Network Agenda Setting: A Third Level of Media Effects

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ABSTRACT

Traditional agenda setting theory assumes that news media transfer the salience of objects and attributes separately. This paper advances agenda setting theory by examining whether news media also are capable of transferring the relationships, or the connections, between the attribute agendas. A social network analysis was conducted on the media and public agendas of the political candidate attributes in Texas gubernatorial and U.S. senatorial elections. Comparing the media and public's attribute relationship networks, the study found a third level of agenda setting effect: the attribute network picture depicted by the news media significantly influences that picture in the public's mind. In addition to theoretical innovation, this study also makes contributions to the methodology in agenda setting research by applying social network analysis to the field.

KEYWORDS

Agenda Setting, Quantitative - Network Analysis, Methodology

INTRODUCTION

Agenda setting theory attributes its intellectual origin to Walter Lippmann's (1922) *Public Opinion* and his thesis that the news media construct a pseudo-environment for the public bridging "the world outside and pictures in our heads" (Lippmann, 1922, p. 3). Subsequent to the pioneering 1968 Chapel Hill study (McCombs & Shaw, 1972), hundreds of empirical studies have explored these "pictures," both in various types of media and in people's heads around the world. As the theoretical focus of this research expanded, a second level of agenda setting was proposed to shift the attention to attribute agenda setting and to scrutinize the actual details of these pictures (McCombs, Lopez-Escobar, & Llamas, 2000; Shaw & McCombs, 1977; Weaver, Graber, McCombs, & Eyal, 1981). However, the elements of the "pictures" investigated to date are in fact objects and attributes, which are disconnected elements of the whole. A further question is now raised: Are the news media able to transfer the salience of a more integrated image, or a real *picture*?

The purpose of this paper is to advance agenda setting theory by examining whether news media are capable of transferring the relationships, or the connections, between the elements of an agenda. This study is theoretically innovative because it steps beyond the theory's assumption that news media can only transfer objects or attributes separately and discretely.

In order to test this hypothesis, we conducted a social network analysis of the media and public agendas of the political candidate attributes in Texas gubernatorial and U.S. senatorial elections. We then compared the attribute relationship networks respectively drawn from the news coverage and from public opinion surveys to explore whether the two patterns, or the two

pictures, are corresponding. By applying social network analysis to agenda setting research, this study also makes contributions to the methodology in this field.

THEORETICAL BACKGROUND

The core theoretical proposition of agenda setting theory is the transfer of salience from the media agenda to the public agenda (McCombs, 2004). Researchers usually compare the rank-order of issue salience in the news coverage with the salience of those issues among the public to determine the degree to which the two agendas are correlated. Regarding the second-level of agenda setting theory, the hierarchies of attributes describing the object, researchers perform a similar comparison of the salience of attributes on the media and public agendas. For both of these levels of the theory, we consider that traditional agenda setting research has the two following presumptions. First, it assumes that this transfer of salience of different objects or attributes occurs discretely. As the second presumption, the existing approach implies that human cognition processes operate primarily in a logical and hierarchical way. Moving beyond these two assumptions, we theorize the agenda setting effect is a more complex mechanism.

Agenda setting and Compelling arguments

A potential influence of the news media is the ability to transfer the *relationships*, or the *connections*, between the agendas. In fact, one of the hypotheses within agenda setting theory, "compelling arguments," implicitly illustrates this point. This perspective basically suggests that media emphasis on certain attributes of an object provides people with cues to modify their perceived salience of the object that possess that attributes (McCombs, 2004; McCombs & Ghanem, 2001; Severin & Tankard, 2001; Yioutas & Segvic, 2003). In other words, this perspective holds that news media not only shape the perceived importance of attributes and

objects separately, but can actually bundle an object with an attribute and make them salient in the public's mind simultaneously. Therefore, the audience might not only treat certain attribute as a part of the object, they might also regard the two as connected, integrated elements in the "pictures." There is some empirical support for the "compelling argument" hypothesis (e.g.Schoenbach & Semetko, 1992; Williams, Shapiro, & Cutbirth, 1983), but the "compelling argument" effect remains greatly understudied (Kiousis, 2005).

