practitioners can gain understanding of whether stories are shared more often when the network is well connected when compared to one that is less connected. In order to begin looking at such question, it is necessary to know the structure of the network.

RQ1: What are the structural characteristics of the blog networks?

The second research question builds from the first RQ by exploring how the content is diffused through the network. Does the content begin at the periphery of a network and move its way to the center? Or, does a central blog begin the conversation that then diffuses through the

network? The answer to the research question can explain where practitioners should target their pitching within a blog network. In theoretical terms, the research question seeks to consider the intermedia agenda building processes within a blog network. Meraz (2013), Rosen et al. (2011), and Woo-young and Park (2012) all suggested that the centrality of blogs influences how the content is shared. Each of these researchers studied the diffusion of topics and content within political blogs. The notion has not been explored in other blog networks. As such, the following research question is posed:

RQ2: How does the structure of a blog network affect how content is shared?

The research is applicable to practitioners in that it creates knowledge about which blogs are most prominent in a network. To extend public relations and social media scholarship, this research builds theoretical evidence by applying network-based theories about blogs that has been missing from research.

Method

Ognyanova and Monge (2013) explained that traditional agenda setting research approach of correlated rank-ordered lists of media issues does not offer an explanation for the influence of content used by other media outlets. The argument being that the current quantitative methods used in intermedia agenda building do not adequately measure the relationships between media outlets. Ognyanova and Monge suggested a social network approach “allows for a more sophisticated exploration of the social influence between media organizations and content selection” (p. 77). Research of network analysis has been challenged with accurately studying the flow of information through networks but is able to do so with a combination of research methodologies such as content analysis (Rosen, Barnett, & Kim, 2011). To answer the research questions, hyperlink analysis and content analysis were used.

Sample

The blog indexing services of Technorati was used to study the blog networks and how topics diffuse through the blogs. Blogs are highly specialized for specific topics (Kent, 2008), and Technorati ranks blogs by topics. Four topics were selected to study the network of the blogs: green, technology gadgets, financial report and TV show reviews. The topics were selected to provide a multiplicity in the networks' structural aspects. This study's focus on the relationship between network structures and content diffusion required variability. In May 2013, the top 50 blogs for each topic area were selected to begin the network analysis.

Hyperlink Network Analysis

Hyperlink network analysis (HNA) is an increasingly used by public relations researchers to study the connections between websites and blogs (Yang, 2012). HNA is related to social network analysis and examines how websites and blogs hyperlink to one another to form a network. Speaking to the method's application, Ognyanova and Monge (2013) wrote, "as media organizations and audience members coexist on the web and link to each other's content, patterns of influence can be detected from existing hyperlink networks" (p. 84).

To measure the patterns of influence, hyperlink data was extracted using VOSON (Auckland, 2011). VOSON is a web crawler that mines hyperlinks and texts from websites and blogs. The crawler was instructed to mine four levels after the top-level domain looking at the inbound links to and outbound links from a blog. The data mined were transformed in a directional network data set. The direction of the relationships is determined by who sends or received a link. If a blog sends a hyperlink to another blog and that blog does not reciprocate, the relationship is one directional. Should the second blog return a link to the first blog then the relationship is reciprocated by having links to and from both blogs. Some blogs receive a high

number of hyperlinks while others receive only a few links. The diversity of links creates a network structure. The network was analyzed using the NodeXL software (Smith et al., 2010). Three network measures—centrality, density and geodesic distance—were used to study the network structure and the nature of the relationships between the blogs.

Centrality. Social network analysis has been used to identify the most important actors based on their network position (Wasserman & Faust, 1994). Woo-young and Park (2012) wrote, “Bloggers with a high level of centrality are influencers or hubs in the network” (p. 221). A number of centrality measures have been posed (Freeman, 1977, 1979). *Indegree* and *outdegree centrality* measures count the number of links a blog sends to (*outdegree*) and receives (*indegree*) from others in a network. Previous studies of the strength of weak ties and intermedia agenda building have used the *betweenness centrality* measure (Meraz, 2013). *Betweenness centrality* takes the measure a step further and measures how much a blog is between other blogs, which indicates the blog’s influence in the network. The more “between” a blog is in comparison to other blogs, the greater influence of its connections. Another measure of centrality—closeness—provides insights into the network structure. Closeness centrality emphasizes “the distance of an actor to all others in the network by focusing on the distance from each actor to all others” (Hannenman & Riddle, 2005, chapter 10, para. 40). The closeness centrality measure informs this study by indicating the reach of the blogs to other blogs in the network.

