Can the Internet Reconstruct Traditional Media Frames? A Study of Hyperlink Influence on Responsibility Attribution

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This study attempts to establish a descriptive model in order to explore the relationship between hyperlink types and responsibility attribution. The paper hypothesizes that hyperlinks might connect fragmented information into an integrated picture so audiences might have thematic perceptions of society. Thus, their responsibility judgments may shift to social background. The Internet might be seen as a "framing mechanism" to reconstruct traditional media frames. The hypotheses are derived from a combination of previous research such as framing attribution effects and Internet information processing. The research also tested the mediating variables between hyperlinks and attributions. The research method involves between-group computer-based experiments. Data were statistically analyzed with ANOVA and the General Linear Model. The results show that responsibility attribution varies based on experiment treatment. Yet, both the comparative relationship and significance between manipulations were not as expected. The role of mediating variables could not be confirmed. The reasons are discussed in a psychological perspective.

Media frames are always considered determinants influencing audience cognition, which consequently leads to a change in social behavior (Scheufele, 1999). Nevertheless, media nowadays are undergoing criticism because of their improper content (Fleming et al., 2006). There is a popular saying that the media are crammed with "pillows and fists" which are the metaphors of sex and violence. American journalists even evoke more sinister media effects: "if it bleeds, it leads" (Fallows, 1996). Episodic or fragmented media frames – those focusing on specific events or people rather than social backgrounds – fill in everyday news coverage (Iyengar, 1993). Further, Bennett (2003) argued that this kind of political communication was an unavoidable "information tendency" bringing in destruction of audiences' rational reasoning of the public life. Overwhelming attention to details of events or even personal traits torture audience perception so people improperly attribute responsibility to individuals in news stories, while missing the decisive factors originating from social structure (Iyengar, 1990, 1991, 1993). Not only audience cognition but also social actions are reshaped by media (Baron & Byrne, 2003; Iyengar, 1991; Weiner, 1995). Our understanding may be superficial and fragmental because episodic and amusing media coverage deprives human beings of their causal reasoning ability (Postman, 1986).

The cyber age seems to make everyone believe that infinite information produces rational reasoning materials for social and democratic issues (Lax, 2000). It provides the possibility and expectancy for improvement of individual life (Jin, 2001). However, in terms of cost considerations, news websites "port" information from traditional media, especially from print media (Barnhurst, 2002; Fredin, 1997) so content of traditional and new media is partly "overlapped" to a large extent (Tewksbury & Althaus, 2000). Some countries (e.g., China,

North Korea) even regulate traditional media and the official news agency as the only legal sources for the Internet. Managers are not permitted to recruit their own news gathering staff (Zhang, 2006). The traditional media are still a major news source so that episodic media frames in it still make "boundaries" and "interpret" the world (Gamson et al., 1992). Based on this logic, the news coverage we harvest from the Internet is as episodic as ever.

Notwithstanding, even though the Internet cannot "rewrite" content, its unique information-organizing pattern can reconstruct bits of information. As several scholars have explored (e.g., Eveland & Dunwoody, 2001; Eveland et al., 2004a; Eveland et al., 2004b; Sundar, 1998; Sundar et al., 2003; Tewsbury & Althaus, 2000), the Internet's special character – hyperlinks – might convey structural and associative information, weaving a broad, open-ended and all-inclusive network of facts. Therefore, a pressing question is whether hyperlinks can reconstruct traditional media frames by melting the fragmented and episodic information into an integrated form? Can audience responsibility attribution be altered due to the changing of media frames? Are there any differences in terms of responsibility attribution at different levels of Internet interactivity characterized by hyperlink types? If so, what are the dynamics of hyperlink's reconstructing effects?

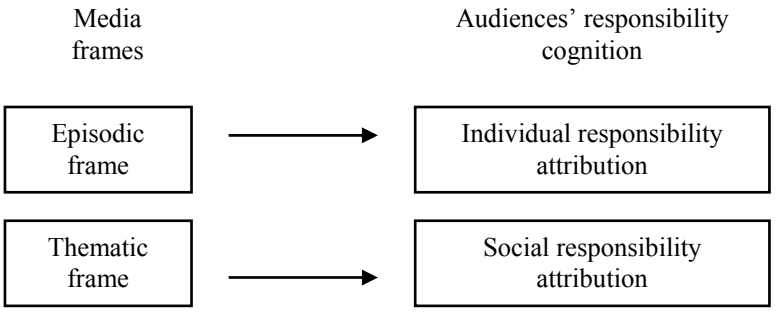
This research attempts to answer these questions by observing and analyzing people's responsibility judgment and online browsing behavior.

