Using a Modified Heuristic-Systematic Model to Characterize Information Seeking on the Internet

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USING A MODIFIED HEURISTIC-SYSTEMATIC MODEL TO CHARACTERIZE
INFORMATION SEEKING ON THE INTERNET

by

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ABSTRACT
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This study combines two major theories in communication research, Palmgreen and Rayburn's Expectancy-Value approach to media gratifications (1985) and Eagly and Chaiken's Heuristic-Systematic Model (1989), in order to identify the relationships between information seeking tendencies, channel beliefs about specific websites, and website usage for accurate information. Taking a page from schema theory (Rumelhart, 1980), it was expected that individuals who use the Internet frequently to find accurate information have a set of beliefs concerning what a "good" or "bad" website has on it. To this end, a study of 130 undergraduate college students was completed. The study had an added experimental manipulation which varied the domain extension and authority of the website given for the task. The analyses performed showed that when given a task of finding accurate information, a higher capacity to understand information predicted which characteristics of a website were highly valued and how likely a given website was to have those characteristics. This in turn predicted website usage. Furthermore, websites with official domain extensions (e.g., *.gov*) were considered more likely to have desirable characteristics, more likely to contain accurate information than websites with non-official domain extensions (e.g., *.com*), and were more likely to be used. The study also offers a model of how information seeking, domain extension, and channel beliefs lead to website use.

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I. INTRODUCTION

For the new generations born into the "information age," the Internet is an indispensable resource. No longer is it required that a query to be solved requires a trip to the local library, rather, all the information is a smart phone swipe or laptop click away. It could be argued that with such an accessible resource offering quick information, the Internet is perhaps among the first one or two places that people will go to for information. However, as opposed to how information "gatekeepers" like newspapers, magazines, television, and books operate, anyone can quickly put unrestrained content onto the Internet for millions of people to see. Because of this, there is a well-documented concern of both information providers and information seekers of a perceived decline in quality of Internet information, or at least a growing belief that high-quality information will be impossible to find amidst the vast amount of lower quality, unfiltered information (Eysenbach, 2000). Accordingly, people must constantly apply different strategies on the Web to get at information that is sufficient for them.

Searching for good information on the Web is a concatenation of many factors: credibility, motivation, involvement, and cognitive capacity. Some scholars paint the Internet as a minefield to be traversed, with errors littering cyberspace (e.g. Nadaranjan & Ang, 1999). However, when seeking and later processing information, individuals take cues, themselves driven by motivations, in order to traverse this field to obtain sufficient information (e.g. Freeman & Spyridakis, 2004). The current study asks what cues, given a motivation to be accurate, do people use for seeking out good information on the Internet. Have Internet users become complacent in their evaluation of information, or are

useful heuristics like an official domain extension perceived to be just as good at getting at reliable information?

While the Internet is a modern invention, our brains are not. We bring to the table all of the same cognitive capabilities that we would to books, magazines, or television, despite the radical change in medium. Therefore, the ways that we process information are the same, though there is much more information and access to it than ever before. To explore this, a theory of information processing, the Heuristic-Systematic Model (HSM) developed by Shelly Chaiken (1980a), is considered.

II. LITERATURE REVIEW

A. Theoretical Framework

1. The Heuristic-Systematic Model of Information Seeking and Processing

The HSM posits that when people are forced to make judgments, they can process information either heuristically or systematically. Heuristic processing exerts relatively little cognitive effort and relies on heuristics—general rules, stereotypes, and shortcuts—to make judgments. Rather than processing argumentation, people may rely on more accessible information such as the source's identity or other non-content cues in deciding to accept a message's conclusion (Chaiken, 1980a, p. 752). Of course, for people to use heuristic processing, it is required that those heuristics are first available, accessible, and applicable (Higgins, 1996). In order to process information heuristically, a heuristic must be stored in memory (available), retrieved from memory (accessible), and relevant (applicable) to the judgment task (Chen, Duckworth, & Chaiken, 1999). Conversely, systematic processing—an in-depth look at the content of a message and its evidence— exerts much more cognitive effort. People using systematic processing will actively attempt to evaluate and comprehend a message's arguments or content (Chaiken, 1980a, p. 752). While heuristic processing avoids detailed processing of message content, relying on more peripheral characteristics (Kahlor et al., 2003), systematic processing occurs when an individual encounters information of significant personal importance. In this "high issue involvement," information reliability and accuracy outweigh time and cognitive energy constraints and the receiver focuses more on message content rather than heuristic cues (Chaiken, 1980a, p. 754). Systematic processing may also be needed

when there is a perceived need to be accountable for one's judgments (Maheswaran & Chaiken, 1991).

As one determination for how much cognitive effort people will put into processing information, the HSM stipulates that people operate under a "sufficiency principle." This principle states that individuals will actively engage in information processing until they have reached the depth or breadth of understanding that they perceive to be necessary, or the "sufficiency threshold" (Chen et al., 1999). Also according to this principle, people will exert whatever effort is required to attain a "sufficient" degree of confidence that they have accomplished their processing goals (Eagly & Chaiken, 1993). Between current knowledge and sufficiency exists a gap in knowledge that will determine the information processing style. The perception of a large gap between current knowledge and knowledge needed for a confident decision is associated with systematic processing and vice versa with heuristic processing—the perception of a small gap between current knowledge and knowledge needed to make a confident decision is associated with heuristic processing (Eagly & Chaiken, 1993). This gap is also modulated by relevant motivations, which is discussed in the next section.

Another factor guiding cognition in the HSM is information gathering capacity (Eagly & Chaiken, 1993). Capacity—the ability to understand and learn information about a topic—acts as a moderator in the sufficiency principle. For example, a physicist (having a high capacity) might heuristically process a news story about the Higgs boson while a layman (with a low capacity), wanting to understand the story, must exert much cognitive effort to achieve the same goal. The HSM posits that one will exert cognitive

effort until the information sufficiently threshold is reached, but this is all assuming an adequate capacity (Chen et al., 1999).

Individuals can switch back and forth between both heuristic and systematic processing, and indeed they can co-occur (Chaiken, Liberman, & Eagly, 1989), constructively co-occur (Maheswaran & Chaiken, 1991), or even bias each other (Chaiken & Maheswaran, 1994). People are likely to gravitate towards one or the other, however, based on their capacity to process the information and their level of motivation (information insufficiency). For example, a high level of motivation and capacity can drive a person to move beyond heuristic to systematic processing (Chaiken et al., 1989).

2. Motivations in the HSM

Along with the sufficiency principle are the motivations to process information and their associated levels. To distinguish between types of motivation and levels of motivation, Chen et al. (1999) explain: "[The] level of motivation predicts whether heuristic or systematic processing will predominate in a judgment…the type of motivation predicts the 'direction of cognition'" (p. 44).

In order to satisfy motives for information seeking and processing, message receivers come to some equilibrium between minimizing cognitive effort and maximizing confidence (Chaiken et al., 1989). Systematic processing tends to be more effective in increasing confidence than heuristic processing (Chen et al., 1999). Using the sufficiency principle as a reference, systematic processing is more likely to occur when there is a large gap perceived, but a higher level of motivation also creates a larger perceived gap (encouraging systematic processing). On the other hand, a decreased level of motivation

may shorten the knowledge gap, encouraging heuristic processing (p. 45). In this way, motivations can lead to either heuristic or systematic styles of processing.

According to Chen et al. (1999), there are three main types of motivations in the HSM that direct cognition (p. 45). First, there is *accuracy* motivation. This motivation entails an open-minded and even-handed treatment of judgment-relevant information (Chaiken, 1980a; Chaiken, 1980b). This is therefore a motivation to obtain accurate and valid information in order to make a confident judgment. Relating to information processing, when the accuracy motivation and cognitive resources are low, heuristic processing may be seen as the best way to satisfy accuracy goals. When the accuracy motivation and cognitive resources are high, systematic processing will tend to instill a greater judgmental confidence given a heightened sufficiency threshold (Chaiken, Giner-Sorolla, & Chen, 1996).

Secondly, there is *defense* motivation. This motivation is a desire to make judgments that are in accordance with one's material interests or identity-entangled beliefs (Chaiken et al., 1996). These "self-definitional" beliefs are those that are closely tied to the self, one's values, identity, and attributes (Chen et al., 1999). Interestingly, defense motivation affects information processing by creating selectivity among both heuristic and systematic measures. Chen et al. (1999) have found that, in order to maintain self-concept, information is processed selectively (p. 45). When the defense motivation is low, encouraging heuristic processing, people will selectively choose which heuristics are congenial to their own beliefs, and discard or ignore the ones that are not. Conversely, when defense motivation and cognitive resources are high, even the typically in-depth and thorough nature of systematic processing becomes biased. Systematic

processing in a defensive motivation seeks reinforcement and not necessarily truthful information. In fact, contrasting information may be systematically scrutinized in an effort to tarnish its validity (Liberman & Chaiken, 1992). Again relating to the sufficiency principle, unsupportive heuristic cues (finding a website written by someone with no credentials, for example) shake confidence, therefore encouraging systematic processing to close a widening sufficiency gap. Likewise, supportive heuristic cues boost confidence in prior beliefs, rendering systematic processing less likely with a shortened sufficiency gap (Giner-Sorolla & Chaiken, 1997). This is an important factor to remember when looking at information processing behavior on the Web. A common tactic in credibility assessment, for example, is to look for multiple confirmatory sites for information validity (Metzger, Flanagin, & Medders, 2010). Given the wide array of information on the Internet, this heuristic, when defensively motivated, may be to the detriment of the Web user (i.e., an "echo chamber").

Lastly, HSM considers an *impression* motivation. This motivation is a desire to form judgments that will satisfy current social goals and is dependent upon perceived interpersonal consequences of expressing a particular judgment in a social context. Like defense motivation, it also leads to selective processing towards relevant, in this case social, goals (Chaiken et al., 1996). Like to defense motivation, impression motivation selectively applies both heuristic and systematic processing in line with the sufficiency principle, in order to achieve interpersonal objectives (Chen et al., 1999).

3. *Information Seeking/Processing Cues on the Internet*

Probably the most prominent cues when seeking information on the web are related in some way to credibility. Other approaches to the question of information seeking/processing online can consider informal learning or memory, but because the present study examined heuristic and systematic seeking/processing on the Internet in general, cues such as credibility are most important.

Research has found that the more one relies on a medium for information, the more credibility is given to that medium (Johnson & Kaye, 1998; Robinson & Kaye, 2000). Specifically, Internet users may rate the Internet as highly credible while nonusers may not (UCLA, 2000).

Two main dimensions of credibility have been identified for source credibility on the Web: expertise and trustworthiness (Metzger, Flanagin, Eyal, Lemus, & McCann, 2003). The attributes associated with expertise are commonly: perceived skill, competence, knowledge, qualification, and reputation. Also weighing heavily on personal judgment, the attributes commonly associated with trustworthiness are: well-intentioned, truthful, unbiased, perceived goodness and morality, honesty, and integrity (Metzger et al., 2003). For example, higher perceived source expertise tends to lead to greater attitude change towards credibility ratings (Eastin, 2001). Moreover trustworthiness, as a credibility indicator, can be modulated even by perceived source motivations. Whitehead (1968) found that the perceived source intention shaped the degree of trustworthiness bestowed by message receivers. Similarly, more recent studies have found that in an online context, information seekers are likely to view websites with commercial motives as less credible than those without perceived motivations to persuade or sell (Rieh &

Belkin, 1998; Warnick, 2004). Furthermore, perceived trustworthiness likely exerts more influence on people's credibility assessments that does expertise (Lui & Standing, 1989; McGinnies & Ward, 1980), although this has seldom been studied in an online context. While both of these factors relate to a website's source credibility in a broad and general way, there are other more specific aspects of the Internet that influence credibility.

There are many factors in Internet credibility that have been explored in previous research. Factors relating to the source or medium (in the literature, source and medium are used interchangeably) include: source expertise/knowledge/competence, source trustworthiness, source credentials/influence, message content/relevance/currency/accuracy/tailoring, website surface attractiveness/format, design of website interface, speed of website loading, website accessibility/usability, and website interactivity/flexibility. Factors relating to the web user include: assumptions about source or topic, level of motivation, knowledge/expertise regarding topic and technology, and "social location" (Wathen & Burkell, 2002).