Density. The second measure, which provides a picture of the network structure (RQ1), density takes the number of connections within a network and divides it by the total number of possible connections (Wasserman & Faust, 1994). Such assessment illustrates how well the blogs

are connected to one another. A highly dense network has blogs that are highly connected to one another whereas a less dense network has blogs linking to only a few others (Cha et al., 2012).

Geodesic distance. The final structural measure, which is very common in network analysis research, is geodesic distance. Geodesic distance is shortest distance it takes for one actor (blog) to get to another actor (blog) in the network (Hanneman & Riddle, 2005).

Specifically, it tells how many blogs that blog A will have to go through to reach blog Z in the network. The measure draws from the density and the centrality measures of a network.

The above procedures and measures have detailed the hyperlink network analysis portion of the study. The following portion reviews the methods used to study the blogs' content.

Content Analysis of Blogs

A content analysis of the blogs takes the study a step further by looking beyond the network structure to provide a look at the intermedia agenda building processes in the blogosphere. After the hyperlink analysis, the top 20 most central blogs in each of the blog networks were then content analyzed. Additional description of the most central blogs is reported below. As described in the results section, the TV show blog network was not well connected. The websites were so far removed from one another it was not possible to study the intermedia agenda setting processes and the websites from that network were removed from the content analysis portion. The sparse connections between the blogs constrained the possibility of accurately documenting intermedia agenda building processes. The unit of the analysis was the blog posts under each blog's domain. The time frame of the blog posting was two weeks. The blog posts were coded for the general topic and the mention of sources. In total, 1,107 blog posts were content analyzed. After a four-hour training session, a trained coder content analyzed 10% (N=111) of the sample to establish intercoder reliability of organizational type. The reliability

reached a Holsti's score of .86. The data was used to create network matrices. Each blog was listed with topic and source(s) mentioned. The relationships of a blog to topic and source(s) was then transformed into matrices correlating blogs that discussed the same topics and referenced the same sources. For example, when blogs A and C discussed Topic X and referenced Source C, the matrices connected the blogs for both discussing the same topic and referencing the same source. The results are reported below.

Results

RQ1 directs attention to the structural aspects of the four blogs networks. Density measures the connectedness of a network. More density indicates more connections within the network where as less density indicates sparser connections. The density of the networks are reported as follows financial blogs: .040 (4%), green blogs: .009 (.9%), information gadget blogs: .018 (1.8%), and TV blogs: .005 (.5%). Of all the possible connections within a network, the financial blogs had the most connections with 4% and the TV blogs with the fewest at 0.5%. These numbers indicate that the financial blogs are more connected to one another than the TV blogs. Blogs in the financial network are connecting to one another at a significantly higher degree than the other networks.

In considering the structural aspects, it is also important to consider the breadth of a network. Some networks that are "tight" are represented with low geodesic distance scores whereas broader networks have greater scores. The measure is relevant as it offers an indication of the likely intermedia agenda building connections between blogs with networks with low geodesic distances indicating close connections. The results of the geodesic distance measure further indicated variation between the networks' structures. The financial blog network had a maximum geodesic distance of five and an average of 2.41. The green blog network had a

maximum geodesic distance of 11 with an average distance of 3.67. In the information gadget network, the maximum geodesic distance was six and the average 2.52. The maximum geodesic distance in the TV blog network was six with an average of 2.98. Comparing the networks, the green blog network showed the greatest difference from the other three with the greatest distance between blogs, which might indicate that some blogs are playing a central role in the network in brokering the links between other blogs. In the financial blog network, the geodesic distance was the least suggesting that the blogs are well connected and few blogs are acting as brokers between other blogs. Based on the measure it can be argued that intermedia agenda building is most likely occurring within the financial blog network.