Literature Review

Responsibility Attribution and Traditional Media Framing

Responsibility attribution is one of the four major effects of framing (Pan, 2006). Iyengar's research (1990, 1991, 1993) showed how responsibility attributes varied with the way in which the media depict social facts. The independent variable – social fact representation – has two values. If news coverage is about the background of the story, it is called a thematic frame, which as Iyengar & Simon (1993) held, is "abstract and impersonal" (p. 369). On the other hand, if news coverage focuses on the "individual level rather than societal phenomena" (Iyengar, 1993), the media frame is defined as episodic. The dependent variable is thus personal or social responsibility attribution depending on whether the media frame is episodic or thematic. Iyengar (1993) took the issue of poverty as an example. Stimulus of the episodic frame was description of poor persons, their families and the places where they lived. The episodic frame drew a "good picture" (Iyengar, 1991, p. 14) which was filled with strong "visual attraction and made the audience be attendant in that situation" (Iyengar, 1990, p. 22). However, the thematic frame was the description of a difficult and severe social environment. In Iyengar's survey, the respondents exposed to the episodic frame believed that individual victims are accountable for their poverty due to "lack of hard work and education/skills", while those assigned to the thematic frame group pointed out problems of "the state of economic conditions and inadequate governmental/societal efforts" (Iyengar, 1990, p. 13). Iyengar's perspective on framing and attribution can be illustrated as follows:

Figure1. Iyengar's Framing Effect Model on Responsibility Attribution



Why Does Iyengar's Perspective Matter?

Why has the issue of episodic or fragmented news coverage attracted so much scholastic attention (e.g., Bennett, 2003; Iyengar, 1990, 1991, 1993; Postman, 1986)? Explanatory approaches in both psychology and media studies are relevant. Though the criteria for social judgment varies with different situations, social psychologists believe people are inclined to simplify such complicated processes into responsibility attribution because the process of attribution is the base of social conduct (Weiner, 1995). Attribution may not only conceive personal images that result in evaluations and attitudes of the communicators, but it also plays a role as a circumstantial and contextual cue for our daily choices, forming judgments, expressing opinions and making decisions (Baron & Byrne, 2003; Weiner, 1995). Further, Weiner (1995) pointed out that we extend our views from responsibility cognition to attitudinal and behavioral aspects. In this way, attribution surpasses the boundary of personal information processing to exert considerable influence on social interactivity.

From the perspective of media studies, episodic news coverage is crammed in everyday news reports in TV networks and on every page of newspapers (Iyengar, 1990). This inclination, which is an unavoidable trend of news style, as Bennett (2003) argued, conceals the real background of social facts so news cannot provide guidance for public action and hinders participation in political life. The accountability of social issues are left to politicians or victims while social factors and other necessary solutions such as social welfare reforms or mutual assistance, are ignored. Citizens, therefore, live in an "isolated or suburban community" (Turow, 1997) where growing cynicism unfolds (Cappella & Hall, 1997) because people think that those in power or in difficulty can decide problem solving and initiate social change without civic society debate and the participation of average people (Bennett, 2003). This also, to some extent, explains why today's politics become "candidate-centered politics" (Wattenberg, 1991). In this sense, audiences are "passive" receivers because of the lack of causal reasoning capacity (Postman, 1986). Postman's monograph (1986) carries a title that with great insight crystallizes the episodic and fragmented negative effects of messages: This kind of media text may just "Amuse ourselves to death." Based on this reasoning, media frames with attribution effects may be decisive factors for our social

action. They can also be references when people try to make sense of political issues and public affairs (Iyengar, 1991, 1993).

Comments on Iyengar's Perspective

There is no doubt that Iyengar's contribution (1990, 1991, 1993) explores a brand new stage for framing analysis which can enlighten scholars' knowledge mining on public opinion and media effects (Pan, 2006). Yet, some aspects of his findings need to be supplemented.

The attributing effects of media frames tested in previous research take place in the era of mass communication. It is based on the premise of mass media's "great effect" (McQuail, 2005) by which an audience may not actively reorganize information on their own. However, the Internet can change audiences' media usage and result in better control of personal browsing behavior such as speed, order and content, allowing people to enhance their learning (Kinzie et al., 1988; Tsai, 1989; Young, 1996). On the base of information reorganization by hyperlinks, Eveland et al. (2004a) proposed that hyperlinks are a specific kind of "framing mechanism" providing "a context" for an episodic event. Hyperlinks associate related information from other messages and integrate the "nature of public affairs topics" (Eveland et al., 2004b). Social perception may be "more thematic" than it is when triggered by disconnected messages in traditional media. In this way, can hyperlinks reconstruct episodic frames drawn from traditional media and reorganize audiences' responsibility judgment?

"As a theory of media effect," Iyengar's finding does not surpass the tradition of framing analysis in which individual frames are directly affected by media frames (Scheufele, 1999). The attributing process by mass media looks like a "black box" which simplifies complicated information processing into a "stimulus-response" model without any mediating variables (See Figure 1). The communicating process itself is beyond Iyengar's interest (Pan, 2006). In reality, this process is full of mediating variables (Eveland et al., 2004a). They composite a continuous process (Broadbent, 1958, cited in Eysenck & Keane, 2000) during which people handle information both in "top-down" or "bottom-up" manners (Neisser, 1976, cited in Eysenck & Keane, 2000). As mentioned above, audiences may take advantage of the interactivity of the Internet such as hyperlinks to reconstruct messages. Audience browsing behavior and information processing may modify learning effects. Therefore, the mediating variables should be taken into account.

So what are the reconstructing dynamics of the Internet? How do hyperlinks, one of the distinguishing characteristics of the cyber age, reorganize the frames that audiences receive? To answer this we need to consider the Internet's information processing pattern.