Based on the logic of the "compelling argument," we further hypothesize that when two particular attributes of an object are frequently mentioned together on the media agenda, there may be an impact on the perceived relatedness of the two attributes among the public. For example, when people talk about the general topic of the economy, they might always relate unemployment with federal spending. Conversely, they might seldom connect unemployment with tax issues because news media seldom bond the two. In this sense, our basic hypothesis in this study is that *the news media transfer the salience of relationships between a set of attributes to the public* in addition to the well studied discrete transfer of object and attribute salience from the media to the public.

Agenda Setting and Cognitive Map

A second presumption of traditional agenda setting theory, as noted earlier, is that of human's logical and hierarchical cognitive process to handle information. In contrast, some psychologists and philosophers hold that people's mental representations also operate pictorially, diagrammatically or cartographically (Armstrong, 1973; Barsalou, 1998; Braddon-Mitchell & Jackson, 2007; Cummins, 1996). In other words, audiences might map out media objects and attributes in their heads as network-alike pictures according to their *interrelationships*. This is

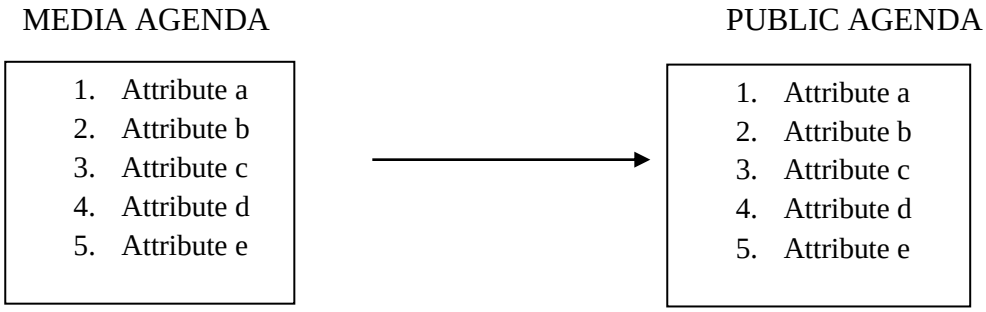
different from, and complementary to, traditional agenda setting's presumption that individuals' perception of media agendas works logically according to their *importance* (see Table 1). This "pictorialist" perspective is reflected in the psychological concept "cognitive map," a phrase already used by McCombs (2004) intuitively to paraphrase Walter Lippmann's idea:

> …the news media, our windows to the vast world beyond direct experience, determine our *cognitive maps* of that world (McCombs, 2004, p. 3).

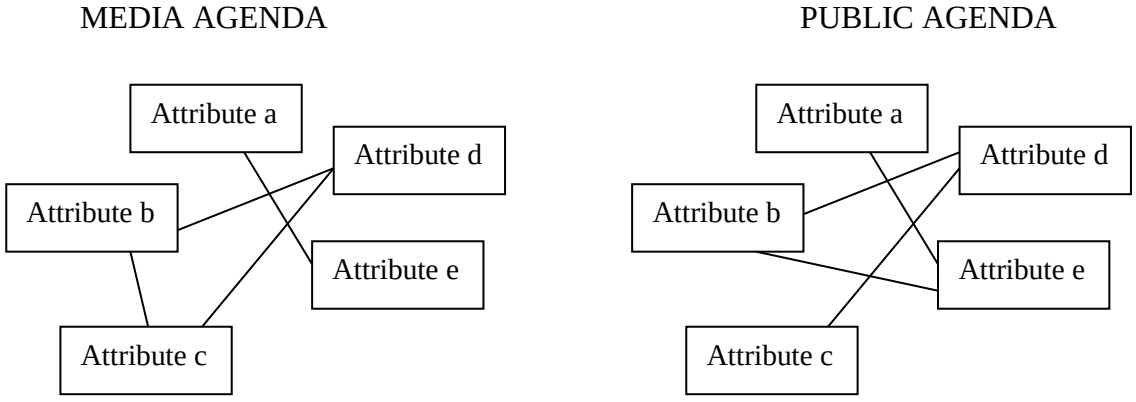
TABLE 1

The Comparison of Traditional Attribute Agenda Setting and Network Agenda Setting

Traditional Attribute Agenda Setting



Network Agenda Setting



Cognitive mapping refers to "a process composed of a series of psychological transformations by which an individual acquires, stores, recalls, and decodes information about the relative locations and attributes of the phenomena in his everyday spatial environment" (Downs & Stea, 1973, p. 7). In fact, scholars in various disciplines including cognitive psychology, philosophy, geography and communication have theorized this associative network model in similar ways yet under different terms besides "cognitive mapping". Examples are "associative network model" (Anderson, 1983; Anderson & Bower, 1973), "cognitive network model" (Santanen, Briggs, & de Vreede, 2000), "connectionist model" (Monroe & Read, 2008), and "spreading activation model" (Collins & Loftus, 1975).