Centrality—measured by betweenness and closeness centrality—identifies for practitioners the influential blogs in a network. For the financial blog network the average betweenness centrality was 100.08 and the average closeness centrality was 0.004. In the green blog network, the average betweenness centrality was 69.96 and the average closeness centrality was 0.056. The information gadget network had an average betweenness centrality of 46.62 and an average closeness centrality of 0.004. The TV blog network yielded an average betweenness centrality of 19.60 and an average closeness centrality of 0.063. The greatest variance between the networks was in the betweenness centrality with the financial blog network having the greatest and the TV blogs having significantly less betweenness centrality. The numbers indicate that in the financial blog network many of the blogs are positioned between one another, which corresponds to the network being the most dense network of the four and having the lowest geodesic distance between the blogs. The measure of closeness centrality also had some variance with the TV network having the greatest average closeness centrality, which suggests that many of the blogs in the network have a great amount of reach to different regions of the network.

Another measure for looking at influence is the indegree and outdegree centrality measures. As mentioned in the method section, the indegree centrality counts the frequency a blog receives a hyperlink from another blog. This can be seen as a measure of influence. Blogs link to other blogs when they are referencing sources of information and when a blog receives a high number of hyperlinks they are being identified as influential. In the reverse, when a blog sends a high number of links it is directing readers away and is measured through the outdegree centrality measure. Within the context of the theoretical framework, the indegree centrality measure is most relevant for determining the blogs referenced by others. Table 1 reports the top five indegree measures for each network topic.

Table 1. Top Five Indegree and Outdegree Blogs by Network Topic

Network Topic	Blog	Indegree	Blog	Outdegree
Financial	Krant Cents	20	Wisebread	27
	Debt Roundup	18	The Simple Dollar	24
	Frugal Rules	16	36 Months	16
	Money Life and More	13	Invest It Wisely	15
	Brick by Brick Investing	13	20s Finance	14
Green	Grist	9	National Journal	6
	The Oil Drum	5	Brave New Climate	6
	Climate Change Psychology	4	Desmog	6
	Real Climate	3	Sierra Club Compass	5
	Yale Environment 360	3	Alt Energy Stocks	5
Info Gadgets	The Verge	15	Android Authority	13
	Engadget	15	Tech Crunch	11
	Tech Crunch	10	Engadget	9
	The Next Web	10	Into Mobile	8
	Nokia Conversations	7	Techpinions	8

Interestingly, the two most dense networks—financial and info gadgets—also had significantly higher number of indegree frequencies. The green network, on the other hand, was not a well connected (less dense) and fewer indegree frequencies were recorded. Blogs within this network are not linking to others as is the case in the financial and info gadget networks. What remains to be understood is how this effects how the content is shared, which is discussed next.

The second research question builds on the understanding of the networks' structures and begins to explore how content moves through the network. Here the data from the content analysis are integrated with the hyperlink network analysis data. As stated previously, the blog network for TV show reviews was removed because it lacked connections between the blogs. In order to see how the content is shared, it is necessary to know the most central blogs in within the blog networks. The most central blogs, as measured by betweenness centrality and closeness centrality, highlights the blogs that are connected to most of the other blogs. Table 2 reports the most central blogs.

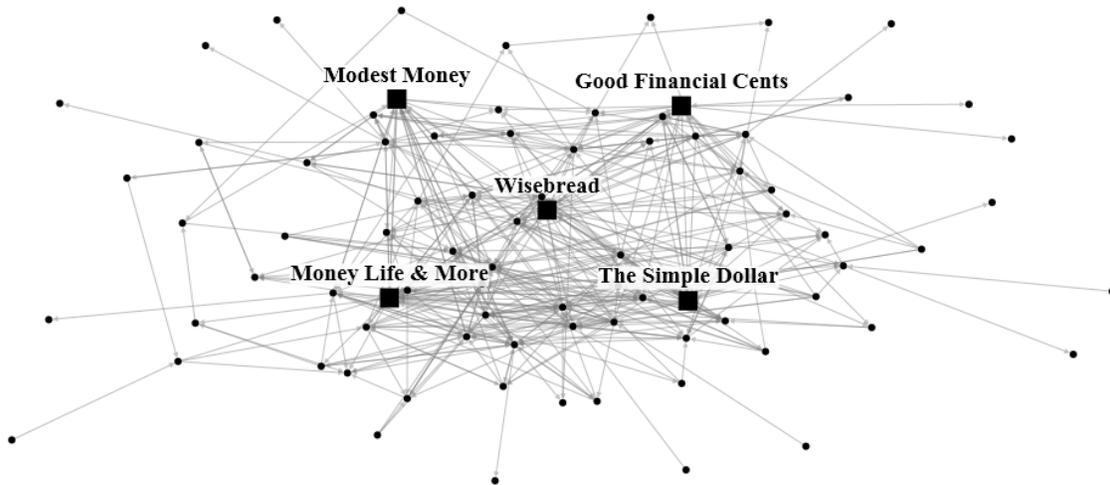
Table 2. Top Five Most Betweenness Central Blogs by Network Topic