Information Structure on the Internet

How does the Internet reframe news coverage? What is the information difference between the Internet and traditional media? Both the content and structure of knowledge are major issues of media studies (Eveland et al., 2004a, 2004b). Nevertheless, as stated earlier, various kinds of media share most news content (Barnhurst, 2002; Fredin, 1997; Tewksbury & Althaus, 2000). What makes knowledge from the Internet unique may be its structure and

organization, since "website designs have a direct impact on knowledge" (Eveland et al., 2004b).

The word "Internet" is composed of the roots "inter" and "net" and both roots suggest interrelationship or interconnection. The literal and practical meaning of Internet is linkage between bits of information. This associative pattern of the Internet has its origin in the human memory structure. Eveland et al. (2001, 2004a, 2004b) called this the "structural isomorphism" of the human brain. In cognitive psychology, memory is modeled as a network composed of linked information nodes (e.g., Anderson, 1995; Sternberg, 2003). The nodes are factual knowledge describing concepts and attributes while the form of linkages between nodes is structural knowledge depicting the organizing pattern of information (Eveland et al., 2004a, 2004b; Jonassen et al., 1993). Memory and learning work by making "meaningful links" between nodes (Collins & Loftus, 1975; Jonassen, 1988; Nelson & Palumbo, 1992). In this sense, the Internet "mimics" the interrelating system of the brain (Churcher, 1989; Eveland et al., 2001, 2004a, 2004b; Nelson & Palumbo, 1992). Websites, texts, graphics, images, and videos look like nodes while hyperlinks are bridges among objects (Carison & Kacmar, 1999). The Internet may extend learning and assist the acquisition of information by the mechanism of structural isomorphism compared with traditional media (Churcher, 1989; Eveland et al., 2004b; Nelson & Palumbo, 1992). The additional dimension that audiences get from the Internet may be knowledge structure rather than factual knowledge.

How can Hyperlinks Reconstruct Episodic Frames?

How can hyperlinks reconstruct episodic frames? Hyperlinks as linkages organize knowledge structures, and may lead to "a large picture" of daily news. Such linked clusters of news may not be episodic any more because related messages on similar topics by hyperlinks are brought in to "enlighten readers about interconnected nature of news events" (Eveland, Marton & Seo, 2004, p. 84). The interactivity of hyperlinks may be like the interconnection of links in the human brain. Eveland & Dunwoody (2001), Eveland et al. (2004a, 2004b) and Sundar et al. (2003) all addressed research in hyperlinks and structural learning of knowledge. From the "reciprocal influence" view of human-computer interactivity (Pavlik, 1996), higher interactivity and more learning take place. Thus, different types of hyperlinks referring to different interactivity levels may influence information acquisition. With in-text hyperlinks, audiences can move to related knowledge any time during reading, and this may be the highest form of interactivity. Following-text hyperlinks represent an intermediary form of interactivity because click-in decisions are usually made freely after reading the whole text. Linear hyperlinks, in this reasoning, are the lowest form of interactivity due to limited browsing by the web-pages structure. Hyperlinks in this web are just like doorknobs of sequential doors. People are not free to go into the room they may wish because where they go is defined by room configuration.

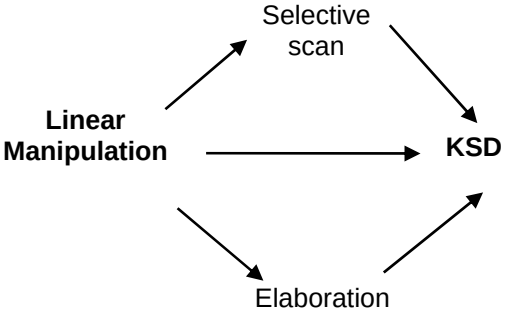
Mediating Variables for Hyperlinks' Reconstructing Effect

Though hyperlinks build information bridges, this does not mean that the Internet has already reconstructed traditional media frames, because the real effect of media frames are their influence on individual frames related to audience cognition and action (Scheufele,

1999). The information network may be a real network only if browsers actively melt the fragments together. Thus, only when users "structure, access, and manipulate information within a spatial network of nodes and links" (Conklin, 1987; Nelson, 1965 cited in Carlson & Kacmar, 1999, p. 386), the comprehension of society may take place on "a mental model that represents the objects and semantic relations" (van Dijk & Kintsch, 1983, cited in Thuring, Hannenmann & Haake, 1995, p. 58). From this logic, "the actions initiated by the website" (Sundar et al., 2003, p. 48) or so-called browsing behavior, intermediate between media and individual frames. With hyperlinks, "the users can freely choose their browsing paths…This intrinsic structure should have some effects on users' browsing and commenting activities" (Tsai, 1989, p. 126) and navigating clicking-in from one node to another specific destination (Carlson & Kacmar, 1999).

In a word, hyperlinks cannot directly reorganize episodic media frames. Browser behavior is critical in mediating variables and catalyzing frame reconstruction. Eveland et al. (2001, 2004a, 2004b) used hyperlinks and knowledge structure density (KSD) as independent and dependent variables to test the relationship between interactivity and knowledge structure. They used mediating variables such as selective scan and elaboration (see Figure 2). In their work, selective scans measured browsing pattern while elaboration depicted mental mechanisms for information connecting. KSD was used to assess the degree of knowledge interrelation. Yet, the results of their research were mixed.

