
Electronic Theses and Dissertations, 2004-2019

2010

Trust On The Web: The Impact Of Social Consensus On Information Credibility

Katherine Del Guidice
University of Central Florida



Part of the [Psychology Commons](#)

Find similar works at: <https://stars.library.ucf.edu/etd>

University of Central Florida Libraries <http://library.ucf.edu>

This Doctoral Dissertation (Open Access) is brought to you for free and open access by STARS. It has been accepted for inclusion in Electronic Theses and Dissertations, 2004-2019 by an authorized administrator of STARS. For more information, please contact STARS@ucf.edu.

STARS Citation

Del Guidice, Katherine, "Trust On The Web: The Impact Of Social Consensus On Information Credibility" (2010). *Electronic Theses and Dissertations, 2004-2019*. 4273.

<https://stars.library.ucf.edu/etd/4273>

TRUST ON THE WEB: THE IMPACT OF SOCIAL CONSENSUS ON
INFORMATION CREDIBILITY

by

KATHERINE VICTORIA DEL GIUDICE

M.A. University of Central Florida, 2009

B.S. Clemson University, 2004

A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy in Applied Experimental
and Human Factors Psychology
in the Department of Psychology
in the College of Sciences
at the University of Central Florida
Orlando, Florida

Summer Term
2010

Major Professor: P.A. Hancock

© 2010 Katherine V Del Giudice

ABSTRACT

Models of the need-driven information search and the information appraisal process were formed from a comprehensive literature review of factors affecting perceived credibility and trust in online information. The social component of online credibility has not, to date, been thoroughly researched. This component's impact on the development of the perceived credibility of online information was examined in two experiments. In the first experiment, the impact of positive, mixed, and negative social feedback on the development of the perceived credibility of a web page was evaluated. In the second experiment, the effect of social feedback on credibility was examined under two levels of motivation for information use to investigate whether social feedback becomes less important as motivation to obtain quality information increases.

The results of Experiment 1 suggest that type of feedback can influence perceived web page credibility. Pages with negative audience feedback received the lowest credibility ratings, while pages with positive audience feedback received the highest credibility ratings. Pages with mixed or no audience feedback received higher credibility ratings than pages with negative feedback, but lower credibility ratings than pages with positive feedback. In Experiment 2, high motivation did not impact the number of web page elements participants reported that they used to determine credibility. High motivation for information use also did not reduce the impact of audience feedback on perceived credibility.

Доверяй, но проверяй
-doveriai, no proveriai-

“Trust, but verify”

ACKNOWLEDGMENTS

I want to sincerely thank all those who helped me, encouraged me, and strengthened me during this process. I especially want to thank my husband and best friend, Matt, who never stopped believing that I could do this (and using his amazing SQL skills to rearrange my data in countless configurations). I also want to thank my friends and family, especially my mom and dad, who provided their never ending love and support. My advisor, Dr. Hancock, and committee members, Dr. Szalma, Dr. Jentsch, and Dr. McDaniel, provided insightful advice and encouragement that made this project the best it could possibly be. I thank them for their time given to serve on the committee and whose examples as scientists give me something to aspire to.

The idea for this dissertation arose from my musings about two things that I had not yet had a chance to explore in my graduate career: my love for Web science and social psychology. Below the surface of what the technology enables, it is the human face of the Web that I hope to explore throughout my career.

“I thought I was going to be a filmmaker, but at the same time I was an intellectual and I felt that I could make a contribution to some field, as yet, not invented. So in my uncertainty, I went to graduate school and there it all happened.”

- Ted Nelson

TABLE OF CONTENTS

LIST OF FIGURES.....	viii
LIST OF TABLES	ix
LIST OF ACRONYMS.....	x
CHAPTER ONE: INTRODUCTION.....	1
CHAPTER TWO: LITERATURE REVIEW AND MODEL DEVELOPMENT	8
Relevance in the Information Search Process.....	11
Credibility Assessment Within the Information Search Process.....	11
Source Characteristics	15
Message Characteristics.....	18
Medium Characteristics.....	21
Receiver Characteristics	23
Audience Characteristics.....	30
Hypotheses.....	33
CHAPTER THREE: EXPERIMENTAL PROCEDURE.....	36
Experiment 1	36
Participants.....	36
Materials	36
Procedure	44
Experiment 2	47
Participants.....	47
Materials	48
Procedure	48
CHAPTER FOUR: RESULTS	52
Pilot Study	52
Participants.....	52
Tests of Hypotheses	54
Motivation Manipulation Check.....	59
Page Credibility Ratings and Treatments Chosen.....	60
Page Elements Used When Determining Credibility	62

Experiment 1	62
Participants.....	62
Tests of Hypotheses	68
Page Credibility Ratings and Treatments Chosen.....	71
Page Elements Used When Determining Credibility	73
Experiment 2	73
Participants.....	73
Motivation Manipulation Check.....	79
Tests of Hypotheses	80
Additional Analyses	84
CHAPTER FIVE: DISCUSSION.....	88
Implications for the Design of Web Pages.....	89
Information Search Process and Information Appraisal Model Impacts.....	91
Directions for Future Research.....	92
APPENDIX A: HUMAN SUBJECTS APPROVAL FORM.....	95
APPENDIX B: EXPERIMENT CONSENT FORM.....	97
APPENDIX C: EXPERIMENT QUESTIONNAIRES	99
APPENDIX D: EXPERIMENT MATERIALS	122
LIST OF REFERENCES	142

LIST OF FIGURES

<i>Figure 1.</i> Model of the need-driven information search process	9
<i>Figure 2.</i> Stages of the information search process (Reproduced from Kuhlthau, 1993)	10
<i>Figure 3.</i> Model of the information appraisal process	12
<i>Figure 4.</i> Sample positive and negative audience reaction icons	43
<i>Figure 5.</i> Average credibility rating by type of feedback in the pilot study.....	55
<i>Figure 6.</i> Average credibility rating by type of feedback and size of audience in the pilot study.....	56
<i>Figure 7.</i> Average credibility rating by type of feedback and motivation level in the pilot study.....	57
<i>Figure 8.</i> Average credibility rating by type of feedback in Experiment 1.....	70
<i>Figure 9.</i> Average credibility rating by type of feedback and size of audience in Experiment 1	71
<i>Figure 10.</i> Average credibility rating by web page in Experiment 1	76
<i>Figure 11.</i> Average credibility rating by type of feedback and motivation level in Experiment 2	82
<i>Figure 12.</i> Average credibility rating for each type of audience feedback by gender	85
<i>Figure 13.</i> Average credibility rating for each type of audience feedback by expertise level	87

LIST OF TABLES

Table 1. <i>Factors that influence credibility assessments of information sources</i>	16
Table 2. <i>Mean accuracy ratings for each of the experimental web pages, issued by physicians</i>	38
Table 3. <i>Factors known to influence credibility assessments as either manipulated, controlled, randomized, or ignored in the experimental procedure</i>	39
Table 4. <i>Types and amounts of audience feedback given during the experiment</i>	44
Table 5. <i>Means for each attribute of the experimental web pages as measured in the pilot study</i>	63
Table 6. <i>Web page credibility ratings and treatments chosen in the pilot study</i>	65
Table 7. <i>Table of means, standard deviations, and correlations among the study variables in Experiment 1</i>	69
Table 8. <i>Web page credibility ratings and treatments chosen in Experiment 1</i>	72
Table 9. <i>Means for each attribute of the experimental web pages as measured in Experiment 1</i>	74
Table 10. <i>Table of means, standard deviations, and correlations among the study variables in Experiment 2</i>	81

LIST OF ACRONYMS

ELM	Elaboration Likelihood Model
HM	Heuristic Model
IA	Information appraisal
IR	Information retrieval
ISP	Information search process

CHAPTER ONE: INTRODUCTION

“[We need] to [investigate] the paradox of the information society. This is, how can such highly rational production [of information goods] result in the incredible irrationality of information overloads, misinformation, disinformation, and out-of-control information. At stake is a disinformed information society.” (Lash, 2002, p. 2)

In July 1945, *Atlantic Monthly* published an article by the American scientist Vannevar Bush. In this article, Bush outlined his vision for human interaction with information technologies that has proved to be a most enduring and effective set of ideas (Bush, 1945). Bush proposed the development of a new machine, the “Memex”, which would supplement and aid human memory by serving as a physical electronic complement to the biological brain (Nyce & Kahn, 1991). The Memex was designed to reduce the burden placed upon human cognitive capacities by the enormous amounts of information encountered in day-to-day life through storing information in a networked, rather than hierarchical, fashion. Since 1945, our world has only become more complex and information saturated, hastening the necessity for ever-more complex forms of Bush’s Memex.

Most of this increase in information complexity has been driven by the digital revolution in which we have seen many work tasks converted to networked computing environments. One of the central components of this new environment is the hypertext-based World Wide Web. Originally designed by Sir Tim Berners-Lee, the World Wide Web, and the Internet on which it runs, is now thoroughly woven into the fabric of everyday life (Berners-Lee, 1999; Berners-Lee, Cailliau, Luotonen, Nielsen, & Secret, 1994). In most European, North American, and Asian countries

Internet penetration rates stand at well over 50% of the population (World Internet Usage Statistics, News, and World Population Stats, 2009). Internet penetration rates alone do not tell the whole story, however, as to how many individuals have come to rely on the Internet and the Web as their primary source of information, or need it to perform their jobs (Hoffman, Novak, & Venkatesh, 2004; Rainie, Estabrook, & Witt, 2007). Instant access and availability have encouraged preferential use of the Web over many of the traditional mediums for information distribution such as newspapers, magazines, and libraries, especially among the younger population of users. This emerging cohort of users born after 1980 has begun to be referred to as the “Digital Natives” for their experience with and reliance on digital technologies (Bennett, Maton, & Kervin, 2008; Howe & Strauss, 2000; Lenhart, Madden, & Hitlin, 2005; Palfrey & Gasser, 2008; Prensky, 2001).

While the abundance of information we now encounter in daily life has been beneficial in numerous ways, increased accessibility to information does come at a cost. Increasingly, individuals are now left to determine for themselves whether the information they encounter on the Internet is trustworthy and credible or not (Drapeau, 2009; Metzger, Flanagin, Eyal, Lemus, & McCann, 2003; Metzger, 2005; Robins & Holmes, 2008). Traditional distributors of information, especially in the sciences, tackle credibility issues through rigorous fact-checking and peer review of to-be-published documents. The publication process also often includes editorial staffs trained to evaluate information quality and accuracy. However, in the digital world few websites and online resources, outside of those that duplicate information found in traditional media, are subjected to this type of critical, independent review. Nonetheless, the appeal of instant information access continues to encourage individuals to turn to the Internet more often than other information sources.