A review of the credibility of online health-related information yielded the following factors that positively affected credibility: clear distinctions between advertising and editorial content, disclosure notices, policy notifications, advertising, paid-links, sponsorships, e-commerce partnerships, certifications/seals from third parties, available contact information, professional designs with clear navigations, notice of editorial or board review processes, links to credible websites, links from credible portals, appearance of link policies, the appearance of logos on all pages, medical disclaimers, notice of privacy and security policies, available reports on past performance, sponsorship by credible organizations, appearance of author names and qualifications,

available scientific citations/references, and timestamps of page creation/updates (Freeman & Spyridakis, 2004).

Another factor possibly contributing to website credibility is the use of references. This factor was consistently reported by focus groups of both high and low involvement (Nofrina, Viswanathan, Poorisat, Chen, & Detenber, 2008). However, other studies have found that for certain websites the appearance of references was irrelevant (Poorisat, Detenber, Viswanathan, & Nofrina, 2008).

Similar to credential credibility cues, website domains have been found to be important to credibility. For example, comparing governmental domains of *.gov* to commercial domains of *.com* found that the *.gov* domain is perceived as indicating a more credible website. Similarly, the same article (author) will be viewed as higher quality (more competent) if the domain ended in *.gov* rather than *.com* (Treise, Walsh-Childers, Weigold, & Friedman, 2003).

4. Heuristic-Systematic Seeking/Processing and the Internet

To connect the ideas of the HSM to credibility cues on the Internet, a recent study by Miriam J. Metzger, Andrew J. Flanagin, and Ryan B. Medders (2010) was reviewed to better construct this cognitive bridge. Their study first suggests that, particularly within information-abundant environments such as the Web, heuristic—as opposed to systematic—cognitive processing is a common means of coping with information overload and uncertainty (Metzger et al., 2010; Gigerenzer & Todd, 1999; Pirolli, 2005; Sundar, 2008; Taraborelli, 2008; Wirth, Bocking, Karnowski, & von Pape, 2007). Supporting this assertion, among Web users, information on websites is first evaluated by surface characteristics, such as appearance or layout (Wathen & Burkell, 2002).

Additionally, Metzger (2007) found that people only "occasionally" or "rarely" verified the information that they had found online, and even then the verification strategies used were of the least cognitive effort and time needed. While heuristics and heuristic processing may be considered the "lazy" way of contemplating information, there is also evidence to support the idea that heuristics are more common, efficient, and effective processing strategies compared to more cognitively demanding strategies (Gigerenzer & Todd, 1999; Gladwell, 2005). However, there is also research to show that heuristic processing leads to a superficial understanding of topics considered, as compared to systematic processing, and that systematic processing tends to develop attitudes that are more stable and resistant to change (Eagly & Chaiken, 1993).

In a more general sense, tying back into motivations, high motivation tends to encourage systematic processing online while low motivation tends to produce heuristic processing online (Metzger, 2007).

Similar to what previous research has found (e.g. Liberman & Chaiken, 1992), in an online context, people are likely to bias the information seeking process to fit their own goals. Metzger et al. (2010) found that if information on the Internet agreed with the existing beliefs of the receiver, or came from a source that was sympathetic to their beliefs, these pieces of information were likely to be considered credible (p. 17). Additionally, adding to this confirmation bias was the fact that receivers tended to end their information seeking after they found information that confirmed their beliefs (i.e., they reached their sufficiency threshold) (p. 17). While this could be interpreted as being simply a function of the sufficiency principle, this finding also speaks to the fact that this

confirmatory behavior can heavily bias heuristic processing and inhibit systematic processing.

Finally, the study, adopting the HSM, outlined several key "cognitive heuristics" that play a role in online credibility judgment. The first heuristic was the *reputation heuristic*. This heuristic calls upon reputation or name recognition of websites or web-based sources as a credibility cue, rather than the close inspection of source credentials or site content (p. 20). The trigger for this heuristic could be anything from brand names to the seals of recognizable organizations. This heuristic may be based on a psychological bias favoring the recognizable over the unrecognized (Gigerenzer & Todd, 1999) or a subset of the *authority* heuristic, which hinges on whether or not the website is an official authority, which is one of the most robust determinants for website credibility (Sundar, 2008).

The second heuristic described in the study was the *endorsement heuristic*. People are inclined to perceive information and sources as credible if others do, without significant scrutiny (also called "conferred credibility") (Flanagin & Metzger, 2008). Two other heuristics similar to the endorsement heuristic are the *linking/agreement heuristic* (Chaiken, 1980b), where people tend to agree with those sources/people/mediums that they like, and the *consensus heuristic* (Chaiken, 1980b), meaning that individuals will think something is correct or good if they perceive many others to be thinking the same. This has also been called the *bandwagon heuristic* (Sundar, 2008).

The third heuristic was the *consistency heuristic*, where information is rated more credible the more consistent it is across the Internet (Metzger et al., 2010). The more

places that a piece of information appears the more credible it becomes. Although this may appear to be more systematic in nature, in that it requires more cognitive effort than most other heuristics, it is still not systematic seeking because each source which adds to the preponderance of evidence is not checked thoroughly, it is only checked for information consistency (p. 23).

The fourth heuristic mentioned in the study was the *expectation violation heuristic*. This heuristic states that if a website fails to meet the expectations that accompany a particular type of site (in terms of layout, features, or functionality) or message content, then the site is not credible (p. 25). Respondents in Metzger et al.'s (2010) focus group interviews indicated that certain cues like unexpected redirection, poor spelling or grammar, unattractive font and type size, and inappropriate use of graphics or layouts were all "red flags" which lessened site credibility (p. 27).

Lastly, in line with previous research, a *persuasive intent heuristic* was defined. This states that people tend to view online commercial information as less credible overall (Flanagin & Metzger, 2000). Furthermore, people respond negatively and almost instantaneously in regard to credibility when presented with unexpected commercial material (Fogg, Soohoo, Danielson, Marable, Stanford, & Trauber, 2003). Similarly, this heuristic is linked to the *intrusiveness heuristic* identified by Sundar (2008), which indicates that intrusive pop-ups and interstitials are also "red flags" that negatively affect credibility.

5. The Expectancy-Value Approach

Palmgreen and Rayburn's Expectancy-Value (EV) approach (1985) was evaluated in order to complete the connections between information seeking/processing and credibility on the web. More specifically, the EV approach links specific website characteristics like domain extension and author credentials to the HSM. Because the EV literature involves cognitive evaluations of media attributes that inform the seeking of gratifications from that media, this study hypothesized that the EV approach can predict, based on how participants value certain website characteristics and where they expect to find those characteristics, what kind of information seeking and processing they will participate in.

Based upon the work of Martin Fishbein (Fishbein, 1963; Fishbein and Ajzen, 1975), Expectancy-Value theory is a merger of information seeking/processing assumptions and the uses and gratifications perspective. Palmgreen and Rayburn (1985) posit that gratifications sought from media experience can be expressed as a mathematical function dependent on the belief (or perceived probability) that a media object will posses a certain attribute or yield a certain outcome and the affective evaluations connected to each outcome or attribute. This conception yields the following equation (p. 63):

$$GS_i = b_i e_i$$

where

$GS_i =$ the ith gratification sought from some media object, X
(some medium, program, content type, etc.);

$b_i =$ the belief (subjective probability) that X possesses some
attribute or that a behavior realted to X will have a
particular outcome; and

$e_i =$ the affective evaluation of the particular attribute or outcome

Figure 1. The Expectancy-Value Equation (Palmgreen and Rayburn, 1985)

This equation uses variables that spread along a negative-to-positive scale, typically

represented in questionnaires as -3 to +3. Using this formulation, the model implies the

following:

> That a particular gratification will not be sought from X if X is perceived not to possess
> the related attribute (or outcome) or if the attribute (or outcome) is very negatively
> evaluated. If the attribute is both strongly believed to be a component of X and is
> evaluated very positively, *then relatively strong seeking of the appropriate gratification
> is predicted* [emphasis added], with more moderated levels of seeking associated with
> more moderate levels of *b* or *e* (p. 63).

For the purposes sought here, this equation is predicted to have some interaction

with the type of seeking and processing that Internet users engage in. For example, a

website that is expected to have a highly valued attribute is predicted by this formulation

to be highly sought by an individual. This may relate to the HSM's conceptions of

heuristic and systematic seeking (but based on website characteristics).

The model below suggests that the gratifications sought from media affect media

consumption. For example, if a person highly values scientific information, and a

particular website is believed to have such information, the person will be motivated to

seek information from that website. Assuming that the website is accessible to the person and there are no better alternatives (p. 65), the person is likely to visit the website.

BELIEFS

GRATIFICATIONS SOUGHT → MEDIA CONSUMPTION → PERCEIVED GRATIFICATIONS OBTAINED

EVALUATIONS
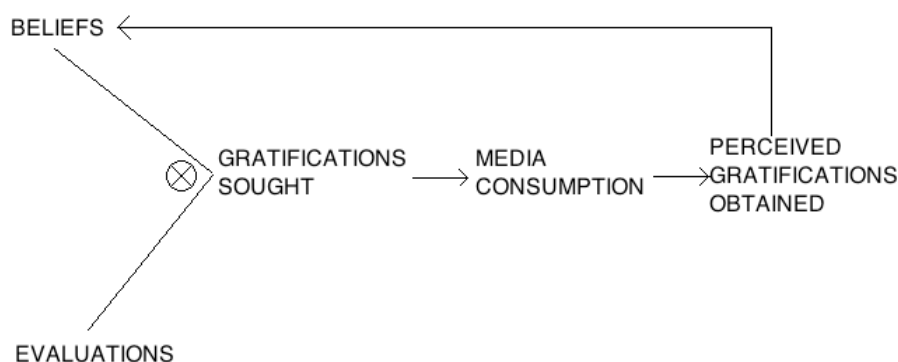
Figure 2. How Gratifications Reinforce Beliefs (Palmgreen and Rayburn, 1985, p. 64)

Following the rest of the model, if the person receives the expected information from the website, this feeds back into the original beliefs about that website (i.e., the website is a good place to go for scientific information). If the expected information is not received (or even better than was believed), the beliefs about that website will change, altering the motivations to seek information from that website in the future. More specific to the present study, the "beliefs" part of the model deals with attributes of websites. For example, considering the aforementioned equation, if the gratification sought from the Internet is to obtain scientifically accurate information, particular websites must be perused to find that information. What is suggested is that people have ingrained cognitive heuristics (or schema) that allow them to assess the credibility/accuracy/reliability of websites based upon certain characteristics like the appearance of references, the reputation of the website's author, or the domain extension (e.g. Metzger, Flanagin & Medders, 2010). These heuristic cues constitute the attribute

beliefs in the Palmgreen and Rayburn (1985) model. When seeking accurate information on the Internet, the belief that a particular website has available references, for example, multiplied by the evaluation of how valuable a website with references is for obtaining accurate information could predict the choice between a particular website over another. Combine this with other factors in the HSM such as information sufficiency and information capacity, and a complete view of how users navigate the Internet may result.

It is this highlighted link between the evaluation of certain attributes or perceived outcomes of a media object and the seeking to use that media object which is related to the present study. The belief that a website will have a certain attribute multiplied by how valuable that attribute is towards the gratification of obtaining knowledge on a subject may predict how likely a person is to use the website. As a side note, the sum of the resultants from the equation in Figure 1 is also posited as "a generalized orientation to seek various gratifications from a particular source" (Palmgreen and Rayburn, 1985, p. 64) (e.g. $\Sigma(GS)=\Sigma(b*e)$), meaning that many different attributes can be summated to obtain a general seeking motivation.

Figure 3 below represents four differing media typologies that fall out of the expectancy-value equation. Again applying this to the present study, because Palmgreen and Rayburn (1985) suggest that the belief aspect of the model more likely represents an attribute or a defining characteristic of some media object (p. 67), it is suggested here that those attributes can be considered website attributes of the larger media object, the Internet.