The mental model of "cognitive mapping" basically suggests the existence in the human brain of a set of "scripts" or "schema" reflecting a person's spatial or network thinking about these elements. Specifically, people often apply this spatial thinking to perform non-spatial tasks: "if we wish to memorize events, people, and things, it helps to know their locations or even assign them arbitrary locations" (Tuan, 1975, p. 210). Kaplan (1973) also suggested that we develop this cognitive mapping mechanism to handle information because it is human nature to anticipate what could happen next in order to survive in a dangerous and complex world. Thus, our cognitive representation of objects and their situations is presented as a network-like structure where any particular node will, in general, be connected to numerous other nodes (Kaplan, 1973). According to this perspective, linear and hierarchical thinking structures could be subparts of a network, but they are not sufficient in themselves (Kaplan, 1973). By nature, cognitive maps are dynamic. They are developed for different events as well influenced by a variety of external factors (Kitchin, 1994; Siegel & Cousins, 1985). News media arguably is a crucial factor impacting our cognitive maps, especially in regard to public affairs. If we apply the

perspective of the "cognitive map" concept to agenda setting theory, we can infer that news media should not only transfer the salience of the object or attribute hierarchy, but also their network structure.

Based on the concept of "cognitive map" and building on the "compelling argument" hypothesis, we propose the following hypotheses to test what we call *network agenda setting* effects. We conducted our initial tests of these hypotheses with political candidate attributes, the area considered to have most straightforward agenda setting effect both in first level and second level (McCombs et al., 2000).

H1a: The salience of the relationship network of a political candidate's attributes on the media agenda will be positively associated with the public salience of this attribute network.

As an additional evidence for network agenda setting, we also hypothesize that the centrality of specific attributes in the news media's attribute network is consistent with their centrality in the public's attribute network.

H1b: The salience of the centrality of a political candidate's attributes in the media attribute network will be positively associated with the public salience of the attribute location.

METHOD

We conducted network analyses on two datasets initially collected for Kim and McCombs (2007)'s comprehensive analysis of attribute agenda setting effects and their consequences for subsequent attitudes and opinions (see Table 2). Use of these data for additional analyses rather than collecting entirely new sets of content analysis and survey research data affords advantages for this initial exploration of network agenda setting as a step beyond attribute agenda setting.

TABLE 2: Datasets for Analysis

	Election	Content analysis Date	Survey Date	Candidates
Spring Dataset	2002 Texas primary gubernatorial election (March)	Jan. 1 – Mar. 12, 2002	Feb. 19 – Mar. 12, 2002	Rick Perry & Tony Sanchez
Fall Dataset	2002 Texas gubernatorial election & U.S. senatorial election (November)	4 weeks in Sept., 2002	Sept. 26 - Oct. 11, 2002	Rick Perry, Tony Sanchez, John Cornyn & Ron Kirk

First, these data present a broad view of journalistic and public perspectives on political candidates based on the attributes of both Republican and Democrat candidates for two different public offices, Texas governor and U.S. Senator from Texas (Graber, 1972; McCombs, Llamas, Lopez-Escobar, & Rey, 1997; Nimmo & Savage, 1976; Sigel, 1964). Most importantly, if the network analyses support this new approach and the hypotheses advanced in this study, these data that document robust attribute agenda-setting effects also provide a solid basis for the next important step, comparing attribute agenda setting and network agenda setting. If, for example, the network analyses were conducted on new data and found network agenda setting effects, but failed to replicate attribute agenda setting effects, we would be left in a theoretical quandary. Here the focus is squarely on the extent to which network analysis adds to the well established attribute agenda setting effects and further elaborates Lippmann's metaphor of "the pictures in our heads."