The importance of the Internet as an information resource has encouraged schools and colleges to consider adding the fledgling domain of information literacy, sometimes referred to as

information fluency, to their standard curricula. This curriculum change signifies the recognition that students need to enter the post-graduation world with the skills required to use the Internet and the Web to their full potential (Abell, 2000; Marshall & Williams, 2006). Information literacy seeks to help students learn how to use information resources and independently judge the quality of the information sources they access (Abilock, 2004; Thompson & Henley, 2000). However, most information literacy teaching practices are limited in scope and offer only broad suggestions, such as evaluating the qualifications of the source from which the information on the website comes (e.g., author, date of publication, etc.) (Charnock & Shepperd, 2004; Jadad & Gagliardi, 1998; Kim, Eng, Deering, & Maxfield, 1999; Thompson & Henley, 2000). Further, research has shown that credibility assessments, if conducted at all, are resistant to the “checklist approach” currently favored by information literacy educators (Meola, 2004; Metzger, 2005).

Complicating these educational interventions is the fact that experimental research is only now beginning to address the question of how users of the Internet judge the quality of the information sources they find. Thus far, research has shown that users appear to make limited judgments about a website’s quality. Initial assessments are primarily based on aesthetic aspects and intuitive reactions to the site’s overall visual design (see Gladwell, 2005; Lindgaard, Fernandes, Dudek, & Brown, 2006; Metzger, 2005). In addition, assessments about an information source’s credibility appear to be influenced by several factors including the user’s prior knowledge of the domain of the problem, their prior experience with using the Internet as an information source, and information about the source’s author and their perceived expertise in the problem area (Gugerty, Billman, Pirolli, & Elliot, 2007; Holscher & Strube, 2000; Jenkins, Corritore, & Wiedenbeck, 2003). While progress is being made toward determining how users make judgments of credibility for any

particular Internet resource, considerably less is known about how users judge the relative credibility of the various sources they ultimately choose to use.

The rise of collaboratively created Internet content written and edited by the online community, like that found in Wikipedia© and YouTube©, means that users cannot rely solely on authorship judgments or even source judgments as a basis for establishing information credibility (Encyclopedia Britannica Inc., n.d.; Giles, 2005; Miller, 2005) . Instead, users must bring their own knowledge and experience to bear in evaluating information quality or rely on other's judgments to determine whom to trust. The popular search engine Google© takes the second approach through its PageRank algorithm, which counts how often a web page is linked to by other web pages in order to rank returned search results (Brin & Page, 1998; Kleinberg, 1999). Google's© PageRank roughly represents a computer algorithm for the familiar citation model, which has been used as a hallmark of publication quality in academic circles for an extended period.

Properly ranked, relevant search results only provide part of the information appraisal picture. Users must still sift through the search results and decide which of the returned sources are most relevant to their concern and which sources they will trust the most, if they access more than one source. Information appraisal (IA) is defined here as the process an individual undertakes to determine an information source's relevance to the problem they wish to address, the credibility of that information source, and its usefulness toward solving that problem. Information appraisal, therefore, consists of several judgment considerations and is a central component of the information search process (ISP).

It is important to note that users are not likely to engage in all parts of the IA process for every one of their concerns. Some concerns may be serious enough to warrant a complete evaluation, while others may only require that users establish trust in the information (Rieh, 2002).

The completeness of any IA process is likely to be affected by time constraints, current workload, personality variables, experience with using the Internet as an information resource, and the users' prior knowledge of the problem area (Fink-Shamit & Bar-Ilan, 2008; Metzger, 2005, 2007).

Several features of the World Wide Web (WWW) call for a thorough examination of how the process of IA unfolds online. The issue of anonymity on the Web can make it particularly difficult to judge the credibility of information found online, a central component of the IA process. The well-known problem of “phishing”, or coercing individuals to disclose sensitive information by appearing to represent a well-known institution, makes especially blatant the issue of trust in Web-based content (Dhamija, Tygar, & Hearst, 2006). Anonymity makes it easy for ill-intentioned or ill-informed individuals to pose under the guise of those who are reputable.

Unlike more static forms of communication, the advent of Web 2.0 technologies allows for easier audience response to Web-based content and this additional information may significantly affect the IA process (Drapeau, 2009; O'Reilly, 2005). Examples of dynamic Web 2.0 technologies include Web-based applications, social networking websites, wikis, blogs, and user-generated ratings, comments, and tags on Web articles. Being able to see publicly applied ratings of articles and the comments made by other users on those articles is likely to affect users' judgments about the usefulness of that content. This is perhaps an analog to seeing well-worn books on the library shelf, which provide patrons with a sense of which books are most popular or well-read and whose contents may be given more weight by the reader. Web 2.0 technologies allow the give and take between searchers and the information they seek to be more salient. For example, one might read a comment on an article from a user with a similar concern as their own, leading them to use the information contained in the article instead of making their own decisions about whether or not to trust and use the information (Fogg & Tseng, 1999; Wang, Walther, Pingree, & Hawkins, 2008).

Anonymity in a publicly-edited online work, such as an article in Wikipedia, relies on the “wisdom of the crowds” to produce quality content, but leaves up to individual users whether or not to trust that particular crowd. It is therefore very important for users to understand that social consensus does not necessarily imply quality, especially for novel or unique problem contexts.

All information is encountered within a context, and this context can affect individual judgments of credibility and determine the eventual use of that information. In particular, of vital importance is the social context within which information is encountered. Hearing information from a friend, or more importantly a group of friends, can be very different than hearing it from the mass media or another information channel. Often, the more consensus given by a group of individuals to a particular piece of information, the more it is accepted as trustworthy and correct (Burns, 2008; Mackay, 1841). Much like a gossip circle in an elementary school classroom, sharing of information can build consensus and acceptance of that information as fact, whether it is true or not. In his book, *The Wisdom of Crowds*, James Surowiecki (2005) makes the argument that the crowd is more likely to form a good decision from collectively agreed-upon information than any one individual within the crowd, even an expert member. Of central importance to his argument is that group input must be unbiased and collected independently from each group member, essentially pooling each group member’s knowledge and forming a group opinion devoid of group dynamics. However, preliminary research into the use of Web 2.0 tools suggests that only a small percentage of Web users are active contributors using these tools, so it remains unclear how the wisdom of crowds might express itself online (Grifantini, 2009; Kennedy et al., 2007).

The rise of online social networking and collaborative editing tools makes the sharing and agreeing upon of information by the collective Web crowd especially easy. Rating tools, comment boxes, collaborative linking, and community-edited information resources allow individual users to

provide feedback on and edit information available on the Web. The popularity of these tools means that it is becoming increasingly unlikely to encounter a piece of information on the Web without a surrounding social context. The social context is provided by the ‘writings on the wall’ of those who have encountered the information before.

To date, the online credibility literature has not investigated the impact of Web 2.0 technologies on credibility assessments. This work seeks to fill that gap by building a model of the process of IA within the larger context of the ISP from the existing literature. It will then delve into further detail concerning the process of credibility assessment within IA and the potential influence of social factors on this process. In particular, the effect of social feedback on credibility establishment will be tested to determine whether the social context should be added to future models of online credibility assessment. To begin, a review of the relevant literature is provided which is then used to build models of the ISP and IA processes. The literature concerning credibility is then reviewed, including a description of the variables known to affect credibility assessments. The literature and model development chapter is followed by a description of two experiments used to test the proposed audience feedback effect on the credibility component of the IA model. The results of these experiments are then presented. Finally, a discussion of the results and conclusions drawn from the results and directions for future research are provided.

CHAPTER TWO: LITERATURE REVIEW AND MODEL DEVELOPMENT

The process of information appraisal (IA) occurs within the larger context of need-driven information discovery and use. The first goal of this dissertation was to develop a conceptual framework for the need-driven information search process (ISP) within which the process of IA could be contextualized. A review of the literature revealed a number of cybernetic frameworks within which to characterize the process of information use for decision making. Some of these frameworks include the OODA (Observe, Orient, Decide, Act) Loop (Boyd, 1996), TOTE (Test, Operate, Test, Exit) (Miller, Galanter, & Pribram, 1960), and the Model of Situation Awareness in Dynamic Decision Making (Endsley, 1995). All of these models include an evaluation of the state of the environment (input), an orientation component which begins to make sense of the input received from the environment, a decision component, and an evaluation of the impact of the decision upon the goal-state (outcome). This basic framework was adopted for the developed model of the ISP presented in Figure 1.

There are numerous models of the ISP in the information science literature (Ingwersen & Jarvelin, 2005; Morville & Rosenfeld, 2007; Pettigrew, Fidel, & Bruce, 2001; Spink & Cole, 2006; Wilson, 1999). One of the most widely accepted staged models of the ISP is Kuhlthau's cognitive model (Kuhlthau, 1991, 1993). Uncertainty is the primary instigator of the ISP in Kuhlthau's model. All information search behaviors are driven by an uncertainty that cannot be reduced by the individual's current state of knowledge (Kuhlthau, 1993). This uncertainty drives the user to the initial stage of the ISP, initiation, and reduction of uncertainty is expected to occur throughout the other five stages in the model: selection, exploration, formulation, collection, and presentation

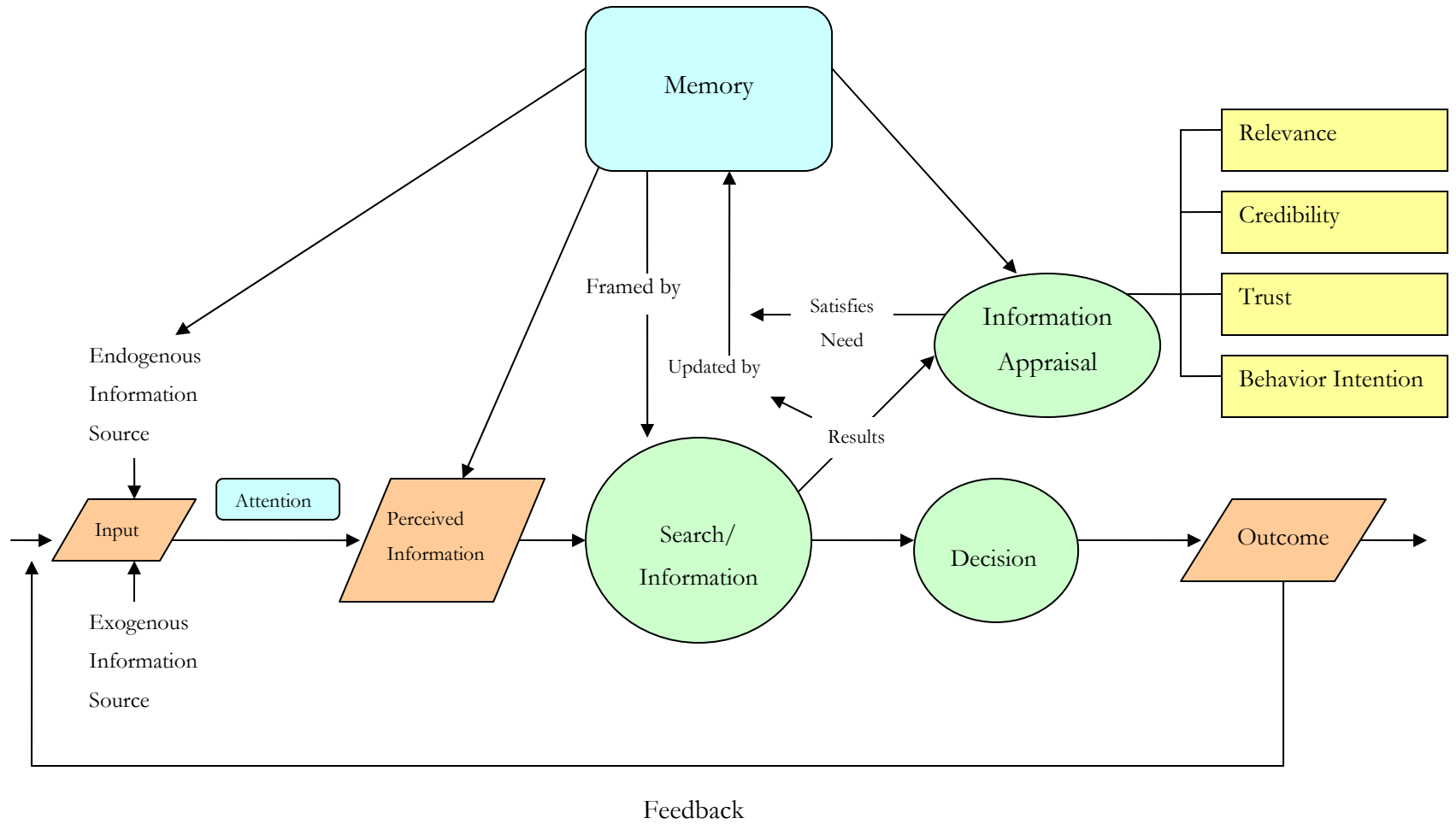


Figure 1. Model of the need-driven information search process

(Kuhlthau, 1991). Kuhlthau's ISP model is unique among competing models in that it includes the cognitive, affective, and physical actions that accompany each stage of the ISP. The overall model is given in Figure 2, along with the cognitive, affective, and physical action components that characterize each stage.