Evaluation of Attribute

	Negative	Positive
No	Negative Approach	Seeking of Alternatives
Yes	True Avoidance	Positive Approach

Belief in Possession of Attribute

Figure 3. Expectancy-Value Typology of Media Motivations (Palmgreen and Rayburn, 1985, p. 68)

Using the figure above, an example can be given as to how website attributes would work within this media motivation typology. A person who is seeking medical information on the Internet could presumably open up her browser and enter in the search query to a search engine. The website *cdc.gov* then appears as one of the first entries. If she has the belief that the CDC website is likely to contain government-sponsored health information and values government-sponsored health information as "good," the EV equation predicts that she will likely seek information from the website (given that it is accessible and no other preferred alternatives are available). This result falls under the "Positive Approach" typology. Conversely, if she sees the CDC website, which she believes contains government-sponsored information, and evaluates government information as "a big conspiracy" (very negatively valued), according to the "True Avoidance" typology she would not be likely to seek her health information from that particular website. Similar examples can be given for the "Seeking of Alternatives" typology (choosing another website because the website she is on does not have government information and she

highly values government information) and the "Negative Approach" typology (she thinks government information is a huge conspiracy but also that the website is unlikely to contain it). This last typology can still lead to the use of the source, especially if other alternatives do contain the negative attribute (p. 68). This type of motivation is likened to a rather passive approach to information seeking.

6. Expectancy-Value Beliefs and Attributes

The Expectancy-Value approach posits that, "beliefs about a source are the primary informational components determining the seeking of gratifications" (p. 69). These are derived from either direct or indirect experience that an individual has with a media object. Fishbein and Ajzen (1975) outline three kinds of belief: descriptive, informational, and inferential.

Descriptive beliefs are the result of direct experience of a media object. Having direct contact with a website will inform your beliefs about the attributes of that website, for example.

Informational beliefs are developed from indirect experience with a media object, such as hearing about a particular attribute of a medium from a friend. More generally, we can form beliefs about whole mediums based upon the experience of others, which "may constitute a large proportion of our total media belief system" (Palmgreen and Rayburn, 1985).

Inferential beliefs are beliefs about a media object that are inferred from logic, causal associations, and cultural stereotypes. This indirect experience, for example, may lead Internet users away from a new scientific website if they hear from someone that the website proffers the flat-earth hypothesis. This is different from informational beliefs in

that while we may get the fact that the website is pro-flat-earth, we then could create a belief based on the (correct) stereotype that those who believe the earth is flat are not very scientific.

B. *Linking Expectancy-Value and the HSM*

As a quick summary, Palmgreen and Rayburn's EV approach suggests that media consumers seek gratifications based on their beliefs about what sources have which attributes and how they value these attributes. Adopting a mathematical conception, the product of this expectancy and evaluation will be correlated with what type of information seeking the user will engage in (outlined by the four aforementioned typologies). In the present study, this seeking predicted by the EV approach was linked with *seeking* in the Heuristic-Systematic Model (Chaiken, 1980a).

First, a conceptual link between the EV approach and the Heuristic-Systematic Model (HSM) does exist. Because the present study tried to understand information seeking and processing online under an accuracy motivation (a drive to obtain credible/accurate information about a topic), a link can be drawn between this motivation and gratifications sought from the EV approach. Of 35 social and psychological needs derived from mass media function, Katz, Gurevitch and Haas (1973) suggest that one category of these, cognitive needs, entails acquiring information, knowledge, and understanding. Therefore, if we view acquiring information, knowledge, and understanding as a cognitive gratification to be sought, we can link this to the motivation to obtain accurate information as outlined in the HSM. For the present study, this means that the attributes of a website will be sought relative to the gratification to obtain accurate information.

Second, based upon the work of others (e.g. Kahlor et al., 2003) it is predicted that belief about the channel, in this case specific websites, will play into the normal conception of the HSM (measures of motivation, information sufficiency and capacity that predict seeking and processing behaviors). Supporting this link, Griffin, Dunwoody & Yang (2012) suggest that beliefs about a channel can be measured in EV terms. This study has interpreted channel beliefs to be website attributes, such as the appearance of on-site contact information, because it is expected from nothing more than rudimentary experience with searching on the Internet that certain characteristics of websites may drive or curtail the use of those websites for informational purposes. This approach is supported by the literature on website credibility judgments (e.g. Metzger, Flanagin & Medders, 2010). The EV approach will then do two important things for the present study: it will reveal which types of websites are expected to have which types of characteristics (an Internet schema) and it will lay out if those characteristics are important for the seeking of accurate information.

C. *Research Questions and Hypotheses*

Summing together the parts of the HSM, the EV approach, and the relevant research on credibility and website characteristics, the purpose of the present study is summed up by the following research question and hypotheses. Based on the literature on the HSM and the EV approach, this study expected to find a few general patterns comprising RQ1.

RQ1: What is the relationship of information insufficiency and capacity to information seeking?

First, the HSM predicts that the antecedent variables will have specific outcomes on information seeking. Namely, that the desire to close an information insufficiency gap will be correlated with seeking out information to do so. Also, one who judges himself to have a large information insufficiency gap is predicted by the HSM to utilize more cognitive resources than those who don't to close it.

H1a A larger information sufficiency gap will lead to more active seeking.

H1b A larger information sufficiency gap will lead to less information avoidance. The other antecedent variable of the HSM—information gathering capacity—predicts that the more one is able to understand the topic in question, the easier it is to seek out good information about it, therefore this study hypothesized the following:

H2a Perceived information gathering capacity will be positively correlated with active seeking.

H2b Perceived information gathering capacity will be negatively correlated with information avoidance.
Research has shown that the predicted pathways of the HSM, as hypothesized above, have empirical support (e.g., Trumbo, 1999).

Next, venturing into less travelled territory, this study expected that channel beliefs would dovetail into the HSM literature by interacting with information gathering capacity, information seeking, and information insufficiency, as in Griffin, Dunwoody & Neuwirth's RISP model (1999). Hypothesizing that website characteristics must feed into information seeking tendencies, this study developed the research question below.

RQ2: When seeking accurate information, how do website characteristics influence the channel beliefs about, and usage of, a website?

In the present's study's instrument, RQ1 was explored before giving subjects any specific task. To tackle RQ2, this study used a 2x2 factorial design experimentally manipulating website characteristics after the antecedent HSM variables to present each subject randomly with one of four different versions of a website needed for informational purposes. Each site was a combination of either high/low authority (e.g. NIH vs WebMD) and official/unofficial domain extension (e.g. .gov vs .com). This study predicted that these manipulations would affect the overall channel belief about a given website and the subject's desire to use the website for the task.

I also predicted—following the literature on the EV approach—that the intention to use a website would correlate chiefly with channel beliefs. A person may have high information insufficiency and capacity, but if the website is thought to have no desirable characteristics (or even undesirable ones), this study predicted subjects would not choose to use the website.

RQ3: What is the relationship of channel beliefs to the intention to use a specific website?

The present study's instrument ultimately asked subjects whether or not they would choose to use the experimentally manipulated website they were given. The study hypothesized that the expectancy-value (EV) product of the value of a website characteristic and its likelihood should correlate with the intention to use the website. A summated scale of all the beliefs about specific website characteristics (e.g. Figure 1) would then predict ultimate website usage. Thus, the present study hypothesized the following:

H3a An overall positive belief about the channel will be positively correlated with the intention to "click on the site right away."

H3b An overall positive belief about the channel will be positively correlated with the intention to "click on the site if there were no better alternatives."

H3c An overall negative belief about the channel will be positively correlated with the intention to "avoid the site completely."

Lastly, in an attempt to link the HSM and the EV approach for the Internet, this study decided to use a path analysis to find a plausible path from information seeking variables and website characteristics to website selection or avoidance. A path analyses was chosen because the present study wanted to model information seeking on the Web as it is really done—from a search to selection—without being artificial.

RQ4: In an exploration, what set of variables in this study best depicts the path to selection or avoidance of a website?

III. RESEARCH METHOD

A. *Exploring the "Internet Schema"*

The study's purpose was to determine if a website differing in the surface characteristics of perceived authority and domain extension would influence the relationship between website usage, channel beliefs about a website (i.e., what other characteristics the website will have and if that is good or not), and information seeking tendencies. This was explored using an instrument looking at what this study considered to be an "Internet schema" (see APPENDIX B).

Schema Theory posits that people have cognitive frameworks off which information hangs. The classic paper by David Rumelhart (1980) defines a schema as "a data structure for representing the generic concepts stored in memory" (p. 34). There are levels and groups and clusters and webs, but the main point is that our brains categorize information and then interpret new information based on these categories, rankings, and webs. For example, the more one's schema for quantum mechanics is fleshed out, the easier it is to scaffold new information upon that existing framework—metaphorically, a sturdier frame can hold more weight. One without a schema for quantum mechanics would have more trouble interpreting a new study on the subject than a theoretical physicist. The present study rested on the idea that people in the age of the Internet have developed an Internet schema. This schema is a set of general rules, heuristics, associations, and habits about the Internet that people use to navigate it. The present study posited that when given a task that involved finding credible information on the web, subjects would draw upon this schema.

Being that it is a schema this study investigated, the research had to stay purely cognitive. So, in an experimental manipulation of website characteristics, it did not manipulate variables that are accessible in memory as a general schema. For example, it would probably be better to ask generally about a website with an official domain extension rather than manipulating timestamps on a specific site. Therefore the study manipulated variables that could describe a "type" of website. Schema theory comes in when participants are asked to estimate the likelihood that this type of website will have certain other characteristics and if those characteristics are good or bad for the task at hand (the EV approach).

Using a factor analysis from a previous pilot study as a guide (see APPENDIX A), and the way people *already* tend to go about finding accurate information on the web, the study chose the dimensions of *Perceived Authority* and *Domain Extension* to experimentally vary. (As the pilot study used human subjects, it received prior approval from Marquette University's Institutional Review Board.) Although these factors explained less variance than the others in the pilot study, they involved items that speak to the parsing problem—how one wades through an Internet search.

The experimental goal of the present study's instrument was to vary the authority and domain extension of a website to touch off the hypothesized Internet schema. Once given a description of a website found through a Google search, subjects would envision what other characteristics the website would have, and whether or not these characteristics would be beneficial to their task of finding accurate information on a topic.

	Level of Authority:	
	High Authority	*Low Authority*
Domain Extension: **.gov**	health.nih.gov	cancer.gov
.com	webMD.com	naturalnews.com

Figure 4. Experimental Manipulation of Perceived Authority and Domain Extension

To keep the cognitions and schema simple, subjects were randomly separated into four groups, each receiving an instrument with a different site description. Figure 4 shows each of the websites that were given in the instrument.

Figure 5. Web Search Showing Domain and Authority Variations

Beyond how much the search terms appear in the results (bolded terms in Figure 5), it's quite clear that one of the only ways to determine what to click on is the perceived authority of the author and the domain extension of the websites returned from a search. So, when searching for a general topic, it stands to reason that authority and domain would be important. This assertion is supported by the attached factor analysis in APPENDIX A.

B. *Sampling*

The study sample was chosen by enlisting the help of various professors within Marquette University's College of Communication who were teaching large introductory classes (five of the subjects indicated that they had college degrees, see APPENDIX C for the descriptive statistics).

Although much has been made of the usage of WEIRD (White, Educated, Industrialized, Rich, Democratic) subjects in psychology and social science (e.g., Henrich, Heine & Norenzayan, 2010), the present study chose to study this group for two reasons. First, because the study wanted to explore an Internet schema, it needed subjects who were familiar with the Internet. Second, it just so happens that the demographic characteristics of those most versed in Internet usage are young, white, and upper class (Pew Research Center, 2010). By studying WEIRD subjects, the present study was hitting the target group (i.e., those unfamiliar with the Internet probably do not have a schema for it).

On March 18th, 2013, the instrument (attached in APPENDIX B) was administered to 130 students. Because this study involved human subjects, the Office of Research Compliance at Marquette University first approved the study. Subjects were

told that their responses were completely voluntary and confidential. Subjects were also given the opportunity to contact me at a later time to get a report on my findings. Data from the 130 instruments were entered into the IBM's Statistical Package for the Social Sciences (SPSS) Version 19 using Microsoft Excel.

Of the 130 students studied, all 130 returned a completed instrument. The mean age of respondents was 20 years old. There was no missing data and no indication that the subjects did not take the instrument seriously.

C. *Procedure*

The subjects were briefly told about the study's purpose, then handed the instrument, which took 10-15 minutes to complete. Figure 6 shows the order of the questions asked and the experimental manipulation. The instrument led off with questions about demographic information like age and sex, and general question about "Internet savvy" and daily time spent on the web.