Network Topic	Blog	Betweenness Centrality	Closeness Centrality
Financial	The Simple Dollar	629.60	.004
	Wisebread	577.20	.007
	Good Financial Cents	555.91	.006
	Money Life and More	520.55	.006
	Modest Money	430.05	.006
Green	Sierra Club Compass	703.11	.008
	The Oil Drum	675.45	.007
	Grist	589.29	.008
	National Journal	504.65	.006
	New Geography	382.67	.006
Info Gadgets	The Verge	528.57	.010
	Android Authority	512.57	.010
	Tech Crunch	404.53	.010
	Engadget	339.39	.010
	Phones Review	320.05	.007

Another way to illustrate the centrality of the blogs is through the below visualizations.

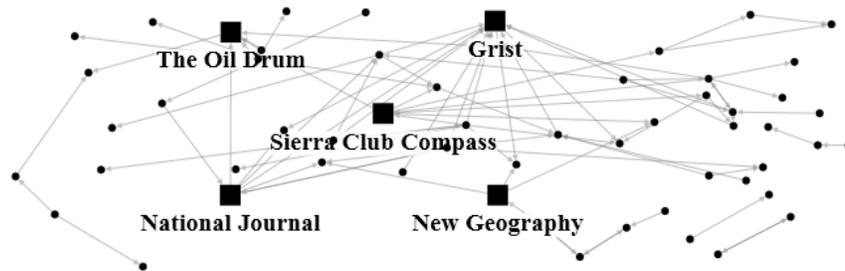
The sociogram in Figure 1 visualizes the connections of the five most central financial blogs.

Figure 1. Financial Blog Network—5 Most Central Blogs



In contrast to the densest network, the green network blog is visualized with the network's top five most central blogs and their connections to others.

Figure 2. Green Blog Network—Five Most Central Blogs



These visualizations frame the variations that occurred with the content discussed within the blog posts. The topics and sources within each network were correlated to investigate which blogs discussed the same topics and used the same sources. In the financial blog network, the overall correlation by topics was a Cronbach's Alpha of .90. Looking specifically at the most central blog in the network, The Simple Dollar, it shared 36 topics in common with Canadian Budget Binder, 20 with Wisebread, 17 with Financial Blogger, and 12 with Frugal Rules. In the same network, the overall correlation of sources reported a Cronbach's Alpha of .87. The green network had an overall Cronbach's Alpha of .86 for topics shared by the blogs. Surprisingly, the most central blog, Sierra Club, did not have the most common topics discussed with other blogs

as was the case with the financial network. Instead, the blog receiving the most inbound links (highest indegree score), Grist, shared the most topics in common. The blog shared 23 topics in common with Yale Environment 360, 22 with Desmog, 19 with Climate Change Psychology, 18 with Matter Resources, and 13 with National Journal. For the sources used, the Cronbach's Alpha was .89 with Grist sharing the most sources in common with the other blogs. Finally, the info gadget network had the lowest topic correlation of all the networks with a Cronbach's Alpha of .58. Android Authority, the second most central blog and the blog with the most number outbound links (highest outdegree), had the most frequently shared topics with the other blogs. As for sources, the network referenced similar sources as indicated with a Cronbach's Alpha of .80. Tech Crunch shared the most sources with Android Authority (N=11), The Next Web with five sources in common, MacGasm with five, and Phone Arena with three. There is little consistency in the network structure and the correlations in topics and sources shared, thus questioning whether the structure of the network determines how content spreads.

The following section discusses the findings and presents the broader implications.

Discussion

First, the findings are defined further by explaining how the results contribute to the theory of intermedia agenda building. Three points are made here: (a) the network structure does not determine how the content moves through a blog network; (b) central blogs are the most influential in the flow of content through a network; (c) more scholarship is necessary to consider the direction of hyperlinks when discussing the diffusion of content. With this summary of the three primary findings, the second portion details the practical implications of the results. Two recommendations are offered: (a) network measures of centrality should be used by

research practitioners to identify online influence and (b) the most central (between) blogs should be targeted by media relations professionals.