Figure 2. Model of Linearity Manipulation and KSD



Comments on Previous Research

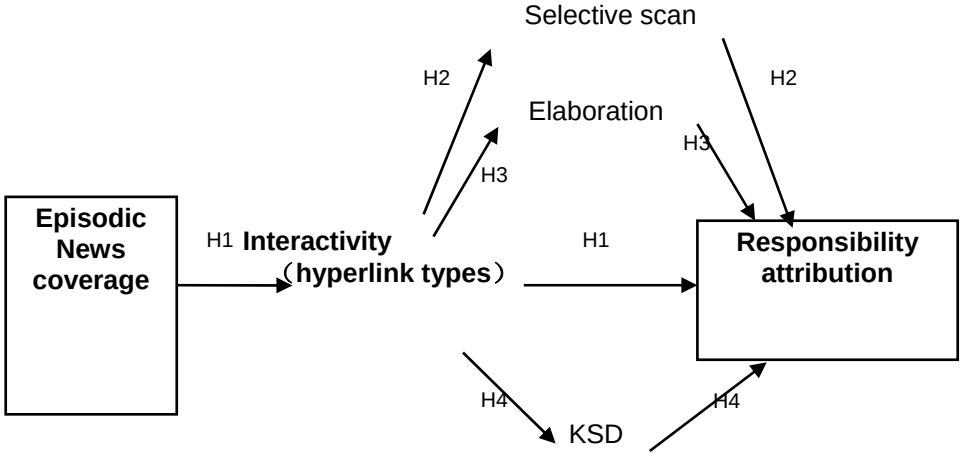
Based on previous literature, it is clear that the structural isomorphism of hyperlink system integrates fragmented messages so users can acquire knowledge with fuller backgrounds, which is close to Iyengar's thematic frames. Eveland et al. (2004b) even hold that knowledge structure "provided important evidence about episodic versus thematic framing effects," with interactivity as "framing mechanism" (p. 102). However, few empirical studies have focused on hyperlinks and responsibility attribution. Can the dynamics of hyperlinks and browsing behavior be accommodated with Iyengar's view on episodic versus thematic frames? Thus, the present research attempts to deal with the issue of hyperlinks and

episodic frame reconstruction while using browsing behavior and linking action as mediating variables.

Research Framework and Hypotheses

The research tries to place Iyengar's model (1990, 1991, 1993) into an Internet communication context while adding mediating variables to the framing process. The integration of Iyengar and Eveland et al.'s models is done as follows (see Figure 3.).

Figure 3. Model of Hyperlink Types and Responsibility Attribution



The present model extends the dependent variable of Eveland et al.'s model to responsibility attribution while episodic news coverage is fixed by imputing stimulus. Meanwhile, for Iyengar's model of frame and attribution, mediating variables such as selective scan, elaboration, KSD and even hyperlinks, are inserted so the "black box" may shift to a "gray box" if the model is confirmed. The causal relationship of variables is arranged as follows: (a) Hyperlink type (degree of Internet interactivity) is an independent variable; (b) Responsibility attribution is the dependent variable; (c) Selective scan, elaboration and KSD are mediating variables; and (d) With the purpose to test the reconstructing effect of hyperlinks, all inputs are identical, episodic news coverage. The hyperlink types are manipulated according to those actually used in cyberspace. Three interactivity degrees from low to high are used: linear treatment, following-text hyperlinks and in-text hyperlinks.

As noted earlier, higher interactivity of a hyperlink design means that more information and connections are available. The research questions are generalized as the following hypotheses:

Hypothesis 1: Social background attribution score will be greater in higher interactivity level hyperlink manipulation.

This means the relationship between social background attribution score and hyperlink types will be as follows: In-text link > following-text link > linear link. Because "linear websites can be viewed as similar to print newspapers" (Eveland et al., 2004b, p. 89), a comparison between Internet and traditional media on attribution is made.

As Iyengar (1990, 1991, 1993) argues, attribution was composed of causal and treatment attribution, and the influence on dependent variables will be tested separately. So hypothesis 1 should be divided into two sub-hypotheses:

Hypothesis 1a: Social background score of causal attribution will be greater in higher interactivity level hyperlink manipulation.

Hypothesis 1b: Social background score of treatment attribution will be greater in higher interactivity level hyperlink manipulation.

Selective scan, elaboration and KSD, the indices of mediating variables of Internet interactivity in previous research (Eveland et al., 2004a, 2004b), are involved in the present study to test how hyperlinks reframe audience attribution. Therefore,

Hypothesis 2: Selective scan will positively affect social factor attribution score.

Hypothesis 3: Elaboration will positively affect social factor attribution score.

Hypothesis 4: KSD will positively affect social factor attribution score.

For the same reason that attribution includes causal and treatment dimension, this study will attempt to verify hypotheses 2, 3 and 4 from the above two perspectives.