Demographic
Questions

(Age, Sex, Education,
Internet savvy, Internet
credibility, Time spent
on Internet per day)

Topic Introduction
(Antioxidants)

Information Gathering
Capacity Battery

Information Seeking
Battery

Task Introduction

Information Insufficiency Scale

Value Battery

Website A   Website B   Website C   Website D
(Official Domain, (Official Domain, (Unofficial Domain, (Unofficial Domain,
High Authority)   Low Authority)   High Authority)   Low Authority)

Expectancy Battery

Site Usage Battery

Figure 6: Flowchart of Instrument Topic, Task, and Batteries

Next, the instrument introduced the topic: antioxidant supplements. Antioxidants

are molecules that help stop damage to cells from other molecules in the body. Today,

many companies are selling them as supplements in juices and pills. The topic was

chosen because it requires some specialized knowledge (the goal being to instill a

motivation to be accurate and to make the "capacity" measure important). Antioxidant

supplements are also non-controversial, in a way that a topic such as global warming, for

example, is not (Meijnders, Midden & Wilke, 2001). In the HSM, a defense motivation

can systematically bias both information seeking and processing and is very different

from a motivation to be accurate (Chen et al., 1999). Choosing an uncontroversial topic

like antioxidant supplements avoided instilling in subjects a possible defense motivation

for information processing.

To establish a connection between channel beliefs (the EV approach) and the

HSM, the antecedent variables of the HSM were then posed to the subjects. The

instrument gave a battery of information seeking, information sufficiency, and

information gathering capacity questions (each relating to antioxidant supplements) to

subjects before giving the task.

Engendering the Internet schema, the instrument then gave subjects a task:

> Imagine that you are asked to provide research for an article on antioxidant supplements
> that will appear as a highly publicized article on a prominent news website. The article
> based on your research will be read by peers, opponents, and the lay audience alike, and
> will be examined for accuracy. Given this task, rate the characteristics of a website you
> might choose.

With this task in mind, the next battery of questions (the Value battery) got at the Internet

schema by asking what website attributes are valued (good-bad scale) for getting accurate

information.

Hopefully imagining what characteristics a site with accurate information about

antioxidant supplements would look like, subjects were then presented with one of four

(randomly assigned) site descriptions according to the variants described in Figure 4. For

example, one random group of participants were presented with the description:

> Now consider that a Google search returns the website **health.nih.gov**, run by the
> National Institutes of Health. What other characteristics is this website likely to have?

Each of the four variants was described according to the credibility dimensions (authority

and domain extension) shown in Figure 4.

The last experimental portion of the instrument asked about what characteristics are likely to be on the site (getting at the schema). The Expectancy battery was then posed in the instrument. Each item pair in the Value and Expectancy batteries would later be multiplied together and the product terms would be summed across the different characteristics to create the channel beliefs measure.

Lastly, as the measure of intention to use the given website, the instrument asked subjects the Site Use battery.

D. Key Variables

Following the HSM, the instrument asked subjects to answer questions related to information insufficiency and perceived information gathering capacity. The general format of these measures is below.

1. Information Insufficiency

To measure subjects' motivation to be accurate, this study used a measure of information insufficiency adapted from Griffin, Dunwoody, & Yang (2012). Specifically, the instrument asked subjects, on scales of 0 to 100, to estimate their current knowledge about antioxidant supplements and how much they needed to know about the topic. The instrument used the measures below:

Current Knowledge: "Using a scale from 0 to 100, with 0 meaning knowing nothing about antioxidants and 100 meaning knowing everything you could possibly know about them, how much do you currently know about antioxidant supplements?"

Sufficiency Threshold: "Using the same scale, how much information would you need to know to be confident enough in your knowledge about antioxidant supplements?"

The mathematical difference between sufficiency threshold and current knowledge was used in the analysis to measure information insufficiency. While others have assessed the impact of the sufficiency threshold on information seeking measures, controlling for current knowledge (Griffin et al., 2004), this technique did not produce anything fruitful for the present study. In seven different studies where this conception of information insufficiency has been tested, five found that information sufficiency was significantly positively correlated to information seeking (Griffin, Dunwoody, & Yang 2013), another antecedent variable in the present study and the original HSM.

2. *Information Gathering Capacity*

Information gathering capacity, or an individual's perceived ability to perform the information seeking and processing steps necessary for the outcome he or she desires (Griffin et al., 2008), was used as a measure in order to link the HSM to information seeking and channel beliefs, as in Griffin, Dunwoody, & Neuwirth's original conception of the RISP model (1999). The instrument used the battery below:

(Information gathering capacity measured in a 5-point Likert scale ranging from 1, "strongly agree" to 5, "strongly disagree." This coding was reversed for all questions except number four, which was already a reversed item, in the analysis.)

1. I would know what questions to ask of the experts.
2. I would know where to go for more information.
3. I could readily take the time to gather any additional information I might need.
4. Much of the information would be too technical for me to understand.
5. I would know how to separate fact from fiction.
6. I believe I could understand information on this topic if I make the effort.

In the analysis, the capacity battery was reverse coded and then used to create a summated scale. In Griffin, Dunwoody & Yang (2013) this conception of capacity was

significantly positively related to information seeking in three out of five studies. However, it was not related to the other antecedent variables of the HSM in their summary (2013).

The insufficiency and capacity batteries above were adapted from Kahlor, Dunwoody, Griffin, & Neuwirth (2006) and Griffin, Yang, ter Huurne, Boerner, Ortiz, & Dunwoody (2008).

3. *Information Seeking*

The present study used a similar conception of "active seeking" and "avoidance" measures that Griffin and colleagues (1999) employed in their RISP model. The present study used a six-item information seeking battery taken from Kahlor et al. (2006). In the factor analysis used to separate the scale in the analysis, items 2 and 3 represented "active" seeking while items 1, 4, and 6 represented "avoidance." Item 5 represented passive or routine seeking. The two distinct active seeking and avoidance factors found during this factor analysis mirror what Kahlor et al. (2006) found, and similarly the present study did not include item 5 going forward. The study used the battery below:

(Information seeking measured in a 5-point Likert scale ranging from 1, "strongly agree" to 5, "strongly disagree")

1. When this topic comes up, I'm likely to tune it out.
2. When it comes to this topic, I'm likely to go out of my way to get more information.
3. When this topic comes up, I try to learn more about it.
4. Gathering a lot of information on this topic is a waste of time.
5. When it comes to this topic, I'm content to let information come to me in the course of my daily life.
6. Whenever this topic comes up, I go out of my way to avoid learning more about it.

4. *Channel Beliefs*

   i. *Expectancy*

Using the same questions from the factor analysis in APPENDIX A and sampling website characteristics important for credibility (e.g., Freeman & Spyridakis, 2004 and Nofrina et al., 2008), the researcher compiled a list of 12 different website characteristics to measure channel beliefs. By asking subjects the evaluation and expectancy batteries and multiplying the resulting paired scores for each characteristic, as in Palmgreen and Rayburn (1985), the present study obtained a composite channel belief score. The study used the expectancy battery below:

(Expectancy measured and coded from -3, extremely unlikely, to +3, extremely likely.)

1. The website will have scientific references.
2. The website will be run by an authority (NASA, USDA, etc.).
3. The website will have links to other sites that I recognize.
4. The website will have author contact information available.
5. The website will have advertisements.
6. The website will be sponsored by large organizations.
7. The website will have attractive graphics.
8. The website will be authored by someone with high credentials (PhD, M.A., etc.).
9. The website will have official domain extensions (.*gov* and .*edu* versus .*com*).
10. The website will have disclosure notices…
11. The website will have timestamps on the pages…
12. The website will have "Like" buttons on it.

ii. Value

Using the same characteristics as the expectancy battery, the study used the value

battery below to complete the channel beliefs measure:

(Value measured and coded from, -3, extremely bad to +3, extremely good.)

1. Scientific references on a website are…
2. A website run by an authority on a topic is…
3. Links to websites that I recognize is…
4. Available contact information is…
5. Advertisements on a website are…
6. Website sponsorship from large organizations is…
7. Attractive graphics on a website are…
8. A website that is written by someone with high credentials is…
9. Official domain extensions are…
10. Disclosure notices on a website are…
11. Timestamps on a website are…
12. "Like" buttons on a website are…

Following the Expectancy-Value approach of Palmgreen and Rayburn (1985), the

scores for expectancy and value were multiplied together to give a channel belief score

for each characteristic. These resulting product-term scores were then summed to create a

composite "Channel Belief" score that was used in the analyses. As in Figure 3, the range

of potential values for each pair of EV questions roughly equates to one of four different

typologies. According to the theory, a "positive approach" comes from a positive channel

belief (e.g., +3 expectancy multiplied by +3 value). Conversely, "true avoidance" of the

channel would result from a negative score (e.g., +3 expectancy multiplied by -3 value).

The other typologies can have overall positive and negative scores as well. The "negative

approach" or passive approach would have a similar score as the positive approach (e.g.,

-1 expectancy multiplied by -2 value) and the "seeking of alternatives approach" would

be similar to the true avoidance approach (e.g., -1 expectancy multiplied by +3 value).

Because scores can be the same for different typologies (e.g., -3*-2 and +3*+2), the EV scores for each pair were summed to form a 10-item channel belief scale (note that items 2 and 9 in the value scale were not included in the summated scale, as these were the experimentally manipulated variables). Though summing the EV pairs would result in a loss of data richness, it would elucidate the typologies easiest to link to site usage: true avoidance (with a lower or even negative summated score, as it includes the seeking of alternatives typology) and a positive approach (higher overall scores, as it includes the passive typology).

According to Griffin, Dunwoody & Yang (2013), this approach—adapting Palmgreen and Rayburn's (1985) expectations and evaluations equation—is a newer, recommended way of looking at how information about a channel can feed into information seeking and processing. Though the team has not yet found support for this technique when looking at risk information seeking and processing (p. 343), the EV approach as outlined in the present study remains promising.

5. *Site Use*

To measure the intention to use the given website, subjects were asked at the end of the instrument to rate how likely they would be to go to the given website.

(Site Use measured with a 5-point Likert scale ranging from 1, "strongly agree" to 5, "strongly disagree." This coding was reversed for the analysis.)

1. I would click on the site right away.
2. I would only click on the site if there were no better alternatives.
3. I would avoid the site completely.

6. Demographic Variables

Control variables of sex, age, year in school, Internet savvy, time spent on the Internet per day, and general credibility of the Internet as a information source were straightforward variables represented by one question each (questions 1-6 on the instrument in APPENDIX B). Sex was coded in the instrument as 1 for male and 2 for female. Age was a numerical value. Year in school was coded in the instrument as 1 for 1-2 years of college, 2 for 3-4 years of college, 3 for a college degree, and 4 for a graduate degree. Internet savvy was an exploratory measure in the instrument coded on a 0-100 scale, with 0 meaning the subject knows nothing about the Internet. Time spent on the Internet was an exploratory measure in the instrument coded as 1 for 0-1 hours, 2 for 2-3 hours, 3 for 4-5 hours, and 5 for 5+ hours. Lastly, general credibility of the Internet was also an exploratory measure this study decided to include, measured on a 5-point Likert scale ranging from 1, "strongly agree" to 5, "strongly disagree."

To test hypotheses 1-3, these variables served as controls, and their effects on the correlations between the key variables are featured in Tables 1 and 2. Because the ANOVAs and path diagram testing RQ2, RQ3, and RQ4 to follow were based on experimental manipulations, the study relied on randomization to control for the variables rather than continuing to use the demographic variables in the analysis.

E. Reliability Details

The information sufficiency scale was created using a simple subtraction—the difference between what a subject needed to know to complete the task and what they already knew about the topic. The skepticism measure asking subjects if they thought

about the reliability of the website at the very end of the instrument was also a simple 1-item measure, and did not require a reliability analysis.

The information seeking measures needed to be separated in order to get at the different concepts it represented. For information seeking this was "active seeking" and "avoidance." Based on a principal component/Varimax rotation factor analysis of the items, the present study separated the items into two groups. The "active" seeking scale consisted of the items "I'm likely to go out of my way to get more information" and "When this topic comes up, I try to learn more information about it." The Cronbach's alpha for this scale was 0.91. The "avoidance" seeking scale consisted of the items "I go out of my way to avoid learning…," "Gathering a lot of information on this topic is a waste of time," and "When this topic comes up, I'm likely to tune it out." The Cronbach's alpha for this scale was 0.61. Given these alphas, the items comprising each scale were summed to create composite measures of "active" seeking and "avoidance" in the analysis. As in Kahlor et al. (2006), the item "I'm content to let this information come to me in daily life," was not included in either scale, because it represented passive seeking rather than active seeking or avoidance. Deleting items from each scale did not help the alphas.