Theoretical Contributions

Intermedia agenda building theory posits that certain media outlets can set the agenda for other outlets. The phenomenon has been studied in the context of traditional media and found that media outlets such as the *New York Times* set the agenda for other outlets (Reese & Danielian, 1989). The results reported here are of the first to consider the theory within blog networks. There are three primary contributions to the intermedia agenda building research.

First, the data found that the most central blogs—as measured by betweenness centrality—appear to consistently share the most topics in common with other blogs in the network. Such finding falls inline with similar research that found central blogs in a network are able to influence the conversation of political blogs (Woo-young & Park, 2012). Likewise, Meraz (2011) found that blogs positioned at central points are able to broker the flow of information between different regions of a network. A growing amount of research has found that central actors in networks play a significant role in the diffusion of content.

Second, the findings from the current study question whether the network structure influences the diffusion of content. Other researchers have suggested the flow of content in networks is influenced by the network structure (Meraz, 2013; Ognyanova & Monge, 2013). The notion being that when a network is more dense—blogs are more connected to one another—the blogs are more likely to share similar content. However, the results from the current study challenge such assumption and present the possibility that the content discussed by a blog determines the network structure. Take for instance the anomaly in the data with the network structures. The financial and green blog networks had very different structures. The financial

network was the most dense and had low geodesic distance between blogs whereas the green network was less dense and had significantly greater geodesic distance between blogs. Yet, the two networks had similar levels of correlations in the content shared within each of their networks. Another commonality between the two topic networks is their high number of blogs with high betweenness centrality scores. The info gadget network, which shared many structural similarities with the financial network, had few blogs that sat between several other blogs. Thus, the overall network structure does not appear to determine how content is shared between blogs as was questioned in RQ2. What seems to be instigating the intermedia agenda building process is not the network structure but the characteristics of blogs. Such results suggest that more actors with greater betweenness in a network lead to intermedia agenda building. Moreover, betweenness can be thought of as a measure of online influence as it accounts for the links a blog receives and the links a blog sends. The logic being that when several blogs have high betweenness they are looking to what other blogs are discussing and other blogs are looking to them. Meraz (2011) also asserted that betweenness could be conceptualized as online influence and reinforced the claim with findings that revealed blogs with greater betweenness were able to broker information between blogs. The notion of betweenness centrality as a measure of online influence is considered further in the practical implications discussed below.

The third primary contribution to the literature became evident during the data analysis when inconsistent results of indegree/outdegree centrality and the frequency of shared content appeared. In the info gadget network, Android Authority had the most topics in common with others in the network and sent the most links (outdegree centrality) to others in the network. To the contrary, the green network's blog received the most links (indegree centrality) and had the most in common with others in the network. Indegree and outdegree measures were not

consistent in how the content was shared within the network. The research on intermedia agenda building using hyperlink analysis must take advantage of the directional network data. Hyperlink analysis indicates the direction of relationships between blogs. Blog A points to Blog B but the relationship is not always reciprocated. When a blog receives a high number of hyperlinks from other blogs it is not clear in the literature if the blog receiving the hyperlinks is initiating the topics discussed in the network. Or, in the reverse, if a blog sends out a high number of links to blogs across the network, does that blog initiate the topics discussed? The data presented here is inconclusive. Future scholarship should explore more in-depth the diffusion of content with consideration of the inbound and outbound hyperlinks. Practitioners can gain a greater understanding of whether blogs they pitch to are more impactful in diffusing content if the blog receives a high number of links or when the blog sends a high number of links to others.

Based on these findings, there are three primary practical recommendations for practitioners offered.

Practical Implications

Intermedia agenda setting theory explains that media outlets look to one another to discuss issues. This study found intermedia agenda building processes with several blogs discussing many of the same topics and citing the same sources. The theory has very practical implications for practitioners. Media relations professionals must understand that while they are trying to persuade outlets to cover stories, other outlets (blogs) are also influencing these outlets. Furthermore, the theory shares many similarities with the often-discussed topic of online influence (Mittenberg, 2013). Although there is little scholarship directly discussing this concept, this study demonstrates how online influence can be measured and used when pitching stories. Both of these are addressed in the following recommendations for practitioners.