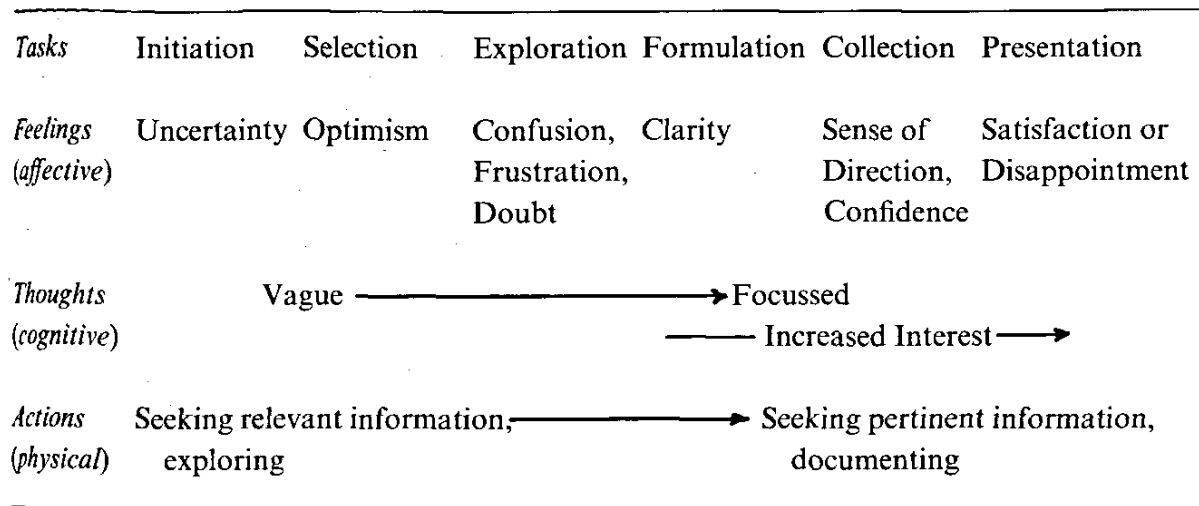


Figure 2. Stages of the information search process (Reproduced from Kuhlthau, 1993)

It is important to note within this model that uncertainty is not necessarily reduced in a linear fashion during the stages of the ISP and may in fact increase during the initial stages of selection and exploration (Ingwersen, 1996). Feedback between the user and the information retrieval (IR) system typically serves to refine the users understanding of their information need. This component of the ISP was added to the model given in Figure 1, indicating that the results of a search using an information retrieval system can change or impact the perceived information need.

Relevance in the Information Search Process

The concept of relevance changes throughout the ISP and this is not emphasized in Kuhlthau's (1993) model. Existing research has shown that the relevance of a document to any information need is a fuzzy concept which is changed by the user's prior knowledge and their understanding of the problem or area of uncertainty for which they are interacting with the IR system (Greisdorf, 2003; Spink & Griesdorf, 1997; Vakkari & Hakala, 2000). Relevance of any particular document is also not a binary concept, with a number of items obtained from an information retrieval system often being each of partial relevance (Borlund, 2003; Spink & Griesdorf, 1997). Interestingly, research on relevance has indicated that the number of partially relevant items is often positively correlated with changes in the user's understanding of their problem, especially for novices in the area of the information need (Spink & Griesdorf, 1997). The process of relevance itself is not a linear process, with users often not recognizing that a document was relevant to their information need until later in the ISP (Barry & Schamber, 1998; Ruthven, 2005; Vakkari & Hakala, 2000; Wen, 2003). Thus, in the model of the ISP given in Figure 1 the process of search, relevance and credibility assessment, and updating of memory is characterized without clear entry and exit points.

Credibility Assessment Within the Information Search Process

A crucial step that is missing in current ISP models is that of credibility assessment. Information credibility has been conceptualized as trust in a source, as whether or not the information is believable, and whether the information is true (Corritore, Kracher, & Wiedenbeck, 2003; Fink-Shamit & Bar-Ilan, 2008; Lee & See, 2004; Metzger, 2007; Walther, Wang, & Loh, 2004). The most widely used definition of credibility is that credibility equates to believability, or whether

the individual demonstrates belief in the information (Dutta-Bergman, 2003; Fogg & Tseng, 1999; Hilligoss & Rieh, 2008; Metzger, 2007).

Figure 3 outlines the process of IA, which consists of a relevance determination, a credibility assessment, and the attitudes, intentions and behaviors that result from this process. The first stage in the information appraisal process is a relevance assessment. In general, if the information is not determined to be relevant to the information need no further

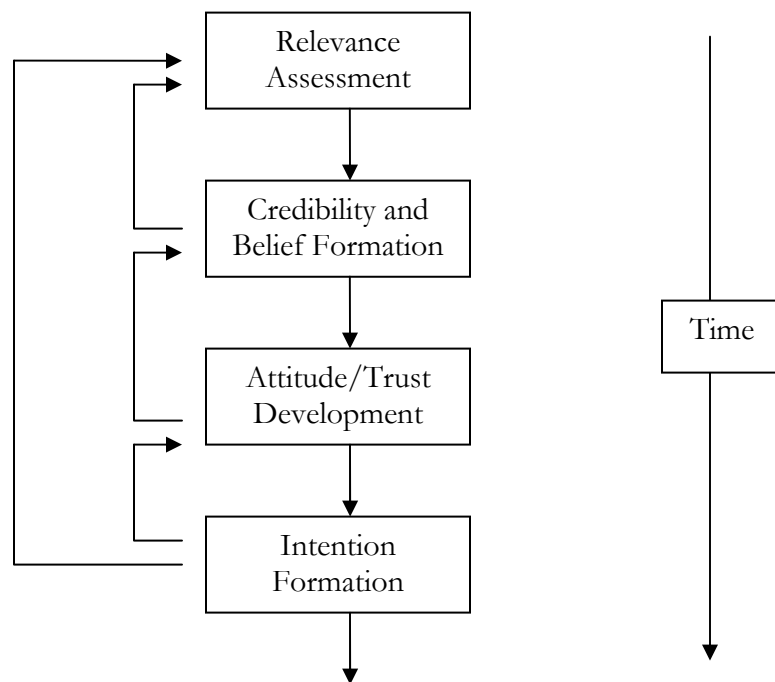


Figure 3. Model of the information appraisal process

evaluation of that information will take place (Spink & Griesdorf, 1997). The second stage in the information appraisal process is credibility assessment, which impacts the believability of the information. Beliefs in turn then determine attitudes (including an attitude of trust), which influences decisions (intention formations) and outcomes (behaviors) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975; Lee & See, 2004).

Fogg and Tseng (1999) have outlined four types of credibility that can be associated with a piece of information: (1) presumed credibility, (2) reputed credibility, (3) surface credibility, and (4) experienced credibility. Presumed credibility is the credibility given to information because of the referring source (e.g., a trusted friend recommends a website to you). Reputed credibility is credibility given a source via third-party endorsements, or through the credentials of the referring source (e.g., a professor recommends a website to you). Surface credibility relates to superficial characteristics of the source (e.g., the design of a website enhances your feelings of trust and/or expertise of the entity behind the website) and experienced credibility is contingent upon and enhanced by interactions with the source and the outcome of those interactions (e.g., regularly conducting transactions with Amazon.com).

Since credibility implies a willingness to believe in the information and can inspire trust, it acts as a crucial component of the ISP. In today's complex information environment, trust can help to reduce complexity and uncertainty during the ISP by acting to facilitate choice as a social decision heuristic (Lee & See, 2004). When faced with a complex set of relevant or partially relevant sources, those deemed most credible, and therefore most trustworthy, will likely receive greater weight when considering all available sources to arrive at a solution, especially within a decision making context (Anderson, 1981).

In order to reduce uncertainty and the complexity of the ISP, users typically employ heuristics and other strategies to reduce cognitive load (Bambauer, 2006; Tversky & Kahneman, 1974). There is also sufficient evidence to suggest that information searchers, in addition to employing heuristics during a search, frequently operate within the limits of bounded rationality (Agosto, 2002a, 2002b). A fully rational model of the ISP would include searchers retrieving and appraising each possible source of information fully before coming to a conclusion or making a

decision. Bounded rationality, however, operates when searchers make satisficing behaviors to reduce cognitive load during the ISP (Paas, Tuovinen, Tabbers, & Van Gerven, 2003). Satisficing behaviors observed during Web search tasks can include reduction (e.g., users return to sites they are familiar with instead of searching for new ones), skimming (e.g., a cursory glance at a website's features and available information rather than an exhaustive analysis), and termination (e.g., where searches are ended prematurely upon the discovery of acceptable information or due to time limitations) (Agosto, 2002a; Simon, 1979).

The use of heuristics to process messages has been investigated in the communication and social psychological research on persuasion and acceptance of messages. The Heuristic Model of Persuasion describes two distinct approaches to processing messages with persuasive information, although this model can easily be extended to include all types of messages (Chaiken, 1987). Systematic message processing involves careful evaluation and scrutiny of message content while heuristic message processing invokes simple decision rules used to judge the credibility of a message (Chaiken, 1980, 1987; Sillence, Briggs, Harris, & Fishwick, 2007a; Stiff, 1995). Whether or not an individual information seeker engages in systematic or heuristic message processing depends on a number of factors, including expertise and prior knowledge of the information topic as well as time and the level of motivation for the information search (Kelly, 2005; Klein, 1998; Metzger, 2005, 2007).