The six items in the information gathering capacity scale had a Cronbach's alpha of 0.67 (once the item "the information would be too technical" was reversed). Deleting any item from the scale did not improve the alpha.

The Channel Beliefs scale used in the analysis was created following the Expectancy-Value approach—taking each score (ranging from -3 to +3) for expectancy and value for each item pair, multiplying them together, and summing the results of all

pairs. The Cronbach's alpha for the expectancy measures was 0.57. The researcher completed a principal component/Varimax rotation factor analysis of the expectancy items, finding three different factors. This was expected from the pilot study factor analysis in APPENDIX A. I used these factors to inform my decision as to what I should experimentally vary. But beyond this, the factors were not included in the present study and used the single dimensional scale in the analysis.

The Cronbach's alpha for the summated Channel Beliefs scale, created with 10 item pairs, was 0.74. The reliability of both measures could have been increased to 0.65 and 0.75, respectively, had the study not included the item concerning "Like" buttons on websites. However, as the analysis was largely exploratory, the researcher did not want to leave out this potentially telling item.

F. *Analysis*

To explore the research questions and test the hypotheses proposed, this study used the Statistical Package for the Social Sciences (Version 19) to complete a number of different analyses on the data set. **RQ1** and Hypotheses H1-H2 were tested using a partial correlation, controlling for the demographic variables of age, sex, educational level, time spent on the Internet per day, perception of Internet credibility, and Internet savvy. Specifically, the information gathering capacity, information sufficiency, and channel belief scales were correlated with the two information seeking ("active" and "avoidance") scales using partial r.

Similarly, H3 was tested using Pearson's r to correlate the channel belief scale with the site usage items.

I tested **RQ2** and **RQ3** using 2x2 two-way analyses of variance (ANOVA), with domain extension and authority as independent variables with respect to channel beliefs, likelihood of website characteristics, and website usage. This portion of the analysis did not use the demographic variables as a control, instead using the randomness of the experimental manipulation as the control.

Lastly, the study used a path analysis in the add-on SPSS program AMOS to model the connections between the HSM and EV approach as hypothesized in **RQ4**.

G. *Descriptive Statistics*

Descriptive statistics for key variables can be found in APPENDIX C.

IV. RESULTS

A. Testing the Relationships Between HSM and Key EV Variables (RQ1)

Table 1 presents the results of testing the hypotheses **H1a-H3c**.

TABLE 1	Zero-order and Partial Correlations for Hypotheses H1b-H3c		
	Strength of Correlation (Pearson's r and partial r)		
	Information Insufficiency	Information Gathering Capacity	Channel Belief
Active Information Seeking	.25** (n=130) r=0.21*	-.24** (n=130) r=-.16	-.04 (n=130) r=-.02
Information Avoidance	-.12 (n=130) r=-.11	.19* (n=130) r=.16	0 (n=130) r=-.02
Use Site Right Away	-.08 (n=130) r=-.11	.05 (n=130) r=.08	.42** (n=130) r=.43***
Use Site Only If No Alternatives	.136 (n=130) r=.22*	.03 (n=130) r=-.03	-.08 (n=130) r=-.08
Avoid Site Completely	.11 (n=130) r=.14	-.03 (n=130) r=-.06	-.38** (n=130) r=-.39***

*p<0.05 **p<0.01 ***p<0.001

Note: Partial r correlations were calculated by controlling for the variables age, sex, educational level, Internet savvy & time spent on the Internet

Hypothesis **H1a**—that a larger information sufficiency gap will lead to more active seeking—was supported (partial r=.21, p<.05, n=130), but the reverse, Hypothesis **H1b**, was not. Hypotheses **H2a** and **H2b** were not supported, with perceived information gathering capacity unrelated to the other key variables when controlling for the

demographics (similar to what Griffin, Dunwoody & Yang (2013) have found).

Hypotheses **H3a** and **H3c** were supported, with a positive belief in the channel positively

correlated with "using a website right away" (partial r=.43, p<.001, n=130) and a positive

belief in the channel negatively correlated with "avoiding a website completely" (partial

r=-.39, p<.001, n=130), becoming even stronger when controlling for the demographic

variables. Lastly, Hypothesis **H3b** was not supported.

Other than my hypotheses, Table 2 shows correlations between the HSM

variables in accordance with HSM theory.

TABLE 2	Zero-order and Partial Correlations for Relationships Among HSM Variables		
	Strength of Correlation (Pearson's r and partial r)		
	Information Avoidance	Information Insufficiency	Information Gathering Capacity
Active Information Seeking	-.33*** (n=130) r=-.33***	.25** (n=130) r=.21*	-.24** (n=130) r=-.16
Information Avoidance		-.12 (n=130) r=-.12	.19* (n=130) r=.16
Information Insufficiency			-.26** (n=130) r=-.23**

*p<.05 **p<.01 ***p<.001

Note: Partial r correlations were calculated by controlling for the variables age, sex, educational level, Internet savvy & time spent on the Internet

With the exception of the insignificant correlations between information gathering

capacity and the information seeking variables, the data support the general conception of

the HSM. Active seeking was significantly negatively correlated with information avoidance (partial r=-.33, p<.001, n=130), information insufficiency was significantly positively related with active information seeking (partial r=.21, p<.05, n=130), and information gathering capacity was significantly negatively correlated with information insufficiency (partial r=-.23, p<.01, n=130).

B. Testing the Effect of the Experimental Manipulation on Channel Beliefs and Website Usage (RQ2 and RQ3)

Addressing the study's central research questions, the analyses considered if— noting the successful manipulation of *.com* and *.gov* domain extensions in the study— having a website with a given domain extension would touch off a mental Internet schema.

Though the experiment was a 2x2 design considering the effect of both domain extension and authority on channel beliefs, site usage and information seeking, the authority manipulation was excluded in the analyses. This decision was based on the fact that an ANOVA revealed no effect of authority on using a website right away, $F(1,128)=.87$, $p=.35$, using the website only if there were no alternatives, $F(1,128)=1.17$, $p=.28$, or avoiding the website completely, $F(1,128)=3.50$, $p=.064$. Another ANOVA also showed no difference in overall channel belief score based on authority, $F(1,128)=.02$, $p=.88$. Lastly, there was no correlation between authority and website usage ("right away," r=.08, p=.35, n=130, "alternatives," r=-.10 p=0.28, n=130 and "avoid completely," r=-.16, p=.064, n=130) or overall channel belief (r=.01, p=.88, n=130). Going forward, only the domain extension manipulation was included in the analysis.

Table 3 shows a one-way ANOVA of domain extension on the site usage

variables:

TABLE 3	Likelihood of Website Usage, Based on Domain Extension				
	Domain Extension		Statistical Significance		
I would…					
	.com	.gov	F	df	Significance
Go to the website right away	3.1 (n=63)	4.0 (n=67)	27.6	1,128	.000
I would only click on the website only if there were no better alternatives	3.5 (n=63)	3.0 (n=67)	5.21	1,128	.024
Avoid the site completely	2.5 (n=63)	1.6 (n=67)	26.6	1,128	.000

Note: Higher mean value indicates a greater level of agreement.

Table 3 shows that the main thrust of the present study—that the experimental

manipulation would have an effect on site usage—was valid. Based on the domain

extension, subjects were more likely to go to *.gov* websites right away (M=4.0, SD=.86)

than *.com* websites (M=3.1, SD=1.2). The difference in means was significant,

$F(1,128)=27.7$, $p<.001$. There was also a significant difference between domain

extensions for avoiding a website completely, $F(1,128)=26.6$, $p<.001$. Subjects were

more likely to avoid *.com* websites (M=2.5, SD=1.1) than *.gov* websites (M=1.6,

SD=0.75). Lastly, there was also a significant difference between domain extensions

when it came to the passive site use measure, $F(1,128)=5.21$, $p<.05$. Subjects were more

likely to only select the *.com* websites if there were no better alternatives (M=3.5,

SD=1.0) than to do the same for the *.gov* websites (M=3.0, SD=1.1).

I also explored the other portion of the research question—that the experimental

manipulation would have an effect on channel beliefs—with a one-way ANOVA. The

results comprise Table 4:

TABLE 4	Belief About the Channel, Based on Domain Extension				
	Domain Extension		Statistical Significance		
	.com	.gov	F	df	Significance
Channel Belief	7.1	25.3	52.0	1,128	.000
Composite Score	(n=63)	(n=67)			
	SD=16.5	SD=12.1			

Note: Higher mean value indicates a more positive channel belief (e.g., the website is very likely to have something of high value).

Table 4 shows that the domain extension plays a huge role in determining if the site is

good for accurate information. There was a large and significant difference between the

means for the *.com* and *.gov* groups, F(1,128)=52.0, p<.001. On average, the subjects

given a *.gov* website had a channel belief that was three times higher (M=25.0, SD= 12.1)

than the subjects given a *.com* website (M=7.10, SD=16.5).

To flesh out the possible Internet schema, a one-way ANOVA of domain

extension on the likelihood of certain website characteristics appearing on the given

website revealed Tables 5 and 6:

TABLE 5	Likelihood (Expectancy) of Finding a Characteristic on a Website, Based on Domain Extension				
	Domain Extension		Statistical Significance		
Likelihood of finding…	.com	.gov	F	df	Significance
Scientific references	.87 (n=63) SD=1.3	2.4 (n=67) SD=0.65	76.5	1,128	.000
Links to other site that I recognize	.78 (n=63) SD=1.1	1.3 (n=67) SD=1.2	5.12	1,128	.024
Contact information	.49 (n=63) SD=1.5	1.8 (n=67) SD=1.1	34.3	1,128	.000
Advertisements	1.6 (n=63) SD=1.3	.28 (n=67) SD=1.4	29.1	1,128	.000
Organizational sponsorship	.76 (n=63) SD=1.4	1.6 (n=67) SD=1.3	12.0	1,128	.001
Attractive graphics	.94 (n=63) SD-1.1	.91 (n=67) SD=1.3	.015	1,128	.901
Articles written by high credentialed people	.43 (n=63) SD=1.6	2.5 (n=67) SD=0.77	94.4	1,128	.000
"Like" buttons	.41 (n=63) SD=1.5	-.70 (n=67) SD=1.5	17.7	1,128	.000
Timestamps	.56 (n=63) SD=1.0	1.0 (n=67) SD=1.4	5.04	1,128	.026
Disclosure notices	.02 (n=63) SD=1.3	.57 (n=67) SD=1.2	6.21	1,128	.014

Note: Mean scores were on a -3 to +3 scale

In all but one case ("attractive graphics"), the difference in means was significant (see

Table 5 for statistical significance). Scientific references, links to other recognizable sites,

contact information, organizational sponsorship, high-credentialed authors, timestamps,

and disclosure notices were all more expected on the *.gov* websites. Both advertisements

and "Like" buttons were more expected on the *.com* websites (see Table 5 for means and

standard deviations).

Table 6 showed the difference in means in overall channel belief score for each of

the 10-item pairs:

TABLE 6	Channel Belief (Expectancy x Value) For Each Characteristic on a Website, Based on Domain Extension				
	Domain Extension		Statistical Significance		
*Channel Belief (Expectancy*Value) For…*	.com	.gov	F	df	Significance
Scientific references	2.0 (n=63) SD=3.3	5.2 (n=67) SD=2.7	37.6	1,128	.000
Links to other site that I recognize	1.3 (n=63) SD=2.3	1.9 (n=67) SD=2.4	2.60	1,128	.11
Contact information	1.3 (n=63) SD=3.6	4.0 (n=67) SD=3.5	18.7	1,128	.000
Advertisements	-1.2 (n=63) SD=2.9	.09 (n=67) SD=2.1	8.90	1,128	.003
Organizational sponsorship	-.05 (n=63) SD=2.6	1.6 (n=67) SD=3.7	8.23	1,128	.005
Attractive graphics	1.2 (n=63) SD=2.1	1.3 (n=67) SD=2.4	.037	1,128	.847
Articles written by high credentialed people	1.2 (n=63) SD=4.3	7.0 (n=67) SD=2.8	84.9	1,128	.000
"Like" buttons	.51 (n=63) SD=2.7	1.0 (n=67) SD=2.4	1.39	1,128	.242
Timestamps	1.1 (n=63) SD=2.5	2.4 (n=67) SD=3.0	7.22	1,128	.008
Disclosure notices	-.21 (n=63) SD=2.4	.78 (n=67) SD=2.5	5.24	1,128	.024
Channel Belief Composite Score (all characteristics)	7.1 (n=63) SD=16.5	25.3 (n=67) SD=12.1	52.0	1,128	.000

Note: Higher mean value indicates a more positive channel belief (e.g., the .com website is very likely to have this characteristic of high value).