Content Analysis

Although Kim and McCombs (2007) focused on the general elections in the fall, two sets of content analysis data are available from their project: (1) content analysis of the news coverage

of Republican candidate Rick Perry and Democratic candidate Tony Sanchez, as each competed in his party's primary gubernatorial election in the Spring (Spring Dataset); and (2) content analysis of the news coverage of the same two candidates as well as two U.S. senatorial candidates, Republican John Cornyn and Democrat Ron Kirk in the general elections in November (Fall Dataset). The *Austin American-Statesman* was used for the content analysis because it is the only local daily newspaper serving Austin residents.

As regards the Spring Dataset, all the news stories about the primary campaigns that appeared in the *Statesmen* from January 1 through March 12, 2002 (Election Day) were content-analyzed. Eight journalism graduate students in a content analysis class analyzed the media attribute agendas and achieved the average agreement percentage of around 90. For the Fall Dataset, another group of 10 student coders scrutinized all the news items about the four candidates during four weeks in September. The intercoder reliability was .87, measured by Scott's *pi*. For this paper, we only considered attributes concerning candidate qualifications and character, which were the more prominent attributes highlighted by the Austin media and voters (Kim & McCombs, 2007). Ten attributes were identified to define personal qualifications and character in both content analyses: (1) Leadership; (2) Experience; (3) Competence; (4) Credibility; (5) Morality; (6) Caring about people; (7) Communication Skills; (8) Pride in family/backgrounds, roots, and race/ethnicity; (9) Non-politician; (10) "Other" comments about the candidates' personal qualifications and character.

The goal of the network analysis in this paper is to map the relationship networks of these candidate attributes both in the news media and in people's heads. An important point to note here is that we did not distinguish among the four different candidates because we wish to examine the narratives regarding the attributes of political candidates in general. For news

media, we measured the relationships between a pair of attributes according to the frequency of their co-occurrence in the same articles. Therefore, we only selected those articles with more than one attribute for analysis. Accordingly, a total of 21 articles with an average of 3.1 attributes were retrieved in Spring Dataset. In the Fall Dataset, we identified 16 articles with an average of 3.8 attributes.

Public Survey

Two rounds of telephone interviews to ascertain the public's attribute agenda. From February 19 to March 12, 2002, telephone surveys were conducted with 271 randomly selected adults, 18 years or older, in the Austin metropolitan area. Another round of telephone interviews was conducted with 417 randomly selected adults between September 26 and October 11, 2002. To measure the public's attribute agenda, respondents were asked in both surveys: "Suppose that one of your friends has been away a long time and knows nothing about the political candidates. What would you tell your friend about (Cornyn, Kirk, Perry, and Sanchez)?

Corresponding to the content analyses, we only considered the ten attributes concerning "personal qualification and character." Again, we analyzed those responses including more than one attribute. Thus, 56 responses each with an average of 2.3 attributes in the spring survey and 136 responses each with an average of 2.7 attributes in the fall survey were examined.

Data Analysis

For each of six subsets of data – (1) Spring Dataset - content analysis; (2) Spring Dataset - survey; (3) Fall Dataset - content analysis; (4) Fall Dataset - survey; and (5) Combined content analysis data; (6) Combined survey data – a matrix of composed of 10 rows × 10 columns was created for the network analysis (Wasserman & Faust, 1994). Each row or column represents a candidate attribute. The entry in each cell is the frequency associated with the relationship

between two attributes. We measured the relationship between two attributes by calculating their co-occurrence in the same article or in the same respondent's narrative. The more frequently the two attributes co-occurred across news articles or across respondents' descriptions of the candidates, the stronger their relationship. Thus, the unit of analysis in this network analysis is a dyad: two attributes and their relational ties. For example, if the two attributes "leadership" and "experience" appear together in 5 articles, the entry is 5 in the cell corresponding to the two attributes in the matrix.

Table 3 based on the content analysis data and Table 4 based on the survey data present examples of the matrices for the relationship network of political candidate attributes.