Whether or not an individual engages in systematic or heuristic processing, there are certain characteristics of the information document itself that appear to influence credibility judgments (although some characteristics may be used more frequently or given more importance during one or the other type of message processing). We can examine credibility assessment through the traditional source – medium – message – receiver – audience paradigm of communication

(McLuhan, 1964; Metzger et al., 2003). Existing findings from the literature on what can contribute to a perception of credibility can be characterized within this framework to produce Table 1, which gives the features of the source, medium, message, receiver, and audience that have been shown to influence credibility perceptions.

Source Characteristics

Source characteristics have been shown to be one of the factors that most strongly influence credibility assessments (Fink-Shamit & Bar-Ilan, 2008; Higgins, 1999). Programs instructing students in information literacy techniques have typically emphasized that the source must be evaluated when deciding whether or not to trust the information provided (Katerattanakul & Siau, 1999). Prior research using focus groups has found that participants often cite source factors as one of the most influential characteristics of whether or not they consider the information to be credible (Eysenbach & Kohler, 2002; Marshall & Williams, 2006; Silence et al., 2007a). Generally, information from sources that are perceived to have a high level of expertise is more influential in decision making than information from sources which are perceived to have a lower level of expertise (Hovland & Weiss, 1951; Tormala & Petty, 2004, Tormala, Brinol, & Petty, 2006). Source credibility has been shown to influence the amount of processing that occurs in relation to other factors that influence credibility, and so can serve as a heuristic for acceptance of information in certain circumstances (Hovland & Weiss, 1951; Tormala & Petty, 2004). However, observation studies indicate that users often do not actually check the source of information they find online and, even if they do, may forget the source of a piece of information shortly after finding it (Eysenbach & Kohler, 2002; Hovland & Weiss, 1951).

The ranking of a site can influence credibility assessments by encouraging a feeling of authority and relevance to the query (Fink-Shamit & Bar-Ilan, 2008; Walter et al., 2004). Many

Table 1. *Factors that influence credibility assessments of information sources*

Source Characteristics	Message Characteristics	Medium Characteristics	Receiver Characteristics	Audience Characteristics
Author credentials/ expertise	Relevance to query	Trust in Internet/Web	Satisficing/ bounded rationality	Perceived audience opinion
Ranking of site	Links to external sites	Physical design of site	Time	Social consensus/ consensual validation
Domain	Writing style	Usability	Importance of information/motivation	Information cascade/informational social influence
Affiliation	Completeness and scope	Download speed	Familiarity with topic	Presumed credibility
Experienced credibility	Accuracy	Paid access	Internet experience	Reputed credibility
Homophily	Currency	Third party awards	Need for approval	
	Objectivity		Cultural norms and values	
	Personalization		Locus of control	
	Strength of message		Evaluation apprehension	
			Availability bias	
			Confirmation bias	
			Corroboration	
			Thoughts about the message	

search engines use link referencing to establish the importance of any one individual web page (i.e., the number of inbound links to a page from external pages), and so search engine rankings can often encode a significant amount of latent human judgment about which sources are most credible or important (Brin & Page, 1998; Kleinberg, 1999).

Early research on website credibility investigated the influence of the domain of a site on establishment of credibility (e.g., .org, .com, .net) (Alexander & Tate, 1999). Early in the Web's existence, a website's domain could give the receiver information about whether the source behind a site was a public, private, or commercial entity. It is possible, however, that top-level domains no longer give consumers information about the source as they once did since many groups and entities now freely adopt varying domain names (e.g., a commercial site using a .net address) and many organizations default to the .com address since it is the most commonly recognized. To date there have been mixed results as to whether individuals still consider domain when evaluating a website for credibility (Fink-Shamit & Bar-Ilan, 2008; Hong, 2006; Walter et al., 2004). Website affiliations have also been shown to impact credibility assessments. In general, those websites perceived to have a commercial intent were seen as less credible than websites run by either government agencies or nonprofit organizations (Flanagin & Metzger, 2007; Fogg et al., 2001; Fox & Rainie, 2002)

Experienced credibility is credibility given to a source from prior first-hand positive experiences with that source (Byerly & Brodie, 2005; Fink-Shamit & Bar-Ilan, 2008, Fogg & Tseng, 1999; Lazar & Preece, 2003; Tseng & Fogg, 1999). For example, if an individual obtains reliable information from a particular website or has a pleasant transaction with an online merchant, that source has gained experienced credibility with the individual. Therefore, they would be more likely to return to that source for future needs as they have already established that source or merchant as credible.

Finally, homophily, or the degree to which a source is perceived to be similar to the user, has been shown to strongly influence credibility perceptions (Fogg & Tseng, 1999; Sillence et al., 2007a). Prior research on homophily has described it as the similarity between source and receiver on at least four dimensions: attitudes, background, values, and appearance (McCroskey, Richmond, & Daly, 1975). Focus group studies have revealed that users often desire information from similar others and perceive information from similar others to be more trustworthy and influential in their decisions (Wang et al., 2008). Some have argued that, at least within the health context, the perception of homophily of any source is what ultimately drives acceptance of information, not necessarily credibility assessment (Wang et al., 2008). However, the suggestion posited here is that where homophily is strongly related to acceptance of information and higher perceptions of credibility, the underlying mechanism is a credibility assessment heuristic whereby source similarity serves as a simple decision rule to accept the information (Higgins, 1999; Petty, Priester, & Wegener, 1994).

Message Characteristics

Message characteristics comprise some of the information features that are deemed most important by those teaching information literacy techniques (Katerattanakul & Siau, 1999; Thompson & Henley, 2000). Message features have been shown in prior research to strongly influence perceptions of credibility, especially in the absence of information about the source (Austin & Dong, 1994; Hong, 2006; Slater & Rouner, 1997).

A message's relevance to the topic or query can influence perceptions of credibility (Fink-Shamit & Bar-Ilan, 2008). A user's understanding of their information problem is framed both by their prior knowledge and the information they examine during the ISP. Hence, judgments of the credibility of any piece of information are influenced by whether or not a user considers the information to be pertinent to answering their information need at the time they retrieve it. If a

piece of information does not meet their current relevancy requirements, then it is likely no further assessment of that information's credibility will occur. However, relevance is not a stable concept and changes throughout the ISP as the user's understanding of the information space changes, as reflected in Figure 1 (Anderson, 2005; Barry & Schamber, 1998; Borlund, 2003; Spink & Griesdorf, 1997). While credibility may not be determined for non-relevant sources initially, credibility may be investigated later in the search process if the source is determined to be more relevant to the topic than initially thought (Wen, 2003).

Links to external sites that support the information can influence credibility (Fink-Shamit & Bar-Ilan, 2008; Hong, 2006; Marshall & Williams, 2006; Metzger, 2005, 2007). Of particular importance is the perceived credibility of those external sites and also their orientation (e.g., scientific or popular opinion). Reference links to external sites of a scientific orientation are generally considered to lend credibility to the referring source, although this can depend on the task and topic (Hong, 2006).

Whether the website document is written with a popular or scientific tone can influence perceptions of credibility (Fink-Shamit & Bar-Ilan, 2008; Fogg et al., 2002; Metzger, 2005, 2007). Which writing style increases perceptions of credibility often depends on the task or topic at hand, but in general users find information written in plain English to be more credible than information written in more complex terms, especially if the topic is either new to the user or difficult to understand (Eyesenbach & Kohler, 2002; Marshall & Williams, 2006). One reason for this effect is that information written in complex terms or in jargon native to the discipline often contains words unfamiliar to the user and a domain novice has no criteria with which to judge the accuracy of the usage of those words. Plain English allows the user to evaluate other characteristics of the message

that influence credibility (e.g., accuracy, scope, and the strength of the message) by providing a common frame of reference for the evaluation of that information.

Credibility can also be impacted by whether the user considers the information to have sufficient coverage or scope of the topic and whether the information is deemed to be accurate (Fink-Shamit & Bar-Ilan, 2008; Sillence et al., 2007a). Whether or not the user can establish these factors is largely dependent upon their prior knowledge of the topic. In general, those pieces of information deemed to cover the topic with sufficient completeness are considered to have higher credibility than those that do not cover the topic in sufficient detail. Likewise, those information pieces deemed to be accurate are considered to have higher credibility than those pieces deemed inaccurate.

Currency is viewed as an important message characteristic in the information literacy literature since up-to-date information is more likely to contain information on the state-of-the-art in the area (Fink-Shamit & Bar-Ilan, 2008; Hong, 2006; Katerattanakul & Siau, 1999; Metzger, 2007, 2005; Thompson & Henley, 2000). Focus group studies have indicated that users self-report that date stamps or other indications of currency of the information is important to them in establishing credibility (Eyesenbach & Kohler, 2002). However, this information is easily forged with the use of Web scripting and may not always be accurate (Steinmetz & Ward, 2008). Novice users may be unaware of this possibility, and so this characteristic of the information may be more or less influential dependent upon the users' knowledge of Web coding.

Objectivity has been noted to be an important characteristic of a website in order to establish credibility (Fink-Shamit & Bar-Ilan, 2008). In general, sources that are judged to be impartial and have no moderating influences on the reporting of the information are deemed to be the most credible (Alexander & Tate, 1999; Metzger, 2005, 2007). Factors outside the message itself

can also be used to establish objectivity, such as the source's affiliation (e.g., commercial versus private website).

Personalization or tailoring of the information in the message is related to the idea of homophily of the source. Generally, users find information that appears to have been tailored or otherwise personalized for them to be more credible than information intended for the public at large (Fogg et al., 2001; Metzger, 2005, 2007; Sillence et al., 2007a). Information tailored to the individual provides the impression that the source that produced the message understands the information need of the user, thus likely increasing perceptions of credibility and establishing positive feelings between the source and user.

Finally, the strength of the message's arguments, implied by its use of evidence and supporting information such as statistics, tables, figures, quotes, testimonials, and reference sources, can influence perceptions of credibility (Fink-Shamit & Bar-Ilan, 2008; Hong, 2006). Whether the user can evaluate the message's use of supporting information is dependent upon their prior understanding of the problem space for which they are seeking information.

Medium Characteristics

Several features of the Internet/Web medium can influence perceptions of credibility of information (Hong, 2006). Individuals may have different degrees of belief in the credibility of information found on the Internet in general, not only for one particular website. The idea of the credibility of the Internet medium fits with Metzger's (2005) idea of levels of credibility, where not only the message itself can have credibility characteristics.

One of the most robust factors routinely demonstrated in Web credibility research to date is user reliance on surface characteristics and the physical design of a website when judging credibility. Some of the factors that have been studied thus far are physical presentation factors (e.g., colors and

layout, font types, pictures used on the site) and usability and ease of use factors (e.g., simple navigation, clear information organization, search engine on the site) (Corritore et al., 2003; Eyesenbach & Kohler, 2002; Fink-Shamit & Bar-Ilan, 2008; Fogg et al., 2001; Fogg, et al., 2002; Holmes & Robins, 2008; Hong, 2006; Marshall & Williams, 2006; Sillence et al., 2007a). Site presentation and usability factors are related to helping the user establish surface credibility, or the superficial characteristics of information that can make it appear credible (Byerly & Brodie, 2005; Fogg & Tseng, 1999; Tseng & Fogg, 1999). Prior research has shown that the surface characteristics of a web page can have an immediate and lasting effect on the user's perception of the credibility of its content, with more aesthetically pleasing web pages typically viewed as being more credible than less aesthetically pleasing pages (Lingaard et al., 2006; Robins & Holmes, 2008; Tractinsky, Cokhavi, Kirschenbaum, & Sharfi, 2006).