Method

Research Design

With the purpose of testing the relationship between hyperlink types and responsibility attribution, this study utilizes controlled laboratory experiments because researchers could directly manipulate causal relationships between independent and dependent variables with the effective exemption of disturbance (Christensen, 1997). A set of between-group computer-based experiments was implemented. The participants were randomly assigned to a three-level interactivity group featured by hyperlink types. The in-text hyperlink group, in which users can directly navigate to related information when looking through the stimulus, represented the highest level of interactivity. The following-text hyperlink, which is the most widely used pattern in actual websites, was the middle level. The linear treatment group presenting information in sequential order played the role of "traditional media" for comparison. A comparative study between Internet and traditional media on episodic frame reconstruction was designed. For valid evaluation of hyperlinks' reconstructing effect, a control group which only presented an episodic homepage without hyperlinks was also included.

Participants

One hundred forty undergraduate students of a Graphic Design Course were enrolled as a convenient sampling for this study. They were primarily first and second year undergraduates, young and relatively well educated, who are also experienced Internet users. The participants were randomly distributed to one of four groups of 35 people when they had class in the computer graphic design laboratory. After questionnaire filling, researchers filtered out invalid participants by blank-check and mistake-check[1]. Valid subjects (n=117, male=42, female=75) for each treatment were: control group (n=32), "in-text hyperlink" group (n=29), "following-text hyperlink" group (n=30), and a "linear treatment" group (n=26). They had an average age of 19.34 years and they spent 25.92 days online out of the past 30 days, and none of them claimed to have not used the Internet in the past month.

Stimulus

A homepage with episodic frames and 22 relevant articles was prepared as a stimulus. The homepage articles were about a Chinese youth's unfortunate experiences such as failing to go to school, committing a crime, losing jobs and being discriminated against when job-hunting. The story gave us a vivid depiction of his life. Indeed, the reason for his suffering was that he did not have an Official Household Registry[2]. The news was a typical episodic framed story while the actual driving force was the flaw of the Official Household Registry System. Because our goal was to verify hyperlink influence on attribution, other potentially affecting factors were avoided. The selection of linked articles was based on following systematic criteria: (a) Truth and objectivity; (b) No personal feelings; (c) Story and information not typical for recalling.

The story was the identical stimulus in all manipulations. For the in-text hyperlink group, participants were allowed to read more freely, instead of waiting to finish a page of reading, users could jump from one page to another by clicking in highlighted hyperlinks in the text. In the following-text group, the 22 hyperlinks with article titles were listed at the bottom of the homepage, and participants could select the stories they were interested in, and this was the middle level of interactivity. For the linear treatment group, the only way to move between pages was to use navigation buttons "next" and "back" at the bottom of the screen. Thus, this site represented the lowest level of interactivity. In the control group, participants only read the homepage with episodic frames.

Procedure

Before each experiment, the researchers gave instructions to the effect that participants would read an article written by a candidate hunting for a position in a news agency. They were informed that the applicant's ability for news writing and information gathering would be evaluated, and everyone could be relaxed and fill out the questionnaires as they liked. Then participants were asked to browse the website as usual. The reading time was fixed to 15 minutes which was not enough to read all 23 articles. They were instructed that all articles were being "evaluated." Yet, they were told several times to read as usual. This arrangement

was aimed to make participants use hyperlinks while not interrupting their browsing habits. During the experiment, participants could only visit stimulus materials we published on a private blog, other unrelated websites were blocked. Afterwards, a paper-and-pencil post questionnaire was administered. The subjects in the control group merely completed a shortened version of the questionnaire (excluding questions related to the use of stimulus materials in sub pages and mediating variables).

Measures

Causal and treatment attribution were measured separately by a 7-point Likert-scale with point 1 as individual responsibility and point 7 as social responsibility (M=4.4916, SD=.3387, Cronbach's Alpha=.4989). Similar versions of scales for selective scan and elaboration were utilized by previous research (Eveland et al., 2004a, 2004b), so the authors used them for mediating variable testing. (Selective scan: M=5.0824, SD=.3160, Cronbach's Alpha=.6506; Elaboration: M=4.9133, SD=.2133, Cronbach's Alpha=.6800. See Appendix for details.)

For Knowledge Structure Density, two sub-indices were implemented: Dichotomous KSD and Value KSD (Scott, 1990; Eveland et al., 2004a, 2004b). A 10 X 10 matrix was provided in the questionnaire. It was used to evaluate correlations between concepts cited from 23 articles. The concepts were chosen by the researchers. Value KSD was to assess the connected density by the correlation value judged by participants. If a subject thought they were correlated, a score from 1 to 7 was marked to represent the correlation strength. If they were not thought to be correlated, the subject wrote 0 in the respective cell. The letter n is the number of paired concepts, v represents the value of each cell of the matrix and k is a given link (M=.5484, SD=.7706).

$$KSD = \frac{\sum kv}{n(n\text{-}1)/2}$$

(Scott, 1990; Eveland et al., 2001, 2004ab)

Dichotomous KSD was to calculate the degree of connectedness by the number of linked pairs where n was the number of paired concepts and l represented the number of linked pairs (M=.7676, SD=.1513). Dichotomous KSD and Value KSD were correlated (r=.553, p=.01).

$$KSD = \frac{1}{n(n\text{-}1)/2}$$

(Scott, 1990; Eveland et al., 2001, 2004ab)

Findings

This research aims to test the reconstructing effect of hyperlink types. A comparison of attribution scores was launched by ANOVA as the first step. More specifically, hypothesis 1 predicted that the social attribution score would be greater in high interactivity hyperlink manipulation. In other words, the relationship between social factors attribution score and hyperlink type would be as follows: In-text link > following-text link > linear link. Because responsibility attribution contains causal and treatment dimension (Iyengar, 1990), both ANOVA and Post Hoc Test were conducted separately.