Seven out of the ten pairs had significantly different mean channel belief scores (see

Table 6 for statistical significance). Overall, channel beliefs—measured by multiplying

how valued a website characteristic is by how likely it is that the characteristic will be on

the website (both on -3 to +3 scales)—were more positive for scientific references,

contact information, advertisements, organizational sponsorship, high-credentialed

authors, timestamps and disclosure notices on the *.gov* websites. The channel beliefs were

more positive for none of the *.com* websites (see Table 6 for means and standard

deviations).

Tables 5 and 6 elucidate the Internet schema by showing the difference in

perceived likelihood and value for website characteristics between *.com* and *.gov*

websites. Looking back at Figure 3 and the channel belief typologies, the channel belief

results in Tables 5 and 6 support the ultimate website usage results in Table 3. For

example, Table 5 shows that scientific references are thought more likely to be on the

.gov websites than *.com* websites and Table 6 shows a higher total channel belief for

scientific references on *.gov* websites. Together, these values—a positive likelihood and a

positive total channel belief—demonstrate the "positive approach" typology of Figure 3.

Scientific references are important and are more likely to be on *.gov* websites. As another

example, Table 5 shows that subjects believed advertisements were more likely to be on

.com websites and Table 6 shows that advertisements have a negative channel belief for

.com websites (*.gov* had a slightly positive channel belief). Taken together, the results

showed that advertisements were thought to be likely on a *.com* website and negatively

valued—a "true avoidance" approach.

In total, Table 6 shows that channel beliefs were significantly more positive for *.gov* websites, meaning that these websites were thought more likely to have characteristics important for accurate information and less likely to have detrimental or unimportant characteristics.

A positive total channel belief indicates a positive approach (predicting website usage), but it could also show a "negative approach"—a passive seeking tendency. Subjects could value a characteristic negatively, but also think that the characteristic is not likely to be on the site. Similarly, A negative total channel belief indicates a true avoidance approach, but it could also mean a "seeking of alternatives" approach. Subjects could positively value a website characteristic, but think that the characteristic isn't on the website they are using, encouraging looking for alternatives. These alternate typologies, by their very nature of being passive and not on either extreme, are likely to represent less positive and less negative total channel belief values.

C. A Revised Path Analysis Model of the Link Between the HSM and Channel Beliefs (RQ4)

The results of Tables 1 and 2 show that few of my hypotheses were supported and that my initial model was incorrect. But looking again at the correlations informed the creation of a path analysis-based model using IBM's SPSS (version 19) add-on AMOS. The study incorrectly hypothesized that seeking tendencies would be the link between channel beliefs and choosing a website or not. It turns out that information gathering capacity filled this role, as Figure 7 shows below:
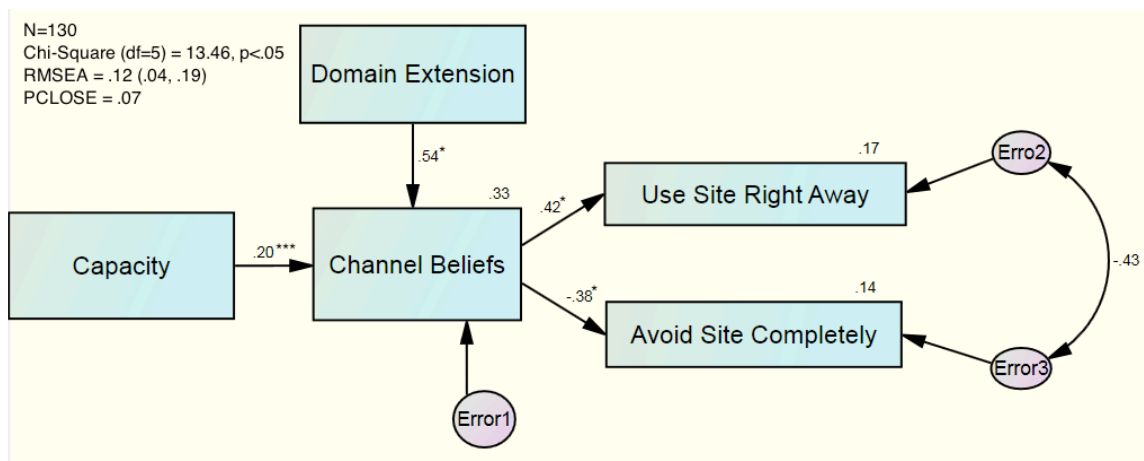
Figure 7: The revised path analysis model linking channel beliefs and the HSM. Channel Belief R^2=0.33, Right Away R^2=0.17, Avoid Completely R^2=0.14. Key: *p<.05, **p<.01, ***p<.001

Using information gathering capacity as the link between the HSM and Channel Beliefs returned the model above. As all the direct effects between the variables were significant, Tables 7 and 8 show the standardized direct, indirect, and total effects on website usage—the ultimate goal of this study—in this model.

TABLE 7	*Path Analysis of Site Usage*: Direct, Indirect, and Total Effects on "**Use Site Right Away**" (standardized betas)		
	Information Gathering Capacity	Domain Extension	Channel Beliefs
Direct	na	na	.42*
Indirect	.08**	.22*	na
Total	.08**	.22*	.42*

*p<.05 **p<.01 ***p<.001

Table 7 shows that the conduit through which domain extension and information gathering capacity act is Channel Beliefs. Capacity had a small indirect effect on using

the website right away (beta=.08, p<.01), while did domain extension had a larger effect (beta=.22, p<.05). Channel belief itself had the largest direct on using the website right away (beta=.42, p<.05). (All betas were standardized.) The effect of channel belief on using the website right away also supports **H3a**. Table 8 shows the effects for "avoid the website completely."

TABLE 8	*Path Analysis of Site Usage*: Direct, Indirect, and Total Effects on "**Avoid Site Completely**" (standardized betas)		
	Information Gathering Capacity	Domain Extension	Channel Beliefs
Direct	na	na	-.38*
Indirect	-.07**	-.20*	na
Total	-.07**	-.20*	-.38*
*p<0.05 **p<0.01 ***p<0.001			

Table 8 shows that, similar to Table 7, capacity had a small direct effect on avoiding the website (beta=-.07, p<.01) and domain extension had a moderate effect (beta=-.20, p<.05). As hypothesized in **H3c**, channel belief was negatively related to website avoidance (beta=-.38, p<.05).

For the sake of model simplicity, the site use measure "click on the website only if there were no better alternatives," was left out (as this passive seeking could be interpreted in multiple ways).

Lastly, as shown in Figure 7, domain extension and information gathering capacity had significant effects on channel beliefs, with beta=.20, p<.001 and beta=.54, p<.05, respectively.

V. DISCUSSION

The grand idea of this study was to determine if basic manipulations could influence a mental picture of what is on a website or not, and if these manipulations could influence potential website usage (given no other information about the site to go on). One of the most basic aspects of a website, its domain extension, was significantly important in both respects. First, subjects were, on average, more likely to use a *.gov* website "right away" and more likely to avoid a *.gov* website completely. Second, this tendency was corroborated by the channel belief data. The mean belief about the channel—the product of how valued website characteristics were and how likely they were thought to be on a website, all summed together—was three times higher (more positive) for *.gov* websites compared to *.com* websites. Both conclusions indicate that *.gov* websites are thought more likely to have, as a part of the Internet schema, more valued attributes when it comes to finding accurate information and less likely to have unvalued or detriment attributes (supported by the ANOVA data on website characteristics in Tables 5 and 6). In turn, this channel belief, according to the path analysis model in Figure 7, led subjects to go to the *.gov* websites "right away" more than for the *.com* sites. Looking at the mean scores for the value items in the descriptive statistics (see APPENDIX C), the most valued attributes were scientific references, available contact information, a high-credentialed author, a website run by an authority (e.g. NASA), and an official domain extension (coincidentally the highest valued attribute). These characteristics were all rated more likely to appear on *.gov* websites. As a positive channel belief predicted site usage, it seems as though these are the characteristics of a website that are looked for when searching for accurate information.

Additionally, "Like" buttons and advertisements were the lowest valued characteristics on average, suggesting that they are red flags when looking for good information. These attributes were all rated more likely to appear on *.com* websites. Again supporting the idea of an Internet schema, when merely presented with a website name like *cancer.gov*, a whole slew of connected attributes (some good, some bad) appear in cognition.

Overall, the results of the study indicate that *.gov* websites are more valued when seeking accurate information.

Only three out of seven hypotheses were supported in the present study. However, the path analysis model reveals a plausible reason why the present study did not find the connections it was looking for. According to the EV literature, channel beliefs would be important for website usage. But what was not understood was how seeking tendencies (described by the HSM) could fit into this model. Looking at the direct and indirect effects of the path analysis model, the present study likely moved the participants out of the general and into the specific with the task they were provided.

The participants were asked to evaluate a given website, remembering that they would possibly have to use this website for a research project. This instilled a high-level accuracy motivation that overrode over variables in the HSM. The information sufficiency gap and seeking tendencies, according to the path analysis, did not influence site usage at all. The high accuracy motivation, especially when used among the student subjects, is to blame. Subjects' general seeking tendencies did not matter when they were *forced* to consider actively seeking information. For example, when you have to know a lot to complete a research project, how much you already know about the topic or how you handle the topic in your daily life takes a back seat to accuracy. This left one HSM

variable in the model—information gathering capacity—that did make it through to influence both channel beliefs and website usage.

The forced motivation to be accurate in the study is in accordance with what Chen et al. (1999) deemed as "direction of cognition." In other words, the high motivation encouraged more systematic-type seeking (rendering the differing seeking measures in the study ineffective), and the task given to subjects directed that motivation (an accuracy motivation rather than a defensive one, for example). In fact, given the lack of connections between the information seeking and sufficiency measures and the rest of the model, the study at least avoided the potential pitfalls of instilling a different kind of motivation or not making the task important enough to conceptualize in subjects' minds.

Supporting the path analysis model, having a greater capacity to understand information could plausibly factor into what kinds of things subjects looked for and value on a website. For example, if you feel able to evaluate scientific references on a website, and value them highly, finding some on a website could influence you to choose that site for research. In this view, the high (and constant) motivation to obtain accurate information was the filter—only the variables that could influence the end decision made it through in the path analysis model.

When tasked with finding accurate information on the web, the results of the present study suggest that motivation can be thought of as constant, general seeking tendencies get overridden, and the capacity to evaluate task-specific information feeds into how one evaluates a website. Ultimately, how one values a website determines if he or she uses it or not. General tendencies get weeded-out in favor of what is on a website and how one evaluates those characteristics.

The other main finding of the study is that there does seem to exist an Internet schema. Though the experimental manipulation of perceived website authority (e.g., WebMD vs. NIH) did not influence anything, the domain extension manipulation was powerful in both likelihood determinations and overall channel beliefs (the highest direct effect in the path analysis model). Tables 5 and 6 show just how much more desirable attributes like scientific references were thought to be on websites that ended in *.gov*. With the exception of advertisements and "Like" buttons (undesirable attributes with the lowest mean value scores), every other attribute was expected to be on the *.gov* websites more than the *.com* sites. This higher likelihood also determined the overall channel belief, which was also higher (more positive) for the *.gov* websites. This very basic domain manipulation suggests that individuals who use the Internet frequently have an idea of what *.com* and *.gov* websites have on them, and whether those characteristics are good or bad. When searching for accurate information, seeing a Google search return a *.gov* website seems to touch off a schema that includes a host of other characteristics important for website usage.