Download speed is related to physical presentation factors in that it establishes the tone of an information transaction between a user and a website. Websites that load and transfer information faster are generally deemed to have more credible information than websites that are slower (Metzger, 2005, 2007). Whether or not the user has to pay for access to information also appears to have an effect on credibility judgments, with the credibility of paid access information deemed to be of higher quality than free information (Metzger, 2005, 2007).

Website awards and third-party endorsements have been shown in prior research to have mixed effects on credibility assessments. Website award and ratings systems have been suggested as one possible way to help the user establish credibility for website content, similar to book awards for those judged to be noteworthy (Metzger, 2007). Some focus group studies have found that users often mention third-party endorsements and website awards as criteria they use for establishing credibility (Eyesenbach & Kohler, 2002; Hong, 2006). However, other studies have found that

website endorsements do not influence credibility judgments of website content, with sites that have an award deemed no more credible than sites that do not have an award (Shon, Marshall, & Musen, 2000).

Receiver Characteristics

Credibility judgments are a subjective characteristic of the receiver, and so individual receiver factors can greatly influence credibility assessments (Hong, 2006). Several well-known models of individual information processing may be active during the ISP, and the thought processes implied by these models can greatly impact how users establish credibility and the depth to which they do so. First, users often engage in the ISP within the limits of bounded rationality (Agosto, 2002a; Byerly & Brodie, 2005; Rubin, 2004). The Nobel Prize-winning psychologist Herbert A. Simon defined bounded rationality as a complement to the fully rational model of information processing and decision making where all possible outcomes and sources are explored when trying to solve a problem (Agosto, 2002a; Simon, 1979). Characteristic of a bounded rational decision process is the demonstration of one or more satisficing behaviors. On the Web these satisficing behaviors are demonstrated in terms of (1) reduction – returning to known sites or sites the user is familiar with and skimming, rather than reading all available information, and (2) termination – early stoppage of a search for information by finding “good enough” information or due to physical or time constraints (Agosto, 2002a).

Operating within the limits of bounded rationality has been shown to be a generally effective method of decision making (Gigerenzer & Goldstein, 1996). The Principle of Least Effort directly ties the issues related to credibility assessment and the behaviors of bounded rationality. This principle states that users are willing to accept a lower quality of information to minimize the effort required to obtain higher quality (and often unknown) pieces of information (Rubin, 2004). Thus,

we can imagine that the credibility assessment factors employed under a bounded rationality model of Web-based decision making might rely much more on heuristics than a scenario occurring outside a bounded rationality framework.

The Elaboration Likelihood Model (ELM) and Heuristic Model (HM) of persuasion, both dual-process models of information processing, relate to both the idea of bounded rationality and also to the process a user is likely to undertake to establish credibility. According to the ELM, users can process information either centrally, with maximum cognitive effort to considering all aspects of the source, message, and medium to establish credibility, or peripherally, with minimal cognitive effort devoted to establishing credibility (Brinol & Petty, 2009; Fogg & Tseng, 1999). Central processing is more likely to occur when a user has a high stake in the answer gleaned from the information or if they have the ability to evaluate the information thoroughly. Peripheral processing is more likely when the user has low motivation and a lower stake in the answer obtained or if they do not have the ability to evaluate the information (Brinol & Petty, 2009; Fogg & Tseng, 1999).

The HM is very similar to the ELM, proposing two paths through which users can evaluate information. Systematic message processing occurs when users have the cognitive resources, ability, and motivation to thoroughly evaluate a message while heuristic message processing occurs when users do not have the cognitive resources, ability, or motivation to evaluate a message (Chaiken, 1980, 1987; Sillence et al., 2007a). In relation to credibility assessment, the use of systematic message processing might invoke a detailed analysis of the message for accuracy, coverage, objectivity, and the strength of the argument. However, if the user evaluates a information piece using heuristic message processing they might rely more on authorship expertise and credential judgments and surface characteristics of the information to establish credibility (see Table 1, Chaiken 1980).

Credibility assessments can take many forms within the receiver. For most users credibility assessments are not simple accept/reject decisions. One theory has proposed three processes by which an individual can establish credibility of an information document (Fogg & Tseng, 1999). The first process, binary evaluation, occurs when users either accept or reject the document as being credible. This process is likely to be used when users have low interest in the issue, experience cognitive or situational factors that affect their ability to process the information, have no familiarity with the topic, and have no reference points to compare the information to. Using the second process, threshold evaluation, a document can meet a certain threshold for establishment of credibility, after which it is deemed to be credible. Threshold evaluation is more likely when users have moderate interest in the issue, experience fewer cognitive or situational factors that affect their ability to process the information, have moderate familiarity with the topic, and have at least a few reference points with which to compare the information. Finally, with the third process, spectral evaluation, each credibility judgment is a shade of grey and independent of the others. Multiple factors (see Table 1) are included in the assessment and each can add to or subtract from the overall assessment of credibility. Spectral evaluation is likely to occur when users have high interest in the issue, experience few cognitive or situational factors that affect their ability to process the information, have high familiarity with the topic, and have multiple reference points with which to compare the information.

Two errors have been proposed to occur within this framework (Fogg & Tseng, 1999). The Gullibility Error occurs when an individual determines that information is credible when in fact it is not credible. This is akin to a false alarm using the paradigm provided in Signal Detection Theory (Swets, 1996). The Incredulity Error occurs when an individual determines that information is not credible when in fact it is credible. This is identical to the idea of a miss in Signal Detection Theory.

The likelihood of conducting one or the other error is dependent upon the process undertaken to establish credibility. However, since credibility assessment is a subjective receiver-based characteristic, it is likely impossible to establish a priori an objective credibility assessment that can produce these errors.

Situational factors of the task can influence which process users employ when making credibility assessments. In general, if the user is under time pressure they are more likely to engage in heuristic message processing than if they are not. However, this does not imply that users not under time pressure or another constraint will use systematic message processing. The likelihood of engaging in systematic message processing is increased as the topic or information and decision outcome becomes more important (Chaiken, 1980, 1987; Fritch & Cromwell, 2001; Sillence et al., 2007a; Zalesny & Ford, 1990).

Prior knowledge of the topic of the ISP can affect credibility assessments by influencing the depth to which users can assess important message features related to credibility (see Table 1). Users with a high knowledge of the topic are likely to be more critical of the information documents they find, as well as being able to more quickly assess qualifying characteristics of the source or the message (Fogg & Tseng, 1999; Fink-Shamit & Bar-Ilan, 2008; Gugerty et al., 2007). Prior studies have indicated that participants often judge the quality of information they find online by comparing it to their own knowledge (Holscher & Strube, 2000; Kelly, 2005; Marshall & Williams, 2006). While expertise and topic familiarity is often helpful in this regard, it can also cause users to view a problem in a stereotyped way, perhaps leading to incorrect perceptions of credibility when their initial assessment of the document does not fit with their existing cognitive framework of the issue (Klein, 1998).

An individual's degree of Internet experience affects how they determine the credibility of the documents they find online as well as their strategies for doing so. One study found that Internet and domain experts were most successful in obtaining high quality information while Internet and domain novices were least successful in their searches (Holscher & Strube, 2000). It appears that experience with the Internet as a medium helps users to better determine which features of the information indicate higher quality and are more likely to lead to an accurate assessment of credibility (Flanagin & Metzger, 2007; Freeman & Spyridakis, 2004; Johnson & Kaye, 2000, 2002; Metzger, 2007). Another study, however, pointed out the potential pitfalls of being an Internet expert by demonstrating that experts, even though they indicate in interviews that they stringently assess information for credibility, actually spend little time conducting information credibility assessments during an online search (Flanagin & Metzger, 2007).

The importance of the information topic to the individual greatly impacts the depths to which they will take their credibility assessment. The importance of the topic plays a central role in motivating the user to engage in an in-depth credibility assessment in order to obtain the highest quality of information available. Prior research has shown that individuals for whom the results of their search are inconsequential engage in little processing of source or message characteristics and are likely to rely on simple decision rules and heuristics (e.g., experts are correct) when assessing credibility (Byerly & Brodie, 2005; Metzger, 2005, 2007). However, when user motivation is high and the results of the ISP are highly consequential to the individual, they are more likely to use a systematic message processing strategy and examine more features of the source and message for credibility (Chaiken, 1980). The importance of the domain can also play a role in the depth of credibility assessment, with one study indicating that users are unlikely to accept and trust advice in a

high-risk domain (e.g., finance, health care) over advice in a low-risk domain (Briggs, Burford, De Angeli, & Lynch, 2002; Sillence, Briggs, Harris, & Fishwick, 2006, 2007a).

Personality traits such as need for approval have been shown to impact offline credibility assessments in past research and are likely to affect the degree to which an individual engages in an online credibility assessment. In general, those who are high on need for approval are more likely to agree with social factors and feedback left on the information document (Crowne & Marlowe, 1964; Steinfatt, 1995). However, this is likely to be tempered by the perceived importance of the information topic (Millham & Jacobson, 1978; Steinfatt, 1995). Cultural values such as power distance, subjective norms, individualism or collectivism, and uncertainty avoidance have been shown to influence adoption of technologies and the information contained within those technologies (Srite & Karahanna, 2006). In addition, field dependence, task experience, locus of control, self-esteem, evaluation apprehension, ability, and orientation towards work have been hypothesized to affect the likelihood of a person relying on available social cues as guides for attitudes, perceptions, and behavior (Zalesny & Ford, 1990).

Repetition and availability bias affects how likely a piece of information is to be judged as credible. In general, information that the individual has heard often is more likely to be deemed credible than information they have not heard before or have not heard often (Tversky and Kahneman, 1974). This phenomenon plays out online in the micro-blogging virtual space of Twitter©, where a large number of posts to any individual blog are often ‘re-tweets’ or re-posts of information found on other member’s blogs (Landau, 2009). As the message is spread, information about the original author is often lost, leading to a large number of identical posts distributed as common knowledge, and often accepted as being credible simply because the information is so widely distributed (Fragale & Heath, 2004). Another bias, confirmation bias, can also impact

credibility assessments. In confirmation bias, the user is likely to accept information as being credible if it fits with their existing knowledge about the topic (Marshall & Williams, 2006). This bias is most likely to affect users with a thorough background about the topic of interest and can even lead users to reject credible sources that do not agree with their backgrounds.

Corroboration with other sources is recommended as one way to establish the credibility of any piece of information in the information literacy literature (Meola, 2004). This type of cross-checking can help users with low domain knowledge of the topic ensure that what they have found is established in the domain literature and is not merely the author's opinion (Fink-Shamit & Bar-Ilan, 2008; Metzger, 2005, 2007). Information that can be found in several locations throughout the literature is more likely to be accepted as credible than information found in only one or two sources.