Expectation of hypothesis 1a was partially supported because the result did not fully verify this hypothesis by post hoc mutual comparisons. As it was about causal attribution and hyperlink types, the main effect was significant with F (3, 115) = 18.257, $p < .001$. However with the Post Hoc Test, the result did not strongly support the authors' assumption (see Table 1). As pointed out earlier, all intergroup score comparisons might be significantly different with social background attribution scores and with ascending order from control group to in-text manipulation. Yet, just four of the six pairs of between-group score differences were significant (e.g., linear treatment versus following-text; following-text versus in-text; in-text versus control group; following-text versus control group). The score difference of linear treatment with both in-text and control group were not as expected. Furthermore, the comparative relationship between scores was not as in hypothesis 1a. In-text treatment, the assumed highest level, showed a lower score than following-text manipulation (Following-text: 5.43, In-text: 4.41).

The data conveyed a mixed result of hypothesis 1a. Those participants exposed to following-text hyperlinks might believe more that the victim in the news story would shoulder the responsibility for an unfortunate life. Yet the score of the in-text group could not support the expectation of statistic significance with the linear group and the following-text treatment. Meanwhile, the score of the linear treatment with the sequential information structure was not significantly different from the one of the control group without related information in sub-pages.

Table 1. ANOVA and Multiple Comparisons of Hyperlink Types and Causal Attribution

ANOVA	Multiple Comparison by Dunnett Test			
F (3, 115) = 18.257, $p < .001$	Attribution Score	Between-group Score Difference		p
	Following-text 5.43	Linear group -- Following-text	**-1.63**	**.00**
	In-text 4.41	Linear group -- In-text	-.61	.353
	Linear group 3.81	Linear group -- Control group	.40	.678
	Control group 3.41	Following-text -- In-text	**1.02**	**.010**
		Following-text -- Control group	**2.02**	**.00**
		In-text -- Control group	**1.00**	**.015**

Shedding light on hypothesis 1b, the relationship between treatment attribution and hyperlink types, expectations were also partially supported because the result did not fully verify this hypothesis by post hoc mutual comparisons. As it is about treatment attribution

and hyperlink types, the main effect was significant with F (3, 115) = 23.318, p < .001. However, with the Post Hoc Test, the result did not strongly reflect the authors' assumption (see Table 2). As pointed out earlier, all intergroup score comparisons might be significantly different with social factor attribution score rising from control group to in-text manipulation. Yet, also five of the six pairs of intergroup score differences were significant (e.g., linear treatment versus following-text; linear treatment versus in-text; following-text versus in-text; in-text versus control group; following-text versus control group). The score difference of linear treatment with control group was not as expected and the score comparison between following-text and in-text manipulation just showed a slight significance at the .05 level. Furthermore, the comparative relationship between scores was not as in hypothesis 1b. In-text treatment, the assumed highest level, showed a lower score than following-text manipulation (Following-text: 5.47, In-text: 4.66).

The data conveyed a mixed result of hypothesis 1b. Those participants exposed to following-text hyperlinks might believe more that the victim in the news story would solve the problem. Yet the score from the in-text group could not support the expectation by comparison with the following-text treatment. Meanwhile, the score for linear treatment with sequential information structure was not significantly different from the one of control group without related information in sub-pages.

Table 2. ANOVA and Multiple Comparisons of Hyperlink Types and Treatment Attribution

ANOVA		Multiple Comparison by Dunnett Test		
F (3, 115) = 27.764, *p* < .001	Attribution Score	Between-group Score Difference		P
	Following-text 5.47	Linear group -- Following-text	**-1.85**	**.00**
	In-text 4.66	Linear group -- In-text	**-.1.04**	**.014**
	Linear group 3.62	Linear group -- Control group	.32	.777
	Control group 3.29	Following-text -- In-text	**.81**	**.041**
		Following-text -- Control group	**2.17**	**.00**
		In-text -- Control group	**1.36**	**.00**

The remaining hypotheses were tested using the General Linear Model to verify the role of mediating variables such as selective scan, elaboration and KSD on frame reconstructing effect. Because the questionnaires of the control group did not have items concerning mediating variables, the GLM was only conducted in in-text, following-text and linear treatment. Hypothesis 2a and 2b assumed that selective scan might be positively related with social attribution. Nevertheless, the selective scan scale did not present any positive effect on attribution (see Tables 3-4). Hypothesis 3a and 3b yielded the same result as hypothesis 2. Hypothesis 4a predicted that KSD would be positively related with causal attribution. This hypothesis was supported for value density (ß=.435, p<.05) while that of dichotomous density was without any significant difference (ß=.382, p=.703). Unlike Hypothesis 4a, neither dichotomous nor value density could support the treatment attribution of hypothesis 4b (Dichotomous KSD: ß=-.441, p=.692; Value KSD: ß=-.196, p=.373).