Table 6 shows that the overall channel belief for each item pair was significantly different for each domain extension. However, some pairs that were significant in Table 5, showing differences in expectancy, were not significant in Table 6. "Like" buttons did not pan out, "attractive graphics" was probably too subjective to return the proper variance, and "links to other websites that I recognize" was most likely too vague. When combined with the value battery, Table 6 shows what websites (based on domain alone) are more likely to have high-value characteristics and less likely to have low-value characteristics. Per item pair, channel beliefs favor *.gov* websites across the board.

The path analysis model showed that only a few variables made it through this filter of an artificially high motivation. For this reason, neither information sufficiency nor information seeking tendencies was included in the model. The other experimental manipulation, perceived authority, also was not included in the model because it had no effect on any variable. Authority is an important variable in this kind of work even though it did not shake out in this study. In the future, the distinction between "high" and "low authority" websites could be made more distinct. For example, instead of choosing *cancer.gov* and *health.nih.gov*, the study could use sites with different expertise, like *cdc.gov* and *aapcc.org* (the websites for the center for disease control and prevention and poison control centers, respectively). A different expertise could lead to a better conception of authority in the Internet schema. Besides choosing more disparate websites, perhaps subjects could have been presented with two websites of differing authority side-by-side for comparison. In isolation, the authority of one website is likely too subjective to impact other measures depending on it.

A final finding—that whether or not participants had to think about the accuracy of the website's information influenced their belief about the channel and avoiding the website—was an interesting outcropping (the last question in the instrument before the site use battery). The present study considered this measure to get at underlying skepticism. The more a participant was skeptical of the given website, the less favorable their belief about the channel ($r=-.21$, $p<.05$, $n=130$). This skepticism also extended to website selection. A more skeptical participant was more likely to avoid the website completely ($r=.27$, $p<.01$, $n=130$). The influence of a motivation to check a website for accuracy suggests that while what is on the website itself is important, there is also a

wider consideration of whether or not the site is trustworthy. Among subjects with either

.com or *.gov* websites, this trustworthiness rating favored the *.gov* websites, with subjects

having to think harder about the accuracy of a *.com* website (M=3.6, SD=.94) than a *.gov*

website (M=3.1. SD=1.3). The differences between these groups were significant,

$F(1,128)=6.83$, p<.01.

The path analysis model, as strong as the connections were, did not have a very

good fit. With a RMSEA of 0.12, the model could have been better. However, because

this was an exploratory model, a study focusing on these five variables exclusively could

get a much better fit. Without all the other antecedent variables of the HSM tugging on it,

a study considering information gathering capacity exclusively might be more successful.

(I will also note that there was a large range in RMSEA values, with the lowest being a

good fit of 0.04.)

A. Theoretical Contributions

The present study sought to combine two major theories in communication

research: Palmgreen and Rayburn's Expectancy-Value approach to media uses and

gratifications (1985) and Eagly and Chaiken's Heuristic-Systematic Model (1989), in

order to identify the relationships between information seeking tendencies, channel

beliefs about specific websites, and website usage for accurate information. To connect

these theories, this study used research on website credibility to inform what website

characteristics would be important for information seeking and Griffin, Dunwoody &

Neuwirth's Risk Information Seeking and Processing model (1999) to link channel

beliefs to information seeking. The instrument led subjects through this linkage, from

information seeking to website characteristics to channel beliefs to ultimate website

usage, the whole time manipulating whether they received a website with a *.com* or *.gov* domain extension. The path analysis model provided the main support for this linkage, demonstrating that information gathering capacity was related to channel beliefs, which in turn predicted website usage.

The results of the study support the EV approach. Websites (namely the *.gov* websites) that were thought to have more valued characteristics and less unvalued or lower valued characteristics were more likely to be selected. Aside from supporting the approach generally, the present study demonstrates that despite how unique a medium the Internet is, the Internet can be quantified and studied. In particular, the present study demonstrated that a schema has developed organically among Internet users, and that this schema informs how users navigate the web when looking for accurate information. By successfully identifying website characteristics in this schema, the present study showed that general communication theories like the EV approach can still have value in the Internet age.

By giving subjects a very specific task—find accurate information on a topic from a website—the present study showed that general information seeking tendencies can get drowned out in the process. This study suggests that future users of the Heuristic-Systematic Model take this into account. When the motivation is high enough, other variables in the HSM lose importance; how much you need to know about a topic isn't as critical as completing the information seeking task itself. This is not to say that the HSM needs revision, but selective application. Future research looking at information seeking on the web will likely have more success with the HSM when a specific task is not given.

Both the HSM and the EV approach can learn something from each other. As this study found, the general seeking tendencies of a person are not the whole story when selecting one website over another. Similarly, what website characteristics one looks for and values on the Internet is at least partly influenced by one's ability to understand the topic at hand. If kept separate in further studies looking at information seeking and website usage, this study suggests considering that there is a larger schema at work. The Internet is a relatively new medium that requires all the scalpels we have to dissect.

VI. CONCLUSION

A. Summary of Key Findings

This study attempted to join two major theories in communication research in order to find out how information seeking tendencies and channel beliefs lead people to one website over another. The present study sought to examine an "Internet schema"—a network of beliefs about websites, what they have on them, and if what they have on them indicates good information within. It hypothesized that the antecedent variables of the Heuristic-Systematic Model—information gathering capacity and information sufficiency—would be related to general information seeking tendencies, and that these tendencies would influence channel beliefs about websites, it turn influencing choosing a website or not.

The study used an instrument administered to undergraduate college students, giving them a task of finding good information on the Internet, and then manipulating the domain extension and the authority of the website that they had to use for this task. The study returned data on the subjects' channel beliefs for each website, their likelihood of going to that website or not, as well as their general information seeking tendencies, information gathering capacity, and information sufficiency. The relationships between these variables were explored using partial r correlations, analyses of variance, and a path analysis.

Few of the initial hypotheses were supported, save for the connection between channel beliefs and website usage. In an exploratory model, this study found a significant link between the experimental manipulation of a website's domain extension, the channel

belief about that website, the capacity of the subject, and the ultimate usage of the website. Subjects with a higher capacity for information about the topic (antioxidants) were likely to have a higher (more positive) channel belief, as were subjects with a website including a *.gov* domain extension. Both capacity and the domain manipulation fed into channel beliefs, which ultimately predicted avoiding the website or choosing it.

B. Limitations

There are a few things that could have made the study better. As is true of all studies, this one could have recruited more subjects. More power could produce better results. The present study also could have picked a different topic to base the information-gathering task on. Antioxidant supplements were chosen to avoid something controversial like climate change, but these supplements are rather vague. Unfamiliarity with the topic might explain why this study did not get very good data from the information sufficiency measure. Relating to this, further studies could consider a different way to ask about information sufficiency. The instrument asked participants about their sufficiency *after* it gave them the task. Had the instrument asked about sufficiency before the task, perhaps it wouldn't have been weeded-out by the high accuracy motivation, as was information seeking.

C. Future Research Directions

No study has yet considered how information seeking and channel beliefs fit into the new medium of the Internet. Other studies have considered what website characteristics are important for credibility, but none have given specific websites to participants and asked them what they are likely to find on those sites. This study found

that not only do people have at least some kind of Internet schema for determining what an accurate website looks like; there is a path to choosing one website over others. With a motivation to find accurate information on the Internet, a person's capacity to evaluate topic-specific information influences what they look for and value on a website, and ultimately if they use that website or not. Further study seeking to replicate and expand on this work could focus down on the variables the present study found to be important (excluding the variables drowned out by the high motivation) and test the path analysis model it discovered.

Future research could go further in testing the theories this study used. For the EV approach, researchers could test how website selection influences later website selection (the process shown in Figure 2). It may be that one website could influence the value of certain website characteristics, thus determining future website selections or reinforcing old selection processes. Other researchers could also expand on the website characteristics used in the present study, perhaps looking at site-specific characteristics for blogs, news websites, and even online newspapers like the *New York Times*. For the HSM, researchers could go further and test information processing tendencies of Internet users. It could be the case that certain website characteristics influence the use of heuristic rules and stereotypes as opposed to an unbiased look at the evidence, or even the other way around.

It won't be long before the Internet becomes the main information medium, so describing the pathways to certain sites will be critical for future scholars and communicators. Why does a person land at an anti-vaccine website instead of the CDC? How can communicators optimize their sites so that people who value what the site has

can find it? What if a person comes into their search with a defensive motivation? It all

remains to be seen. Hopefully the present study can be a stepping-stone in answering

these questions.

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APPENDIX A

During the first three semesters of my graduate program, I completed literature reviews on both the Heuristic-Systematic Model (HSM) (Eagly & Chaiken, 1993) and the Expectation-Value (EV) literature (Rayburn & Palmgreen, 1985). My goal is to combine these theories to explore how people seek, evaluate, and process information on the Internet. To this end, during my second semester I completed pilot study with 125 participants, looking to discover the dimensions of credibility on the web.

Pulling from studies that have already looked at credibility cues on the web, I included 14 questions relating to accurate information on a website in the pilot study. After asking participants to imagine that they needed to do research on a scientific topic, I asked what kinds of things would appear on a website with credible information. For example, when asked about antioxidants, would a credible website have scientific references or a professional design? These questions were all on 7-point Likert-type scales.

I used the data that I gathered from this pilot study to perform an exploratory factor analysis. I included all of the credibility questions, and used a VARIMAX rotation to ensure that the dimensions would not be correlated. I found the following:

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.419	24.418	24.418	3.419	24.418	24.418
2	1.656	11.828	36.246	1.656	11.828	36.246
3	1.435	10.250	46.496	1.435	10.250	46.496
4	1.202	8.588	55.083	1.202	8.588	55.083
5	1.135	8.104	63.187	1.135	8.104	63.187
6	.875	6.251	69.438			
7	.766	5.474	74.912			
8	.726	5.187	80.099			
9	.676	4.827	84.926			
10	.523	3.736	88.662			
11	.458	3.269	91.931			
12	.420	3.000	94.931			
13	.379	2.709	97.640			
14	.330	2.360	100.000			

Five main dimensions emerged from the data. I used the rotated component matrix to start making sense of the dimensions I believed would appear:

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
Website that is professionally designed likely to have credible info	.725				
Attractive graphics on site means info is probably credible	.719				
Like buttons on a site means info that is more accurate	.700				.321
Website with high credentials likely to have reliable info	.606	.316	-.441		
Website w/ scientific references likely to have credible information		.850			
Website with links to other sites that I recognize is likely to have AI	.339	.677			
Website run by authority is likely to have trustworthy information		.539		.537	
Website with disclosure notices has info that is probably trustworthy			.684		
Website with ads is likely to have info that is less accurate			.605	.409	
Website with contact info for author is probably credible		.403	.600		
Individual more accurate than organization				-.695	
Organization more accurate than individual	.535			.588	
Website with offical domain exts has info that is less accurate					.828
Website with timestamps has info that is less accurate				.345	.605

Extraction Method: Principal Component Analysis.

 Rotation Method: Varimax with Kaiser Normalization.

I then characterized these factors in a way that would hopefully reflect what it is like to evaluate websites for credibility. If credibility on the web fit into these broad categories, they could be varied experimentally to see what each dimension meant for a specific website (i.e., what credibility cues will be on it). Each variable that makes up the factors below had the highest loadings on each factor (comparatively):

1. *Heuristics*: This dimension represents the surface or heuristic aspects of a website that indicate credibility. This factor was made up of positive correlations to the professional design, attractive graphics, "like" buttons, high author credentials, and an organization is more credible than an individual variables. These are superficial characteristics of a website that could be varied in experiment.

2. *Outside Verification*: This dimension represents the need for another confirmation of source credibility beyond the website itself. This factor was made up of positive correlations to the scientific references, links to other recognizable websites, run by an authority, and author contact info available variables.

3. *Skepticism*: This dimension represents the need for a website to be forthcoming with any conflicts of interest and to resist refutation. This factor was made up of a negative correlation with the high credentials variable, and positive correlations with the disclosure notices, advertisements mean less credible information, and author contact information available variables.

4. *Authority*: This dimension represents the power of perceived authority of a website to indicate credibility. This factor was made up of positive correlations to

the run by authority, and the organization more credible than individual variables (and a negative correlation to the individual more accurate than organization variable).

5. ***Domain***: This dimension represented perhaps a gatekeeper for information, the domain extension.