Finally, the user's thoughts generated in response to a message have been shown to influence perceptions of credibility. This factor relates to the meta-cognitive processing that occurs concerning thoughts generated in response to a message (Brinol & Petty, 2009). Factors influencing confidence in one's thoughts include the perceived expertise of the source (Tormala et al., 2006). In general, if a message is strong and produces primarily favorable thoughts, high source credibility is more persuasive than low source credibility. However, if a message is weak and produces primarily unfavorable thoughts, high source credibility can backfire and be less persuasive than low source credibility. Thoughts generated in response to a message can also be influenced by credibility information determined after its reception. Initially favorable thoughts about a message can be undermined by later determining that the source or message that these favorable thoughts were generated in response to was not credible. On the other hand, favorable thoughts backed up with a

credible source can increase confidence in those thoughts generated in response to the message (Brinol & Petty, 2009).

Audience Characteristics

Prior to Web 2.0 developments, most online information was merely transmitted to a receiver in isolation. However, it is now more common for users to encounter information in a context similar to being a member of an audience. Information flows to an individual through social mechanisms such as link structure and recommendations and any individual piece of information is likely to have feedback on it from other individuals that have also encountered the information (Pirolli, n.d.). Social navigation tools, recommender systems, reputation systems, and rating systems are all forms of social feedback on information sources and messages (Dieberger, Dourish, Hook, Resnick, & Wexelblat, 2000; Hitlin & Rainie, 2004; Metzger, 2005; Resnick, Zeckhauser, Friedman, & Kuwabara, 2000; Shardanand & Maes, 1995). This rapid feedback appears to be unique to the Internet medium and is likely to influence credibility assessments in a number of ways.

Audience ratings of online information are now common on most blogs, social media tools, and major network news sites. Audience members who are more likely to have rated something online include those who are experienced Internet users, those with high-speed or broadband Internet connections, males, and those who are more educated or younger (Hitlin & Rainie, 2004). It is interesting to note that those who have given feedback on Internet content are more likely to be skeptical of information found online and more likely to engage in in-depth assessments of credibility (Hitlin & Rainie, 2004). Also important is that not all Internet users who encounter information also give feedback or may leave inaccurate feedback, leading to a potentially biased sample and overall rating of the document (Grifantini, 2009; Kelly, 2005; Resnick & Varian, 1997; Resnick et al., 2000).

Past research has revealed that both audio and videotaped audience reactions can affect individual perceptions of a speaker's message in a mediated context (Duck & Baggaley, 1975; Hovland, Janis, & Kelley, 1953; Hovland, & Weiss, 1951; Kelley & Woodruff, 1954; Landy, 1972). A similar process may occur in the online information medium (Rafaeli & Noy, 2002). Social feedback can aid in establishment of several types of credibility. Social feedback can help to develop reputed credibility for an information source or message (Byerly & Brodie, 2005; Fogg & Tseng, 1999; Talja, 2002; Tseng & Fogg, 1999). Social factors and recommendations are also related to the establishment of presumed credibility, or the credibility that we automatically assign to individuals we trust (Byerly & Brodie, 2005; Fogg & Tseng, 1999; Tseng & Fogg, 1999). The establishment of presumed credibility through a friend's recommendation of a source of information influences the use of the recommendation heuristic during the credibility assessment process. That is, an individual becomes less likely to judge source and message features for credibility are more likely to engage in heuristic processing of the message given the recommendation, especially if other factors encouraging the use of heuristic message processing are in place (e.g., time factors, low motivation) (Sillence et al., 2006).

Social consensus can serve as a strong cue for acceptance of a piece of information, and hence acceptance of the credibility of that information (Tormala & Petty, 2004). Social consensus has been shown to influence confidence in thoughts generated in response to a message (Brinol & Petty, 2009; Festinger, 1950). Also, social consensus serves to reduce both uncertainty related to individual receiver thoughts generated in response to a message and also the perceived risk associated with accepting a particular piece of information as credible (Kim & Srivastava, 2007). Audience feedback on information can establish a sense of social consensus for acceptance of information (Chaiken, 1980; Hovland, & Weiss, 1951; Locher, 2002).

Finally, the concepts of informational social influence and information cascades can help predict why individuals might be more likely to accept information deemed credible by others. Informational social influence is the tendency for individuals to accept as true what has been told to them by others (Deutsch & Gerard, 1955). Informational social influence was best demonstrated in the well-known Asch experiments where confederates gave incorrect answers to a task which asked them to state aloud which line on a piece of paper was longest (Asch, 1951, 1955). Participants in the experiment were likely to agree with the other confederates, even when the answer they gave was obviously incorrect (Baron, Valdello, & Brunzman, 1996). Recent versions of this experiment have demonstrated that incentives for accuracy (task motivation and importance of a correct answer) and task difficulty can modify the effect of information social influence. In one experiment, when task difficulty was low, incentives for accuracy reduced the informational social influence of inaccurate confederates. However, when task difficulty was increased, the reverse was true with individuals conforming more to the inaccurate confederates when there were incentives for accuracy (Baron et al., 1996). Thus, when the outcome of the credibility assessment is important (i.e., the need for a correct answer is high) users are more likely to go along with the crowd's opinion of the information's credibility when the task is difficult (Baron et al., 1996).

In an online environment an effect similar to that found in the Asch study may occur, with users viewing an article positively or negatively simply because the rest of the audience has demonstrated either a positive or negative attitude toward the information. The crowd's opinion may either validate a user's belief about the credibility of information if it is similar or create cognitive dissonance if the crowd's opinion differs. Similar to the recent versions of the Asch experiment, the extent to which an individual is willing to accept and internalize the crowd's opinion is likely to be moderated by task difficulty, motivation, and incentives for accuracy.

The idea of information cascades represents when it is optimal for users to accept the judgment of those prior to them rather than form their own opinion (Bickhchandani, Hirshleifer, & Welch, 1992). In terms of information appraisal, this process can be seen in the physical world in the form of well-worn books on the library shelf. If one is searching for a credible book on a topic, they might be more likely to accept a book that appears to have been used often over a book that is less worn (Dieberger et al., 2000). Search engine results provide an online complement to this idea by listing well-linked information documents that match a query at the top of a results page, thereby automatically encoding social acceptance of that information (Brin & Page, 1999).

While source, message, and receiver characteristics on establishment of credibility of information have been investigated rather thoroughly, audience effects are less well-studied and audience effects on the acceptance of Internet-based information is nearly absent in the literature. One reason for this is that the development of rapid audience feedback on Web documents was not possible or was very difficult to implement until approximately 2004. Therefore, our understanding of audience effects on credibility assessments and the acceptance of online information is limited.

Hypotheses

An understanding of how feedback from a virtual audience determines acceptance of information online is crucial to our understanding of how credibility is assessed on the Web. In the current Web environment, users are more likely than not to be given audience feedback on each piece of information they encounter. It is not yet known, however, whether this feedback will significantly alter the users' process for determining the credibility of online information. This study will investigate whether audience feedback affects assessments of credibility through the following research questions:

Hypothesis 1: Audience feedback will affect credibility appraisals of online information. Documents that have positive ratings from the online community will be viewed as more credible than documents that have either negative, mixed, or no rating from the online community ($\mu_{\text{negative}} < \mu_{\text{mixed}} \leq \mu_{\text{no feedback}} < \mu_{\text{positive}}$).

Hypothesis 2: The effect of audience opinion will be increased by the amount of social feedback given on the web page, with a larger audience having given feedback having a larger effect on credibility perceptions than a smaller audience ($\mu_{\text{small audience}} < \mu_{\text{large audience}}$).

Hypothesis 3: In addition, treatments described in documents that have positive feedback will be more likely to be chosen as a treatment of choice than treatments described in documents that have negative, mixed, or no feedback ($\mu_{\text{negative}} < \mu_{\text{mixed}} \leq \mu_{\text{no feedback}} < \mu_{\text{positive}}$).

Hypothesis 4: Motivation, defined as the importance of the information topic to the individual, will moderate the impact of audience feedback on credibility assessments. Highly motivated participants that engage in information assessment will be less likely to use audience feedback as a heuristic to determine information credibility than participants with lower levels of motivation (i.e., Hypotheses 1 and 2 will not be supported for individuals under high motivation) (Zalesny & Ford, 1990).

Hypothesis 5: In Fogg and Tseng's (1999) model, users with low motivation towards a topic engage in binary evaluation, with few cues being used to establish credibility and the result of that cue evaluation causing either an acceptance or rejection of that information. Users that are highly motivated are likely to engage in spectral evaluation of information, with many different types of cues being integrated and used to establish overall document credibility. Thus, participants who are highly motivated will report using more cues to

establish document credibility than participants who are low in motivation ($\mu_{\text{low motivation}} < \mu_{\text{high motivation}}$).

Hypothesis 6: Because users that are highly motivated are likely to engage in spectral evaluation of information, the impact of audience feedback, if it is used, will be tempered by the other cues being combined into the credibility assessment. Because audience feedback will be viewed as less important in establishing document credibility under conditions of high motivation, participants in the high motivation condition will be less likely to report using audience feedback to establish document credibility than participants in the low motivation condition ($\mu_{\text{high motivation}} < \mu_{\text{low motivation}}$).

Hypothesis 7: Because users who are highly motivated will be less likely to use audience feedback to determine credibility, participants with high motivation for information use will deviate more from the audience's opinion than those low in motivation for information use ($\mu_{\text{low motivation}} < \mu_{\text{high motivation}}$).

CHAPTER THREE: EXPERIMENTAL PROCEDURE

The following experiments investigate the impact of social consensus provided by audience feedback tools on assessments of information credibility.

Experiment 1

Participants

An a priori power analysis indicated that, for a statistical power level of 0.80, an alpha level of 0.05, and a medium effect size of $f = 0.25$, 64 participants would be needed for Experiment 1 (Cohen, 1988, 1992). Participants were recruited online through the psychology department's experimental participation program. College students aged 18-23 are all members of the Millennial generation and thus should be more likely to exhibit characteristics of online information processing that includes Web 2.0 tools (Lenhart, Madden, & Hitlin, 2005; Metzger & Flanagin, 2008; Palfrey & Gasser, 2008). Efforts were made to keep an approximately equal number of males and females in the study sample. All participants were issued course credit for their participation in the study.

Materials

A health topic was selected for the web pages used during the experiment as the Web has become a popular resource for obtaining disease and treatment information, with 61% of American adults as of June 2009 having searched for health information online (Fox, 2006; Fox & Jones, 2009; Hart, Henwood, & Wyatt, 2004). Past research has demonstrated that inspiring trust in health advice given online is an important issue (Fox & Rainie, 2002; Sillence & Briggs, 2007; Sillence, Briggs, Harris, & Fishwick, 2007b). In addition, research has demonstrated that social feedback may be

especially impactful for information concerning health topics (Hardey, 1999; Lau & Coiera, 2008; Sarasohn-Kahn, 2008; Wang et al., 2008). Lyme disease was chosen as the health topic for the current study due to its relevance to a wide range of age groups and its likely degree of unfamiliarity among potential study participants.