As Eveland et al. (2004a, 2004b) have argued, these mediating variables did not show any significantly positive relationship. Further checks for validity of selective scan, elaboration and KSD were conducted. Beyond the authors' assumption, there was not any

Table 3. General Linear Model for Mediating Variables and Causal Attribution

	Type III SS	***df***	***MS***	***F***	***Beta***	***p***	***Partial Eta Squared***
Corrected model	48.057[a]	6	8.010	6.722	--	.000	.344
Intercept	17.454	1	17.454	14.648	4.205	.000	.160
Selective Scan	.485	1	.485	.407	-5.70E-02	.525	.005
Elaboration	2.620	1	2.620	2.199	-.267	.142	.028
Dichotomous KSD	.175	1	.175	.147	.382	.703	.002
Value KSD	5.831	1	5.831	4.894	**.435***	**.030**	.060
Treatment	27.581 [b]	2	13.790	11.573	--	.000	.231
Error	91.752	77	1.192				
Total	1932.000	84					
Corrected Total	139.810	83					

Note

a. Treatment attribution R2=.286 (adjusted R^2=.213).

b. This includes linear treatment, following-text hyperlink and in-text hyperlink, but not the control group. c. * p < .05

Table 4. General Linear Model for Mediating Variables and Treatment Attribution

	Type III SS	***df***	***MS***	***F***	***Beta***	***p***	***Partial Eta Squared***
Corrected model	45.713[a]	6	7.619	5.153	--	.000	.286
Intercept	20.836	1	20.836	14.092	4.822	.000	.155
Selective Scan	.788	1	.788	.533	-7.26E-02	.467	.007
Elaboration	3.693E-02	1	3.693E-02	.025	-3.17E-02	.875	.000
Dichotomous KSD	.233	1	.233	.158	-.441	.692	.002
Value KSD	1.189	1	1.189	.804	.196	.373	.010
Treatment	35.930[b]	2	17.965	12.151	--	.000	.240
Error	113.846	77	1.479				
Total	1961.000	84					
Corrected Total	159.560	83					

Note

a. Treatment attribution R2=.344 (adjusted R^2=.293).

b. This includes linear treatment, following-text hyperlink and in-text hyperlink, but not the control group.

intergroup significance by hyperlink treatment (Selective scan: F (2, 82) = .333, p = .718; Elaboration: F (2, 82) = 1.876, p < .160; Dichotomous KSD: F (2, 82) = 1.260, p < .289;

Value KSD: $F(2, 82) = 2.241$, $p < .113$). The mediating role of browsing behavior should be discussed.

Discussion

Looking at the outcome of this study, perceptions of the Internet's influence on our world may be to some extent reshaped by our findings. Social responsibility attribution, the basis of social understanding and mutual action, as Weiner (1995) suggests, and which was developed in mass media by Iyengar (1990, 1991, 1993), shows new results in the context of Internet communication. The episodic frames dominating traditional media could have been reconstructed by hyperlinks when this news coverage went online. The "framing mechanism" of hyperlinks, in the phrasing of Eveland (2001, 2004a, 2004b), has been partially verified in this study. Although the results are mixed depending on the particular hypothesis, the experiments show the Internet's critical role of cushioning print media's framing effects. Linked information online may refurbish the opinion basis for rational action because browsers can make sense of the world in a more complete and integrated way. Yet, the results obtained by analyzing the attribution score in different hyperlink manipulations are complex, so the following section will address the output and its implications.

What seems most critical for the discussion is following-text manipulation. The score of this experimental treatment, with layout that hyperlinks also at the bottom of the homepage such as that of the linear group, shows significant differences with both the linear and the control group. Further, its attributing score is higher than that of the in-text website which was assumed to be the most interactive at the 0.05 level. How can we interpret this result? A theoretical and practical explanation could run as follows:

From a theoretical viewpoint, research in psychology and educational science has focused on this issue for years. The first explanation may be schema and cognitive completeness. Schema, the guideline of people's daily perception and information process (Sternberg, 2003), is widely accepted in cognitive psychology as a "slot" structure of attributes of social facts in our mindset that give us "predictive information" (Anderson, 1995). Once participants get involved in some parts of a news story, a similar or even the same schema may appear as the story scripts take effect, and this allows people to predict later events. This process can keep people from continuing their reasoning, reading and predicting. Thus, those exposed to in-text hyperlinks may not interrupt reading for related information with the purpose of a more complete understanding of a news story. On the other hand, the motivation to click in-text hyperlinks should be taken into account. But to what extent did participants have an information demand or were interested enough in the linked pages to click hyperlinks? The motivation of this behavior should be considered in further research of hyperlink use.

From a practical viewpoint, in trying to explain why following-text manipulation obtained the highest score in attribution, we must not neglect audience browsing habits. Following-text hyperlinks are the most widely used form on websites while in-text hyperlinks are not so prevalent (Dominick, 2002). People form habits: after reading the main story, they look through the following hyperlinks for more related information. The participants in this group only did what they normally do. From this viewpoint, they might get related information leading to social attribution. Looking back to in-text and linear manipulation, the

participants might face Internet browsing interplay they were not familiar with, so their active behavior to click hyperlinks for new information may have been restricted by uncertainty in an unfamiliar context (Baron & Byrne, 2003). This may well have hindered the automatic information process and action through script in audiences' minds (Myers, 2005). Meanwhile, Sundar et al.'s research (2003) showed a similar explanation, that high level interactivity such as in-text hyperlinks, can annoy subjects by its higher level of information fragmentation.