The interpretation of the factors does not go far beyond a general representation of credibility on the web. My goal with this factor analysis was to suss out the dimensions of seeking accurate information on the web, not to test specific claims. Therefore, going foreword, I will use these factors as a guide for what can/should be experimentally manipulated in my thesis work.

APPENDIX B

The goal of this survey is to understand how people choose websites based on their need for accurate information on the Internet. All responses are completely confidential and are optional.

1. **On a scale from 0-100, with 0 being "no idea how to use the Internet" and 100 being "I know absolutely everything about the Internet," write a number which shows how Internet savvy you think you are**:

    _____

2. **On average, about much time per day do you spend on the Internet (not including email)?** *Please circle the appropriate letter:*

    a. 0-1 hours a day
    b. 2-3 hours a day
    c. 4-5 hours a day
    d. 5+ hours a day

3. **In general, I consider the Internet to be a credible source of information.** *Please circle the letter of the appropriate response to this statement:*

    a. Strongly agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly disagree

4. **What is your age in years?**

    _____ Years Old

5. **What is your sex?**

    a. Male
    b. Female
    c. Prefer not to say

6. **What is your highest level of education?**

    a. 1-2 years of college
    b. 3-4 years of college
    c. College degree (2 or 4-year)
    d. Graduate degree (M.A., PhD)

Antioxidants are molecules that help stop damage to cells from other molecules in the body. Today, many companies are selling them as supplements in juices and pills.

If you had to search the Internet for information about antioxidant supplements…_Please circle the letter of the appropriate response to the statements._

7. I would know what questions to ask of the experts.

    A. Strongly agree
    B. Agree
    C. Neutral
    D. Disagree
    E. Strongly disagree

8. I would know where to go for more information.

    A. Strongly agree
    B. Agree
    C. Neutral
    D. Disagree
    E. Strongly disagree

9. I could readily take the time to gather any additional information I might need.

    A. Strongly agree
    B. Agree
    C. Neutral
    D. Disagree
    E. Strongly disagree

10. Much of the information would be too technical for me to understand.

    A. Strongly agree
    B. Agree
    C. Neutral
    D. Disagree
    E. Strongly disagree

11. I would know how to separate fact from fiction.

    A. Strongly agree
    B. Agree
    C. Neutral
    D. Disagree
    E. Strongly disagree

12. I believe I could understand information on this topic if I make the effort.

     A. Strongly agree
     B. Agree
     C. Neutral
     D. Disagree
     E. Strongly disagree

In general, for information about antioxidant supplements on the Internet… *Please circle the letter of the appropriate response to the statements.*

7. When this topic comes up, I'm likely to tune it out.

     A. Strongly agree
     B. Agree
     C. Neutral
     D. Disagree
     E. Strongly disagree

8. When it comes to this topic, I'm likely to go out of my way to get more information.

     A. Strongly agree
     B. Agree
     C. Neutral
     D. Disagree
     E. Strongly disagree

9. When this topic comes up, I try to learn more about it.

     A. Strongly agree
     B. Agree
     C. Neutral
     D. Disagree
     E. Strongly disagree

10. Gathering a lot of information on this topic is a waste of time.

     A. Strongly agree
     B. Agree
     C. Neutral
     D. Disagree
     E. Strongly disagree

11. When it comes to this topic, I'm content to let information come to me in the course of my daily life.

A. Strongly agree
B. Agree
C. Neutral
D. Disagree
E. Strongly disagree

12. Whenever this topic comes up, I go out of my way to avoid learning more about it.

A. Strongly agree
B. Agree
C. Neutral
D. Disagree
E. Strongly disagree

Please read the following task and think about how you would react in the situation given. The questions that follow refer directly to this task.

Imagine that you are asked to complete a final research paper for a communications course in which you provide information on the potential health benefits of antioxidant supplements. It will be evaluated by your professor and by a professor who teaches nutrition on campus. You will exclusively use the Internet to gather your information.

Using a scale from 0 to 100, with 0 meaning you know nothing about antioxidant supplements and 100 meaning you know everything you could possibly know about them, how much do you think you currently know?

_____

Using the same scale, how much information would you need to know to be confident enough in your knowledge about antioxidant supplements?

_____

Given the task, rate the characteristics of a website you might choose for research.

Please circle the <u>one</u> number that indicates your level of agreement with each statement. For my research on antioxidant supplements:

1. **Scientific references on a website are…**

-3	-2	-1	0	1	2	3
Extremely Bad			Neutral			Extremely Good

2. **Links to other websites that I recognize are…**
3. **Available contact information is…**
4. **Advertisements on a website are…**
5. **Website sponsorship from other large organizations is…**
6. **Attractive graphics on a website are…**
7. **A website that is written by someone with high credentials (MD, PhD) is…**
8. **"Like" buttons on a website are…**
9. **Timestamps on a website are…**
10. **Disclosure notices on a website are…**
11. **A website run by an authority on the topic is…**
12. **Official domain extensions (.gov, .edu., etc.) are…**

Now consider that a Google search returns the website *health.nih.gov*. This is a website run by the National Institutes of Health. What other characteristics is this website likely to have?

Please circle the one number that indicates your level of agreement with each statement:

13. **The website will have scientific references.**

-3	-2	-1	0	1	2	3
Extremely Unlikely			Neutral			Extremely Likely

14. **The website will have links to other sites that I recognize.**
15. **The website will have author contact information available.**
16. **The website will have advertisements.**
17. **The website will be sponsored by large organizations.**
18. **The website will have attractive graphics.**
19. **The website will be authored by someone with high credentials (PhD, M.A., etc.).**
20. **The website will have "Like" buttons on it.**
21. **The website will have timestamps on the pages.**
22. **The website will have disclosure notices.**

Lastly, thinking about the task… *Please circle the letter of the appropriate response to the statement.*

I found myself trying to decide whether the information about antioxidants I would get from the *health.nih.gov* website was accurate:

  A. Strongly agree
  B. Agree
  C. Neutral
  D. Disagree
  E. Strongly disagree

I would click on the *health.nih.gov* website right away:

  A. Strongly agree
  B. Agree
  C. Neutral
  D. Disagree
  E. Strongly disagree

I would only click on the *health.nih.gov* website if there were no better alternatives:

  A. Strongly agree
  B. Agree
  C. Neutral
  D. Disagree
  E. Strongly disagree

I would avoid the *health.nih.gov* website completely:

  A. Strongly agree
  B. Agree
  C. Neutral
  D. Disagree
  E. Strongly disagree

Thank You For Completing This Survey!

APPENDIX C

Descriptive Statistics for Instrument Variables

	N	Mean	Std. Deviation
Internet Savvy (0-100 scale)	130	79.59	11.382
Time on Internet per day (5-point Likert, 1=Strongly agree, 5=Strongly Disagree)	130	2.55	.779
Internet is a credible source (5-point Likert, 1=Strongly agree, 5=Strongly Disagree)	130	1.99	.731
Age	130	20.40	2.590
Sex (1=male, 2=female, see below)	130	1.65	.478
Educational level (see below)	130	1.36	.557
I would know what questions to ask of the experts (5-point Likert, 1=Strongly agree, 5=Strongly Disagree)	130	2.55	.881
I would know where to go for more information (5-point Likert)	130	2.10	.703
I could readily take the time to gather any additional information I might need (5-point Likert)	130	1.93	.673
Much of the information would be too technical for me to understand (5-point Likert)	130	3.33	.943
I would know how to separate fact from fiction (5-point Likert)	130	2.45	.907
I believe I could understand information on this topic if I make the effort (5-point Likert)	130	1.65	.511
When this topic comes up, I'm likely to tune it out (5-point Likert)	130	2.72	1.036
When it comes to this topic, I'm likely to go out of my way to get more information (5-point Likert)	130	3.45	.933
When this topic comes up, I try to learn more about it (5-point Likert)	130	3.18	.913
Gathering a lot of information on this topic is a waste of time (5-point Likert)	130	3.51	.838

When it comes to this topic, I'm content to let information come to me in the course of my daily life (5-point Likert)	130	2.52	.780
Whenever this topic comes up, I go out of my way to avoid learning more about it (5-point Likert)	130	3.89	.838
How much do you know? (0-100 scale)	130	23.93	20.495
How much do you need to know? (0-100 scale)	130	77.83	17.445
Scientific references on a website are… (Extremely bad=-3, Extremely good=+3)	130	2.18	.919
Links to other websites that I recognize are…(Extremely bad=-3, Extremely good=+3)	130	1.35	.955
Available contact information is…(Extremely bad=-3, Extremely good=+3)	130	1.91	1.171
Advertisements on a website are…(Extremely bad=-3, Extremely good=+3)	130	-.82	1.297
Website sponsorship from other large organizations is…(Extremely bad=-3, Extremely good=+3)	130	.71	1.567
Attractive graphics on a website are…(Extremely bad=-3, Extremely good=+3)	130	1.06	1.237
A website that is written by someone with high credentials (MD, PhD) is…(Extremely bad=-3, Extremely good=+3)	130	2.68	.574
"Like" buttons on a website are…(Extremely bad=-3, Extremely good=+3)	130	-.67	1.343
Timestamps on a website are…(Extremely bad=-3, Extremely good=+3)	130	1.11	1.371
Disclosure notices on a website are…(Extremely bad=-3, Extremely good=+3)	130	.46	1.252
A website run by an authority on the topic is…(Extremely bad=-3, Extremely good=+3)	130	2.26	.928

Official domain extensions (.gov, .edu., etc.) are... (Extremely bad=-3, Extremely good=+3)	130	2.58	.735
Scientific references on a website are… (Extremely unlikely=-3, Extremely likely=+3)	130	1.66	1.255
Links to other websites that I recognize are…(Extremely unlikely=-3, Extremely likely=+3)	130	1.02	1.210
Available contact information is…(Extremely unlikely=-3, Extremely likely=+3)	130	1.18	1.449
Advertisements on a website are…(Extremely unlikely=-3, Extremely likely=+3)	130	.92	1.520
Website sponsorship from other large organizations is…(Extremely unlikely=-3, Extremely likely=+3)	130	1.18	1.378
Attractive graphics on a website are…(Extremely unlikely=-3, Extremely likely=+3)	130	.92	1.192
A website that is written by someone with high credentials (MD, PhD) is…(Extremely unlikely=-3, Extremely likely=+3)	130	1.50	1.601
"Like" buttons on a website are…(Extremely unlikely=-3, Extremely likely=+3)	130	-.16	1.603
Timestamps on a website are…(Extremely unlikely=-3, Extremely likely=+3)	130	.80	1.223
Disclosure notices on a website are…(Extremely unlikely=-3, Extremely likely=+3)	130	.30	1.286
I found myself trying to decide whether the information about antioxidants I would get from the website was accurate (5-point Likert)	130	2.65	1.147
I would click on the website right away (5-point Likert)	130	2.41	1.112

I would only click on the website if there were no better alternatives (5-point Likert)	130	2.75	1.095
I would avoid the website completely (5-point Likert)	130	3.94	1.047
Valid N (listwise)	130		

Descriptive Statistics for Summated Scales

	N	Minimum	Maximum	Mean	Std. Deviation
Capacity	130	15.00	30.00	22.6462	2.89041
Active Seeking	130	0	10	6.64	1.765
Seeking Avoid	130	5	15	10.12	2.045
Channel Beliefs	130	-31	71	16.47	17.009
Valid N (listwise)	130				

Frequencies for Time on Internet per day

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-1 hours	7	5.4	5.4	5.4
	2-3 hours	61	46.9	46.9	52.3
	4-5 hours	46	35.4	35.4	87.7
	5+ hours	16	12.3	12.3	100.0
	Total	130	100.0	100.0	

Frequencies for Internet is a credible source

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	28	21.5	21.5	21.5
	Agree	76	58.5	58.5	80.0
	Neutral	22	16.9	16.9	96.9
	Disagree	4	3.1	3.1	100.0
	Total	130	100.0	100.0	

Frequencies for Sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	45	34.6	34.6	34.6
	Female	85	65.4	65.4	100.0
	Total	130	100.0	100.0	

Frequencies for Educational level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-2 years of college	88	67.7	67.7	67.7
	3-4 years of college	37	28.5	28.5	96.2
	College degree	5	3.8	3.8	100.0
	Total	130	100.0	100.0	