During the experiment, participants viewed eight web pages selected from a Google© search on the following query: “treatments for Lyme disease.” The experiment web pages were taken from the websites on the first three pages of the Google© search result for the query. Websites from the first three pages of search results have been shown in prior research on online health information seeking to form the majority of a searcher’s information set (Eysenbach & Kohler, 2002; Peterson, Aslani, & Williams, 2003). All of the web pages selected were determined to have similar levels of factual accuracy by a panel of general practitioners from the medical field. Ten general physicians from hospitals in Georgia, West Virginia, and New Zealand rated each of the eight experimental web pages on the factual accuracy of the information contained within it. Establishing the factual accuracy of the web page’s information is crucial as past research has demonstrated that apparently credible web pages containing health information can often be inaccurate (Kunst, Groot, Lathe, Lathe, & Kahn, 2002). On average, the ten physicians rated the web pages used during the experiment as being very low in factual accuracy. Table 2 gives the average factual accuracy ratings given by the physicians for each page used in the experiment. The web page with the highest level of factual accuracy was the Coenzyme Q10 page.

Factors known to influence credibility assessments (see Table 1) other than the experimental variables of interest were controlled during the study by either fixing them to a particular level (e.g., including no external site links on any of the experimental web pages), or through measurement of the variables of interest (e.g., perceived level of homophily of the source). Those variables that were

not able to be either constrained or measured are ignored. The method used for controlling each of the factors is given in Table 3.

Table 2. *Mean accuracy ratings for each of the experimental web pages, issued by physicians*

Web Page	Mean Accuracy Score (<i>SD</i>)
Hyperbarics	1.77 (0.66)
Salt and Vitamin C	1.11 (0.33)
Magnesium	1.22 (0.44)
Marshall Protocol	1.33 (0.71)
Cat's Claw/Samento	1.55 (0.73)
Miracle Mineral Supplement	1.22 (0.44)
Silver Protein	1.88 (1.69)
Coenzyme Q10	2.55 (1.81)

Receiver characteristics from Table 1 that influence credibility assessments were measured using post-experimental questionnaires. Participants were asked to report their level of familiarity with Lyme disease. Several personality variables that have been shown to impact credibility assessments and likelihood of information use, including social information, were also measured. Need for approval was measured using the Marlowe–Crowne Social Desirability Scale (Crowne and Marlowe, 1960, 1964; Loo and Loewen, 2006). Locus of control (Duttweiler, 1984) and evaluation apprehension (Leary, 1983) were measured using validated scales. Instruments used to measure all variables of interest can be viewed in Appendix C.

Participants viewed three practice and eight experimental web pages. The three practice and eight experimental web pages had social feedback present just below the article title at the top of the page, the most common location for these types of ratings. Audience feedback was provided in the

Table 3. Factors known to influence credibility assessments as either manipulated, controlled, randomized, or ignored in the experimental procedure

Variable	Direction of Effect	Magnitude of Effect	Controlled By
<i>Source Characteristics</i>			
Author credentials/expertise	Perceived expertise increases credibility	High	Measure perceived expertise
Ranking of site	Higher ranking increases credibility	Medium	Fixed level, no search required
Domain	.com decreases credibility, .gov and .org increases credibility	Low	Fixed level, all sites have .com address
Affiliation	Commercial decreases credibility, government and non-profit increases credibility	Medium	Fixed level, all sites are either private or commercial sites
Experienced credibility	Positive experiences increase credibility, negative experiences decrease credibility	Medium	Measure prior experience with websites
Homophily	Homophily increases credibility	High	Measure perceived homophily
<i>Message Characteristics</i>			
Relevance to query	Relevance increases credibility	Low	Fixed level, no search required
Links to external sites	Credible links increase credibility	Medium	Fixed level, no external page links
Writing style	Plain English increases credibility	Medium	Measure perceived ease of understanding

Variable	Direction of Effect	Magnitude of Effect	Controlled By
Completeness and scope	Completeness increases credibility	Medium	Measure perceived completeness
Accuracy	Accuracy increases credibility	Medium	Measure perceived accuracy
Currency	Currency increases credibility	Medium	Fixed level, all pages dated 2009
Objectivity	Objectivity increases credibility	Medium	Measure perceived objectivity
Personalization	Personalization increases credibility	High	Fixed level, all pages targeted for a general audience
Strength of message	A strong message increases credibility	Medium	Measure perceived strength of the message
<i>Medium Characteristics</i>			
Trust in Internet/Web	Trust increases credibility	High	Measure Internet experience and trust in the Internet
Physical design of site	High aesthetics increases credibility	High	Measure perceived beauty of web page
Usability	High usability increases credibility	Medium	Measure perceived usability
Download speed	High speed increases credibility	Low	Ignore
Paid access	Paid access increases credibility	Low	Fixed level, use only publicly available sites

Variable	Direction of Effect	Magnitude of Effect	Controlled By
Third party awards	Awards increase credibility	Low	Fixed level, no third party awards visible
<i>Receiver Characteristics</i>			
Satisficing/bounded rationality	Fewer factors are used to assess credibility under bounded rationality	High	Measure number of features used to assess credibility
Time	Fewer factors are used to assess credibility under time constraints	High	Fixed level, all participants view each page for 60 seconds
Importance of information/motivation	Motivation encourages more thorough credibility assessments	High	Manipulated, two levels of motivation in Experiment 2. Held constant in Experiment 1.
Familiarity with topic	Familiarity impacts thoroughness and what features are used to assess credibility	High	Measure familiarity with topic
Internet experience	Internet experience impacts what features are used to assess credibility	Medium	Measure prior Internet experience
Need for approval/Social desirability	Increased need for approval encourages the use of social heuristics	Low	Measure social desirability
Cultural norms and values	Websites that agree with cultural norms and values are viewed as more credible	Low	Fixed level, all websites US-based
Locus of control	External locus of control encourages the use of social heuristics	Low	Measure locus of control
Evaluation apprehension	Evaluation apprehension increases the use of social heuristics	Low	Measure evaluation apprehension

Variable	Direction of Effect	Magnitude of Effect	Controlled By
Availability bias	Repetition increases credibility	Medium	Measure how often the participant has heard of the treatments outlined
Confirmation bias	Fitting with prior knowledge increases credibility	Medium	Measure whether the participant has used any of the treatments outlined
Corroboration	High level of agreement between sources increases credibility	Medium	Fixed level, all websites concern different treatments
Thoughts about the message	Positive thoughts about the message increase credibility	Medium	Measure participant thoughts about the message and their confidence in those thoughts
<i>Audience Characteristics</i>			
Perceived audience opinion	Positive opinions increase credibility	Medium	Manipulated in Experiments 1 and 2
Social consensus/validation	Increased social consensus increases credibility	Medium	Manipulated in Experiments 1 and 2
Information cascade/informational social influence	Informational social influence increases credibility	Medium	Ignored
Presumed credibility	Trust in the recommender increases credibility	Medium	Fixed level, no recommendations
Reputed credibility	Recommendations increase credibility	Medium	Fixed level, no recommendations

form of a “thumbs-up, thumbs-down” rating, with a thumbs down indicating a generally negative reaction and a thumbs up indicating a generally positive reaction. Numbers were present alongside the rating icons indicating how many audience members responded either positively or negatively. In the positive audience reaction condition, 90% of audience members were shown to have indicated a positive reaction and the remaining 10% were shown to have given a negative reaction. In the negative audience reaction condition, 90% of audience members were shown to have indicated a negative reaction and the remaining 10% were shown to have given a positive reaction. In the mixed audience reaction condition, 49.5% of the audience was shown to have indicated a positive reaction and 50.5% of the audience was shown to have given a negative reaction. Examples of positive and negative audience reaction icons are given in Figure 4. All the audience reaction icons used during the experiment can be viewed in Appendix D.



Figure 4. Sample positive and negative audience reaction icons

In the experiment, two of the web pages had a negative audience reaction rating, two of the web pages had a positive audience reaction rating, two of the web pages had a mixed audience reaction rating, and two of the web pages had no audience feedback. In the no feedback condition, the “thumbs-up” and “thumbs-down” icons were presented as grayed out, with the value “0” alongside each icon to indicate that no audience members had yet provided feedback on the article.

The amount of audience feedback was present in two levels: high (20,000 audience members responding) and low (2,000 audience members responding). In the high audience feedback condition a larger number of audience members provided a rating for the web page than in the low audience feedback condition. The proportions indicating positive, mixed, or negative audience reaction were kept the same for both the high and low amount of feedback conditions. Three of the experimental web pages had a low amount of audience feedback and three of the experimental web pages had a high amount of audience feedback. Table 4 shows the combinations of audience size and type of feedback that was given to each participant across the experimental web pages. The type and amount of feedback present on each page was randomly assigned for each participant to avoid confounding audience response with web page content.

Table 4. *Types and amounts of audience feedback given during the experiment*

Audience Size	Audience Response Type				Total
	None	Negative	Mixed	Positive	
Low (2,000)	1	1	1	1	4
High (20,000)	1	1	1	1	4

Procedure

Participants first completed a consent form and a demographics questionnaire. They then read instructions for the experiment (see Appendix D). These instructions indicated that they would be viewing three practice and eight experimental web pages during the

experiment. They were instructed that they would view each page for 60 seconds and would then be asked to respond to two questionnaires concerning the web page they had just viewed. Participants clicked a button at the bottom of the page to indicate they understood the experiment directions before beginning.

Participants first viewed three practice pages to familiarize themselves with the experimental procedure. The three practice pages concerned treatments for chronic fatigue syndrome. All three of the practice web pages contained audience feedback on them. One contained a high level of negative feedback, a second contained a low level of positive feedback, and the third contained no feedback. The type and amount of audience feedback presented on the practice web pages was randomized for each participant to avoid confounding audience feedback with web page content. The order in which the three practice web pages were presented to participants was controlled using a Latin Square design. Participants were randomly assigned to one of the presentation orders. All participants viewed each of the practice web pages for 60 seconds (Jansen & Spink, 2003). After 60 seconds, the web page automatically advanced to the first of the two questionnaires to be answered following web page presentation.

Participants answered two questionnaires concerning the web page following the viewing of each practice web page. The first questionnaire asked participants to provide a credibility rating for the web page they just viewed using the prompt, “How credible (believable) is the information on the web page you just viewed?” Participants responded to the prompt using an online form with a six point Likert-type scale anchored by “highly credible” and “not at all credible” (Clason & Dormody, 1994). Past research has demonstrated that an individual’s perceptions of the credibility of a piece of information can

be assessed through a direct question (Walther & Burkell, 2002). Participants clicked a button at the bottom of the questionnaire to be taken to the second questionnaire.

The second questionnaire, the Article Opinion Questionnaire, asked participants to rate each web page on the variables being controlled for by being measured (see Table 3). Each variable was measured using an online form asking participants to rate their degree of agreement with the variable being measured. For example, for web page aesthetics participants were asked, “How aesthetically pleasing was the web page you just viewed?” Participants then responded using a six-point Likert-type scale anchored by “highly aesthetic” and “not at all aesthetic” (Clason & Dormody, 1994). Similar questions were developed for each of the other control variables (see Appendix C). The last nine questions of the Article Opinion Questionnaire evaluated the motivation of the participant in terms of the effort spent on evaluating the information (Dutta-Bergman, 2004).