Recommendations for Practitioners

There are three specific recommendations that practitioners can take from this study's findings: 1) pitch to the most central blogs, 2) use hyperlink analysis to become more familiar with blogs, and 3) network measures must become part of assessment of online influence.

The first recommendation calls on media relations practitioners to use hyperlink analysis to identify the most centrally located blogs in a network. Based on this study's results, the blogs with greater betweenness centrality score should be the primary target for pitching stories. The blogs' network positions appear to place them between others as such that topics are shared most often with them. If a practitioner wants a story to diffuse through a network, the most central located blogs are the most likely to initiate the diffusion.

The second recommendation encourages media relations practitioners to integrate hyperlink network analysis into the process of becoming familiar with an outlet. It is common practice for media relations practitioners to thoroughly read the publications they send their pitches. The process helps a practitioner know which outlets are most likely to cover a client's products and services. Hyperlink network analysis can give media relations practitioners greater insights into a blog. The hyperlink data can tell a practitioner which blogs sends a link or directs its readers to another blog. Or in reverse, the data can indicate where a specific blog is receiving links. This information can give a practitioner options for sending pitches to other blogs. Likewise, the practitioner can tailor pitches to a blog by saying, "I saw you linked to blog A's story about X," or "I saw that blog B linked to your story about Y," and provide the blog with story ideas similar to stories X or Y. The idea being that practitioners can show bloggers they are familiar with their stories and where they are getting traffic from other blogs.

The third, and final, recommendation is for research practitioners to begin using network measures such as betweenness centrality as indicators of online influence. Mittenberg (2013) found that researchers use a social media account's number of followers as a measure of online influence. Hyperlink network analysis identifies influence by accounting for the connections a blog has and the connections of its connections. The network perspective measures influence beyond characteristics specific to a blog or social media account by encompassing the network of relationships. The overlooked aspect of influence on social media is the interdependence online outlets have with one another. Measuring online influence must account for the interdependence and relationships outlets have with others.

While this study has discussed the application of intermedia agenda building in the frame of organizations influencing blogs, Ragas and Kiouisis (2010) noted that the intermedia agenda building process is bidirectional—organizations contribute to setting the media's agenda and the media can also set an organization's agenda. Practitioners must take these results with the understanding that organizations should be cognizant of blog networks ability to set an organization's agenda. This falls in line with Kent's (2008) recommendation that blogs be used for environmental scanning and issues monitoring. Public relations practitioners can benefit from setting the blog's agenda and allowing the organizations they counsel to be informed by a blog network's agenda. Practitioners should counsel an organization when a blog network is frequently discussing a topic relevant to the organization.

Limitations and Future Research

The research here begins the exploration of how a network perspective can assist practitioners in the process of pitching to online news outlets. Yet, there are some limitations to the study. First, the study used top 50 lists from Technorati for each topic as others have done

(Meraz, 2011, 2013). Studies that try to replicate these findings may find varying results as the listing of the top 50 sites changes. Practitioners can avoid this problem by assembling a list of blogs frequently relevant to their clients to create a network framework for conducting the hyperlink analysis. The second limitation of the study was the coding of blog posts for general topic. A more in-depth approach would track a topic, the attributes of topic, and sources. Practitioners could code for talking points from pitches or some might find it helpful to code for organizational spokespeople when appropriate.

Future research can build from this exploratory research and consider network structural variables when exploring online publication practices. Scholars should use caution when assuming how the network influences the diffusion of content online. Future research might consider studying if the network structure changes when the content a blog discusses changes. Such results would determine whether a network is determined by the content diffused or if the content diffuses based on the network, as is the presiding assumption in the literature. Such research can benefit public relations practitioners as it is necessary for practitioners to understand how the stories they pitch move through online networks. Cha et al (2012) explained that the diffusion of information varies based on the topic of the content. Popular events that are “breaking news” move rapidly through the blogosphere whereas less topical information slowly trickles through the blogs. Public relations practitioners would benefit from greater insights into how the topics of stories pitched to a blog network diffused differently. Practitioners would benefit from a study that tracked how a specific story diffused online—both in blogs and traditional online news media.

Research practitioners could track stories pitched to different outlets, collect the hyperlink data of the blogs and websites that picked up the story, and content analyze the

mentions of the stories to see which blogs discuss the story. Such study would show a more complete process of the intermedia agenda building process by tracking a specific story from an organization to the blog network. Practitioners could present such findings to clients when counseling them on which blogs in a topic-specific network are the most effective starting points when pitching stories.