TABLE 3: Example Sociomatrix of Candidate Attribute Network 1

Combined Content Analysis Data

	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
A		4	2	3	3	0	1	2	0	3
B	4		9	11	7	5	7	2	4	17
C	2	9		7	6	3	4	1	2	8
D	3	11	7		6	4	3	1	1	12
E	3	7	6	6		1	1	1	1	8
F	0	5	3	4	1		3	0	2	6
G	1	7	4	3	1	3		1	2	5
H	2	2	1	1	1	0	1		0	1
I	0	4	2	1	1	2	2	0		2
J	3	17	8	12	8	6	5	1	2	

(Note: A= Leadership; B= Experience; C= Competence; D= Credibility; E= Morality; F= Caring about people; G= Communication Skills; H= Pride in family/backgrounds, roots, and race/ethnicity; I= Non-politician; J= "Other" comments about the candidates' personal qualification and character.)

TABLE 4

Example Sociomatrix of Candidate Attribute Network 2

Combined Survey Data

	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
A		6	8	2	2	2	0	1	2	10
B	6		50	26	24	6	5	2	11	64
C	8	50		19	19	5	11	3	7	43
D	2	26	19		12	5	4	2	7	22
E	2	24	19	12		6	1	1	7	19
F	2	6	5	5	6		0	1	2	11
G	0	5	11	4	1	0		0	0	2
H	1	2	3	2	1	1	0		0	3
I	2	11	7	7	7	2	0	0		13
J	10	64	43	22	19	11	2	3	13	

(Note: A= Leadership; B= Experience; C= Competence; D= Credibility; E= Morality; F= Caring about people; G= Communication Skills; H= Pride in family/backgrounds, roots, and race/ethnicity; I= Non-politician; J= "Other" comments about the candidates' personal qualification and character.)

H1a: The salience of the relationship network of a political candidate's attributes on the media agenda will be positively associated with the public salience of this attribute network.

We conducted QAP correlation and regression tests on three pairs of matrices: (1) Spring content analysis and survey; (2) Fall content analysis and survey; (3) Combined content analysis and survey. The QAP correlation test computes the correlation between entries of two square matrices. The QAP regression test is to regress a dependent matrix on one or more independent matrices, and assess significance of the r-square and regression coefficient (Borgatti, Everett, & Freeman, 2002). In this analysis, content analysis data were considered the independent matrices and survey data were dependent matrices.

H1b: The salience of the centrality of a political candidate's attributes in the media attribute network will be positively associated with the public salience of the attribute centrality.

An attribute is considered as central if it is extensively involved in relationships with other attributes (Wasserman & Faust, 1994). So for each sub-dataset, we calculated the degree of centrality for each attribute by computing the sums of the values of its ties with other attributes. For example, if the attribute "experience" co-occurs five times with each of the other nine attributes in the same articles, its centrality is 45. To compare the attribute degree of centrality in the media agenda with that in public agenda, we conducted correlation and regression tests on the three pairs of matrices.

RESULTS

Table 5 reports the statistical results with a clear pattern in the significant degree of correspondence between the media network agenda and public network agenda. More specifically, QAP correlation and QAP regression coefficients for all three pairs of datasets are positive and statistically significant, with QAP correlations (Pearson's r) ranging from +.67 to +.84 and R-square ranging from +.56 to +.71. These three sets of evidences all support **H1a**, that media salience of the candidate attribute relationship networks is positively associated with the public salience of the same attribute relationship network.

Another finding from Table 5 is that the QAP correlation and regression results both demonstrate that the most significant correspondence is between the pairs of combination datasets: +.84 and +.71. Also, as shown in Figure 1 and Figure 2, the graphs representing the two datasets are visually very similar.

TABLE 5

QAP Correlation/Regression and Centrality Correlation/Regression between Media and Public Attribute Agenda Networks

DATASET	QAP Correlation (Pearson's r)	QAP Regression (R^2)	Centrality Correlation (Pearson's r)	Centrality Regression (R^2)
2002 Spring Dataset	.75**	.56**	.84*	.70*
2002 Fall Dataset	.67*	.45*	.76*	.57*
Dataset in Combination	.84**	.71**	.91**	.84**