Another result worth discussing is that linear treatment showed no significant difference from the control group. Although linear websites were less interactive than following-text and in-text hyperlink pages, in reality they connected related information. In this vein of reasoning, it may be self-evident that more knowledge was available in linear treatment in comparison with the control group which only had the content of homepages. But why did the score comparison not show any significant effect between these two groups? The layout of linear treatment may provide an explanation. The hyperlinks to "next article" in linear websites were at the bottom of each page, so the patterns were like online serial fictions and participants could conduct a general browsing or even a complete reading of the main story before clicking to the next page. Such special reading patterns might lead to theoretical and research method explanations. Media frames are the information organizing structure guiding audiences' social cognition and reasoning (Gitlin, 1980; Gamson, 1984). Their roles as schemas make boundaries and interpret the world (Gamson et al., 1992). Reading the whole stimulus story first may trigger cognition referring to media frames. After this, an audience may reduce its information processing because people subconsciously incline to save the limited reasoning resources in the brain once they have already absorbed the impression of social facts (Eysenck & Keane, 2000). As a result, the influence of existing frames in news coverage can be reinforced in relative terms, so the effects brought in by hyperlinks and the information they link with can be weakened. From the research method direction, after several minutes of energy concentration on the story in the homepage, the participants may be tired, so even though they had been instructed to read the articles on sub-pages, they may abandon reading these sub pages. From these two views, we may conclude that participants in linear treatment may read just the main story like those in the control group. This may provide an answer to why no significant differences were found.

As suggested several times, social responsibility attribution is brought in by the information a person acquires. Interconnected knowledge may give us a thematic picture while only fragmented and independent information just show people the episodic pictures. In the context of Internet communication, information acquisition is through click-in action and mental association with knowledge furnished by hyperlinks. Previous research utilized such mediating variables such as selective scan, elaboration and KSD—behavioral and mental constructs to measure the influence of Internet interactivity (Eveland et al., 2001, 2004a, 2004b). In our research, even intergroup ANOVA of these three variables did not show any significant difference. In the General Linear Model estimation, only the Beta of Value-KSD conveyed significance for a positive relationship with causal attribution. These three mediating variables did not verify the hypotheses, while the most evident intergroup difference was still hyperlink manipulation. Based on this logic, we find that self-report scales of Internet browsing and mental information processes may lack validity for Internet browsing behavior measurement. Accordingly, the authors suggest that the objective record of browsing behavior such as computer-based monitor of exposure time and click-in behavior

may be a better measurement to construct mediating variables in framing mechanisms of hyperlinks.

In conclusion, though the hypotheses were not strongly supported by the experiment data, it is still theoretically instructive to find evidence that hyperlinks on news websites may give audiences a complete and integrated depiction of society by linking relevant knowledge together. Fragmented and amusing frames may be moderated by the Internet (Bennett, 2003). The negative effect on causal reasoning capacity is cushioned by new media which give people abundant materials for rational and analytical thinking. Yet, such reconstructing effects are complicated since cognition is a combination of both environmental stimulus and brain information processing. Improved understanding of psychological dimensions will allow better appraisal of the internal dynamics of frame reconstruction by hyperlinks. Nevertheless, as Lax suggests (2000), cyberspace might not give us a better chance to conduct democracy, but it can leave us the opportunity to think more rationally about the formation of democracy.

Appendix

Measurement
(a) Causal attribution (7-point Likert-scale)
Who should shoulder the responsibility for the victim's unfortunate experience in the story, the victim himself or the society? (Use 1~7 to represent the extent of your opinion with 1 for victim himself while 7 for society.)
(b) Treatment attribution (7-point Likert-scale)
Who should solve the problem of the victim in the story, the victim himself or the society?
(c) Selective scans (7-point Likert-scale)
1. I only read sections that looked important.
2. I skimmed through the story.
(d) Elaboration (7-point Likert-scale)
1. I found myself tying what I read to ideas I've had before.
2. I tried to visualize the events described in the stories.
3. I tried to relate what I read to my own background experiences.
4. I tried to see the connections between the various stories I read.
5. I thought about how the stories related to other things I know.
6. I tried to mentally piece the stories together like a puzzle to gain a thorough understanding.
7. I found myself making connections between the news stories and information I've read or heard about elsewhere.

Notes

[1] Blank-check aims to filter the questionnaires with at least one unfilled item. Mistake-check aims to filter questionnaires with at least one mistaken item (e.g., mark 10 at age item).
[2] Official Household Registry is a special demography managing and controlling system in Mainland China. It is divided into the urban and the village Household Registry. It is not only the data record of basic demographics, but also includes a person's right to complete social welfare such as education, housing allowance and medical insurance. If an urban citizen or

villager leaves the place where he or she has recorded Household Registry, social welfare cannot be issued elsewhere, even though the tax has been paid. This system is the obstacle to social fairness especially for villagers in China.

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