This paper provides a framework that can be followed by practitioners and scholars interested in the intermedia agenda building process of online outlets. Hyperlink network analysis is a powerful methodological tool for studying online influence and investigating how content is shared within a network. Based on the results, it has been argued here that the network does not directly influence how content is shared, as was suggested in the literature. Specific aspects about blogs such as the content discussed and their centrality within the network appear to influence the diffusion of content. The application of the results suggests that practitioners should target the most central blogs in the network as a starting point when pitching stories. The most central blogs shared many topics and sources with other blogs. Public relations practice and scholarship will benefit from research that builds and challenges these findings to provide a greater understanding of intermedia agenda building and online influence.

References

- Ackland, R. (2011). WWW Hyperlink Networks. In D. Hansen, B. Shneiderman and M. Smith (Eds.), *Analyzing social media networks with NodeXL: Insights from a connected world* (pp. 181–200). Burlington, MA: Morgan-Kaufmann.
- Bajkiewicz, T. E., Kraus, J. J., & Hong, S. Y. (2011). The impact of newsroom changes and the rise of social media on the practice of media relations. *Public Relations Review*, 37(3), 329–331
- Bryant, J., & Miron, D. (2004). Theory and research in mass communication. *Journal of Communication*, 54(4), 662–704.
- Carroll, C. E. (2010). Should firms circumvent or work through the news media?. *Public Relations Review*, 36(3), 278–280.
- Carroll, C. E., & McCombs, M. (2003). Agenda-setting effects of business news on the public's images and opinions about major corporations. *Corporate Reputation Review*, 6(1), 36–46.
- Cha, M., Pérez, J. A. N., & Haddadi, H. (2012). The spread of media content through blogs. *Social Network Analysis and Mining*, 2(3), 249–264.
- Cohen, B.C. (1963). *The press and foreign policy*. Princeton, NJ: Princeton.
- Curtin, P. A. (1999). Reevaluating public relations information subsidies: Market-driven journalism and agenda-building theory and practice. *Journal of Public Relations Research*, 11(1), 53–90.
- Denham, B. E. (2010). Toward conceptual consistency in studies of agenda-building processes: A scholarly review. *The Review of Communication*, 10(4), 306–323.

- Freeman, L. (1977). A set of measure of centrality based upon betweenness. *Sociometry*, 40(1), 35–41.
- Freeman, L. (1979). Centrality in social networks: I. Conceptual clarification. *Social Networks*, 1(3), 215–239.
- Gandy, O. H. (1982). *Beyond agenda setting: Information subsidies and public policy*. Norwood, NJ: Ablex.
- Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology*, 78(6), 1360–1380.
- Hanneman, R. A., & Riddle, M. (2005). *Introduction to social network methods*. Riverside, CA: University of California, Riverside.
- Kent, M. L. (2008). Critical analysis of blogging in public relations. *Public Relations Review*, 34(1), 32–40.
- Kelleher, T. (2009). Conversational voice, communicated commitment, and public relations outcomes in interactive online communication. *Journal of Communication*, 59(1), 172–188.
- Kim, J. Y., & Kioussis, S. (2012). The role of affect in agenda building for public relations implications for public relations outcomes. *Journalism & Mass Communication Quarterly*, 89(4), 657–676.
- Kioussis, S., & Strömbäck, J. (2010). The White House and public relations: Examining the linkages between presidential communications and public opinion. *Public Relations Review*, 36(1), 7–14.
- Kioussis, S., Mitrook, M., Wu, X., & Seltzer, T. (2006). First-and second-level agenda-building and agenda-setting effects: Exploring the linkages among candidate news releases, media