Notes: *p<0.5 ; **p<0.01

FIGURE 1: Media Attribute Agenda Network

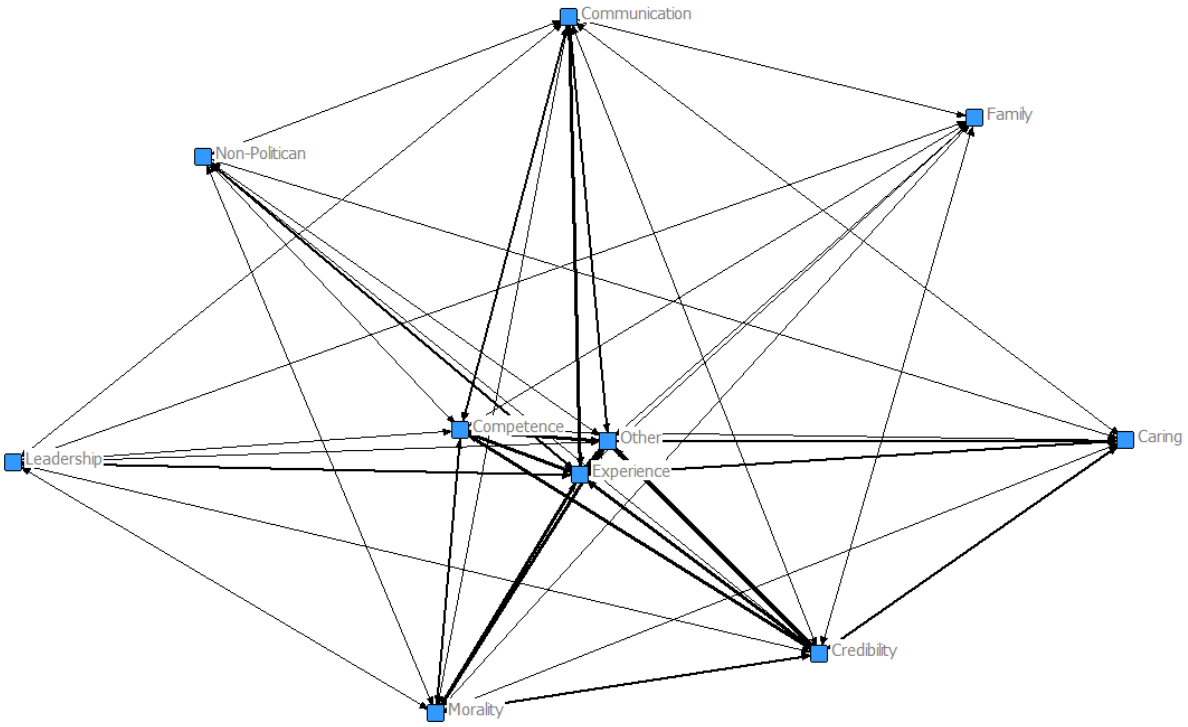


FIGURE 2: Public Attribute Agenda Network

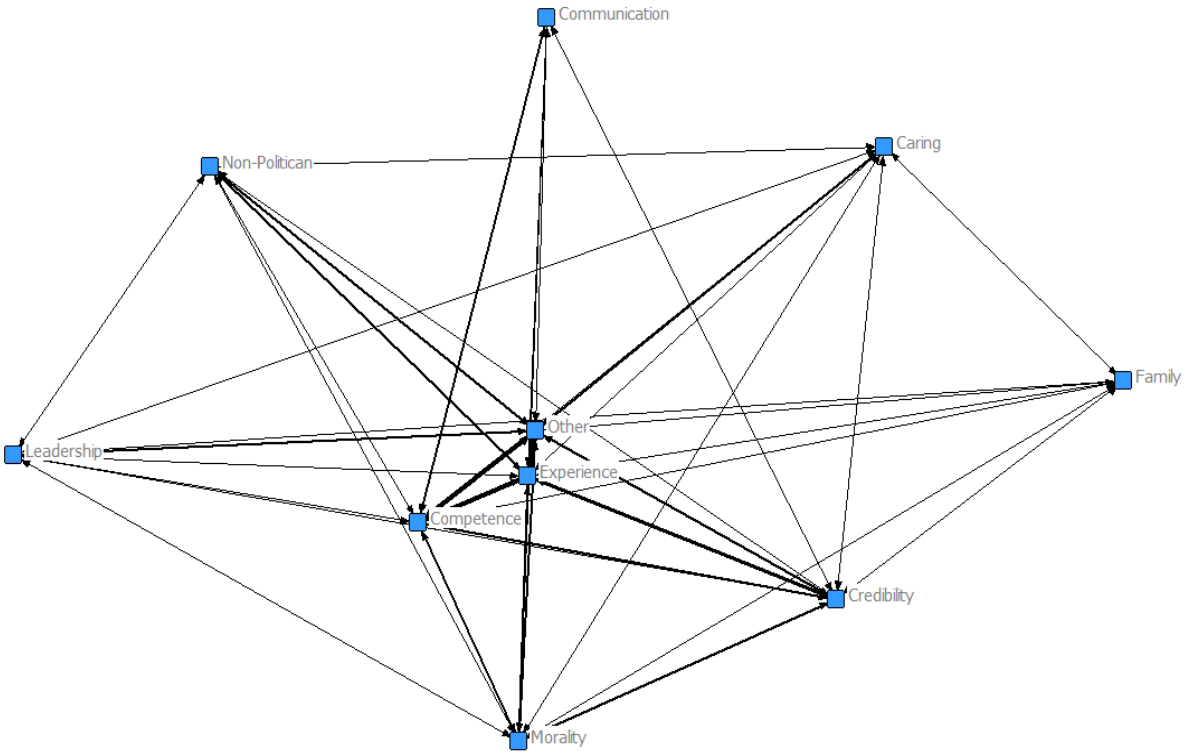


Table 6 details the degree centrality of the ten candidate attributes on the media and public attribute network agenda in each sub-dataset. Pearson's r correlation and regression tests were conducted between each pair of media and public agendas in terms of the degree centrality. As shown in the Table 5, the degree of centrality in the media attribute agenda is significantly correlated with the degree of centrality in the public agenda: +.84, +.76, and +.91. The result of the regression test, the R-square for each pair of media and public agenda confirms the strong and positive relationships: +.70, +.57, and +. 84. Again, the correlation and regression coefficients of the combined dataset are the highest among all. Our second hypothesis **H1b** is thus supported.

TABLE 6

Degree Centrality of Candidate Attributes on the Media and Public Attribute Network Agenda

Attributes	Spring Media	Spring Public	Fall Media	Fall Public	Combined Media Agenda	Combined Public Agenda
Leadership	18	7	0	26	18	33
Experience	39	52	27	142	66	194
Competence	20	37	22	126	42	163
Credibility	24	13	24	85	48	98
Morality	27	20	7	71	34	91
Caring	6	6	18	35	24	41
Communication	10	10	17	4	27	14
Family	9	3	0	10	9	13
Non-politician	4	9	10	42	14	51
Other	33	45	29	147	62	192

In sum, the results provide strong evidence to support the positive and significant correlation between media attribute relationship networks and public attribute relationship networks.

DISCUSSION

Traditional agenda setting theory assumes that news media transfers the salience of objects and attributes separately. This study presents evidence which indicates that news media also are capable of transferring the salience of the relationships, or the connections, between attribute agendas. That is to say, there is also a network agenda setting effect: the attribute network picture depicted by the news media significantly influences that picture in people's head. Therefore, this study moves a step closer to Walter Lippmann (1992)'s picture metaphor.

What is noteworthy is that the results for network agenda setting effects found in this study are consistent with the attribute agenda setting effects in Kim and McCombs (2007)'s study on the same Fall dataset. Specifically, the overall rank-order correlation coefficient

(Spearman's rho = +.65) between the media and public attribute agendas well corresponds with the QAP correlation (Pearson's r = +.67) between the media and public network agendas. In other words, network agenda setting as the third level of media effects is solidly grounded in the second level of agenda setting effects.

In addition, the evidence presented here indicates that the correlations and regression coefficients are highest in the combined datasets. This might imply that a network agenda setting effect depends on the cumulative media coverage, rather than a small time span as frequently found in traditional agenda setting research. In other words, it might take a longer period of time to establish the connections between the attributes than to build the salience of a sole attribute.

Based on the findings, this study also theoretically suggests the possibility that people relate to the media agenda in a pattern of network thinking, which is different from the logical and hierarchical cognition mechanism presumed in traditional agenda setting theory.

It is without doubt that the Network Agenda Setting Model can be enriched and improved in various ways. Future research could evaluate the network agenda setting effect in regard to certain political candidate versus political candidates as a whole. In addition, more empirical studies should be conducted to test the Model in other regional and national elections as well as other areas of communication.

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