- coverage, and public opinion during the 2002 Florida gubernatorial election. *Journal of Public Relations Research*, 18(3), 265–285.
- Kiousis, S., Popescu, C., & Mitrook, M. (2007). Understanding influence on corporate reputation: An examination of public relations efforts, media coverage, public opinion, and financial performance from an agenda-building and agenda-setting perspective. *Journal of Public Relations Research*, 19(2), 147–165.
- Lariscy, R. W., Avery, E. J., Sweetser, K. D., & Howes, P. (2009). An examination of the role of online social media in journalists' source mix. *Public Relations Review*, 35(3), 314–316.
- Meraz, S. (2011). Using time series analysis to measure intermedia agenda-setting influence in traditional media and political blog networks. *Journalism & Mass Communication Quarterly*, 88(1), 176–194.
- Meraz, S. (2013). The democratic contribution of weakly tied political networks moderate political blogs as bridges to heterogeneous information pools. *Social Science Computer Review*, 31(2), 191–207.
- McCombs, M. (2005). A look at agenda-setting: Past, present and future. *Journalism Studies*, 6(4), 543–557.
- McCombs, M. E., & Shaw, D. L. (1972). The agenda-setting function of mass media. *Public Opinion Quarterly*, 36(2), 176–187.
- Mittenberg, B. (2013, April 15). Measuring influence requires more than counting social media followers. *PR News*, Retrieved from <http://www.prnewsonline.com/topics/measurement/2013/04/15/measuring-influencer-requires-more-than-counting-social-media-followers/>

- Monge, P. R., & Contractor, N. (2003). *Theories of communication networks*. New York: Oxford University Press.
- Ognyanova, K., & Monge, P. A. (2013). A multitheoretical, multilevel, multidimensional network model of the media system: Production, content, and audiences. In E. Cohen (Ed.), *Communication Yearbook* (pp. 67–93), 37(1).
- Ohl, C. M., Pincus, J. D., Rimmer, T., & Harrison, D. (1995). Agenda building role of news releases in corporate takeovers. *Public Relations Review*, 21(2), 89–101.
- Ragas, M. W. (2012). Issue and stakeholder intercandidate agenda setting among corporate information subsidies. *Journalism & Mass Communication Quarterly*, 89(1), 91–111.
- Ragas, M. W., & Kioussis, S. (2010). Intermedia agenda-setting and political activism: MoveOn.org and the 2008 presidential election. *Mass Communication and Society*, 13(5), 560–583.
- Ragas, M. W., Kim, J., & Kioussis, S. (2011). Agenda-building in the corporate sphere: Analyzing influence in the 2008 Yahoo!–Icahn proxy contest. *Public Relations Review*, 37(3), 257–265.
- Reese, S. D., & Danielian, L. H. (1989). Intermedia influence and the drug issue: Converging on cocaine. In P. J. Shoemaker (Ed.), *Communication campaigns about drugs: Government, media, and the public* (pp. 29–46). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Rosen, D., Barnett, G. A., & Kim, J. H. (2011). Social networks and online environments: when science and practice co-evolve. *Social Network Analysis and Mining*, 1(1), 27–42.
- Smith, B. G. (2011). Becoming “quirky” towards an understanding of practitioner and blogger relations in public relations. *Public Relations Journal*, 5(4), 1–17.

- Smith, M., Milic-Frayling, N., Shneiderman, B., Mendes Rodrigues, E., Leskovec, J., Dunne, C., (2010). NodeXL: A free and open network overview, discovery and exploration add-in for Excel 2007/2010. Retrieved from <http://nodexl.codeplex.com/>
- Sweetser, K. D., & Metzgar, E. (2007). Communicating during crisis: Use of blogs as a relationship management tool. *Public Relations Review*, 33(3), 340–342.
- Sweetser, K. D., Golan, G. J., & Wanta, W. (2008). Intermedia agenda setting in television, advertising, and blogs during the 2004 election. *Mass Communication & Society*, 11(2), 197–216.
- Tremayne, M., Zheng, N., Lee, J. K., & Jeong, J. (2006). Issue publics on the web: Applying network theory to the war blogosphere. *Journal of Computer-Mediated Communication*, 12(1), 290–310.
- Wasserman, S., & Faust, K. (1994). *Social network analysis: Methods and applications*. New York: Cambridge University Press.
- Woo-young, C., & Park, H. W. (2012). The network structure of the Korean blogosphere. *Journal of Computer-Mediated Communication*, 17(2), 216–230.
- Wright, D. K., & Hinson, M. D. (2011). A three-year longitudinal analysis of social and emerging media use in public relations practice. *Public Relations Journal*, 5(3), 1–32.
- Yang, A. (2012). When transnational civil network meets local context: An exploratory hyperlink network analysis of northern/southern NGOs' virtual network in China. *Journal of International and Intercultural Communication*, 5(3), 1–21.