Participants were then given a short descriptive scenario (Appendix D, High Motivation Condition Instructions) and asked to imagine that they have been recently diagnosed with Lyme disease. They were told they would have to make a decision concerning the treatment they will receive to reduce symptoms of their disease from the information that is presented to them on the web pages they were to view. All participants viewed each of the eight experimental web pages for 60 seconds. They then answered the same two questionnaires following each web page’s presentation as in the practice. This sequence continued until participants had viewed all eight of the experimental web pages. The order in which the eight web pages were presented to participants was controlled using a Latin Square design, in which there were eight potential sequences. Participants were randomly assigned to one of the eight presentation orders.

Following the eight web page presentations, participants were asked to make a decision as to which treatment they chose and recorded this decision using an online form that listed the eight treatments discussed on the experimental web pages (see Appendix C). They then completed a post-experiment questionnaire asking them to rate their familiarity with Lyme disease, the treatments discussed on the experimental web pages, and their familiarity with the web sites used during the experiment. They were also asked to rate their level of trust in the Web, list the features they used to assess each web page's credibility (from Table 1), and how important each of those features were in their overall credibility rating. Finally, participants completed three questionnaires measuring the personality trait variables being controlled for: social desirability, locus of control, and evaluation apprehension. Participants were then debriefed on the purpose of the experiment.

Experiment 2

The following experiment investigates the moderating effect of motivation on agreement with social consensus provided by audience feedback tools during judgments of information credibility.

Participants

An a priori power analysis indicated that, for a statistical power level of 0.80, an alpha level of 0.05, and a medium effect size of $f=0.25$, 64 participants would be needed for Experiment 2 (Cohen, 1988, 1992). College students were recruited online through the psychology department's experimental participation program. College students aged 18-23 are all members of the Millennial generation and thus should be more likely to exhibit characteristics of online information processing that includes Web 2.0 tools (Lenhart et al., 2005; Metzger & Flanagin, 2008; Palfrey & Gasser, 2008). All college student participants

were given course credit for their participation in the study. Efforts were made to keep a close to equal number of males and females in the study sample.

Members of the medical profession (medical doctors and nurses) were recruited through contacts at hospitals in South Carolina, Georgia, West Virginia, and New Zealand. Only the college student sample was used to meet power analysis sample size requirements. The medical professional sample was analyzed separately from the college student sample. Physician participants were not compensated for their participation in the study.

Materials

Participants used the same three practice and eight experimental web pages used in Experiment 1. The audience feedback icons and questionnaires used in Experiment 1 were also used in Experiment 2.

Procedure

Participants first completed a consent form and a demographics questionnaire. They then read instructions for the experiment. These instructions indicated that they would be viewing three practice and eight experimental web pages during the experiment. They were instructed that they would view each page for 60 seconds and would then be asked to respond to two questionnaires concerning the web page they had just viewed. Participants clicked a button at the bottom of the page to indicate they understood the experiment directions before beginning.

Participants first viewed three practice pages to familiarize themselves with the experimental procedure. The three practice pages concerned treatments for chronic fatigue syndrome. All three of the practice web pages contained audience feedback on them. One contained a high level of negative feedback, a second contained a low level of positive

feedback, and the third contained no feedback. The type and amount of audience feedback presented on the practice web pages was randomized for each participant to avoid confounding audience feedback with web page content. The order in which the three practice web pages were presented to participants was controlled using a Latin Square design. Participants were randomly assigned to one of the presentation orders. All participants viewed each of the practice web pages for 60 seconds (Jansen & Spink, 2003). After 60 seconds, the web page automatically advanced to the first of the two questionnaires to be answered following web page presentation.

Participants answered two questionnaires concerning the web page following the viewing of each practice web page. The first questionnaire asked participants to provide a credibility rating for the web page they just viewed using the prompt, “How credible (believable) is the information on the web page you just viewed?” Participants responded to the prompt using an online form with a six-point Likert-type scale anchored by “highly credible” and “not at all credible” (Clason & Dormody, 1994). Past research has demonstrated that an individual’s perceptions of the credibility of a piece of information can be assessed through a direct question (Walthen & Burkell, 2002). Participants clicked a button at the bottom of the questionnaire to be taken to the second questionnaire.

The second questionnaire, the Article Opinion Questionnaire, asked participants to rate each web page on the variables being controlled for by being measured (see Table 3). Each variable was measured using an online form asking participants to rate their degree of agreement with the variable being measured. For example, for web page aesthetics participants were asked “How aesthetically pleasing was the web page you just viewed?” Participants then responded using a six point Likert-type scale anchored by “highly aesthetic” and “not at all aesthetic” (Clason & Dormody, 1994). Similar questions were

developed for each of the other control variables (see Appendix C). The last nine questions of the Article Opinion Questionnaire evaluated the motivation of the participant in terms of the effort spent on evaluating the information (Dutta-Bergman, 2004).

Participants were then given either a short descriptive scenario (Appendix D, High Motivation Condition Instructions) asking them to imagine that they have been recently diagnosed with Lyme disease, or asked to simply browse through the information that will be presented (Appendix D, Low Motivation Condition Instructions). Participants in the high motivation condition were told they would have to make a decision concerning the treatment they will receive to reduce symptoms of their disease from the information that is presented to them on the web pages they were to view. The two motivation conditions represent either goal-directed information use (high motivation) or experiential information use (low motivation). These two conditions for information use have been used in past research studies to manipulate participant motivation (Dutta-Bergman, 2004). Participants were randomly assigned to either the low or high motivation conditions.

All participants viewed each of the eight experimental web pages for 60 seconds. They then answered the same two questionnaires as in the practice web pages. This sequence continued until participants had viewed all eight of the experimental web pages. The order in which the eight web pages were presented to participants was controlled using a Latin Square design, in which there were eight potential sequences. Participants were randomly assigned to one of the eight presentation orders.

Following the eight web page presentations, participants in both the high and low motivation groups were asked to make a decision as to which treatment they would choose for Lyme disease and recorded this decision using an online form that listed the eight treatments discussed on the experiment web pages. They then completed a post-experiment

questionnaire asking them to rate their familiarity with Lyme disease, the treatments discussed on the experimental web pages, and the websites used during the experiment. They were also asked to rate their level of trust in the Web and list the features from Table 1 that they used to assess each web page's credibility, as well as how important each of those features were in their overall credibility rating. Finally, participants completed three questionnaires measuring the personality trait variables being controlled for: social desirability, locus of control, and evaluation apprehension. Participants were then debriefed on the purpose of the experiment.

CHAPTER FOUR: RESULTS

The study was completed in three phases. In Phase 1, a pilot study was conducted to examine the characteristics of the experimental web pages and materials, check the experimental procedure and manipulations, and provide for a preliminary examination of the experimental hypotheses. In Phase 2, data was collected for tests of Hypotheses 1, 2, and 3. Phase 3 collected data to examine Hypotheses 4, 5, 6, and 7.

Pilot Study

Participants

Seventy participants completed the study. There were a total of 50 participants with a complete data set which were then used in the final analysis. The incomplete data sets are presumed to be due to technical glitches, not attrition, since some participants reported difficulties with pages not advancing automatically after the minute-long display and difficulties submitting the online forms on the experimental website. Other participants reported that their Web browser was not compatible with or would not display the experimental website. Many of the incomplete data sets were begun, but not completed. It is presumed that such incomplete data sets were due to either the technical issues described or to individual skill differences in ability to use the experiment web site.

Participants who had difficulties displaying the experimental website were given instructions on common solutions to these problems in an email (e.g., turning off pop-up blockers, using either the Firefox or Internet Explorer browser, or resetting their modem). Some participants reported that they were able to complete the experiment after applying these solutions while other participants were still unable to complete the experiment. All

participants were given course credit for completing the experiment, regardless of whether they were able to complete the study or not.

The mean age of participants was 20 years ($SD = 3.98$), with a minimum of 18 and a maximum of 42. There were 24 females and 26 males in the study sample. The mean Internet experience level reported by participants was 6.02 ($SD = 1.25$) on a scale of 1 to 7, indicating that most participants believed that they had a high level of Internet experience. The mean self-reported level of trust in the Web was 4.08 ($SD=1.06$) on a scale of 1 to 7, indicating that participants had, on average, a medium to medium-high level of trust in the Web. Participants reported an average of 10.5 ($SD = 2.51$) years of Web experience and an average of four hours of Web use per day ($SD = 3.02$). Taking the mean age of participants into account, the study sample appears to be mainly composed of members of the Millennial generation who began using the Internet around the age of 10.

The mean self-reported level of familiarity with Lyme disease was 2.47 ($SD = 1.14$) on a scale of 1 to 7, indicating that most participants believed themselves to be very unfamiliar with the disease. Fifteen participants reported that they were born or had lived in the northeast United States, an area of high activity for Lyme disease. These participants reported, on average, a low level of familiarity with Lyme disease ($M = 2.87, SD = 1.30$). Their self-reported familiarity level with Lyme disease did not differ significantly from those not born in the northeast United States, $t(48) = -1.523, p = .134$. Three participants reported that they were born or had lived in either Wisconsin or Minnesota, another area of high activity for Lyme disease. These participants reported, on average, a medium level of familiarity of Lyme disease ($M = 3.00, SD = 1.00$). Participants who were born or who had lived in either Wisconsin or Minnesota did not differ significantly from those not born in Wisconsin or Minnesota on familiarity with Lyme disease, $t(48) = -0.788, p = .435$.

Tests of Hypotheses

The pilot test data provided for a preliminary examination of the experimental hypotheses. All hypotheses were tested with alpha at .05. Bonferroni corrections were applied to all post-hoc pairwise tests. To examine Hypothesis 1, a 2 (Amount) X 4 (Type) within-subjects ANOVA was conducted on web page credibility ratings. The four levels of Type in the analysis include the web pages that had no feedback present on them. The two pages with no feedback were arbitrarily assigned to high and low Amount conditions.

Hypothesis 1, that pages with positive feedback would receive higher average credibility ratings than pages with no, mixed, or negative feedback, was not supported as there was not a significant main effect for type of audience feedback, $F(3, 150) = 1.45, p = .232$. Participants gave a page with negative feedback an average credibility rating of 3.76 ($SD = 1.14$), a page with no feedback an average credibility rating of 3.91 ($SD = 1.43$), a page with mixed feedback an average credibility rating of 4.00 ($SD = 1.28$), and a page with positive feedback an average credibility rating of 4.18 ($SD = 1.35$). Figure 5 shows the average credibility rating for each of the four types of audience feedback. The sample size for the pilot test was smaller than the 64 participant sample size recommended in the a priori power analysis. The observed power for the test was 0.38, suggesting that a larger sample would be needed to observe significant mean differences in credibility ratings by type of feedback. This shortcoming was addressed in Phases 2 and 3 by recruiting a larger sample of participants.

A 2 (Amount) x 3 (Type) ANOVA was conducted to examine Hypothesis 2, that a larger crowd having given feedback would strengthen the effect of type of feedback on credibility ratings. Hypothesis 2 was not supported as there was no interaction between type and amount of feedback, $F(2, 100) = 1.43, p = .244$. The observed power for this test was

0.30. Figure 6 shows the average credibility rating obtained with different types of audience feedback and different audience sizes.

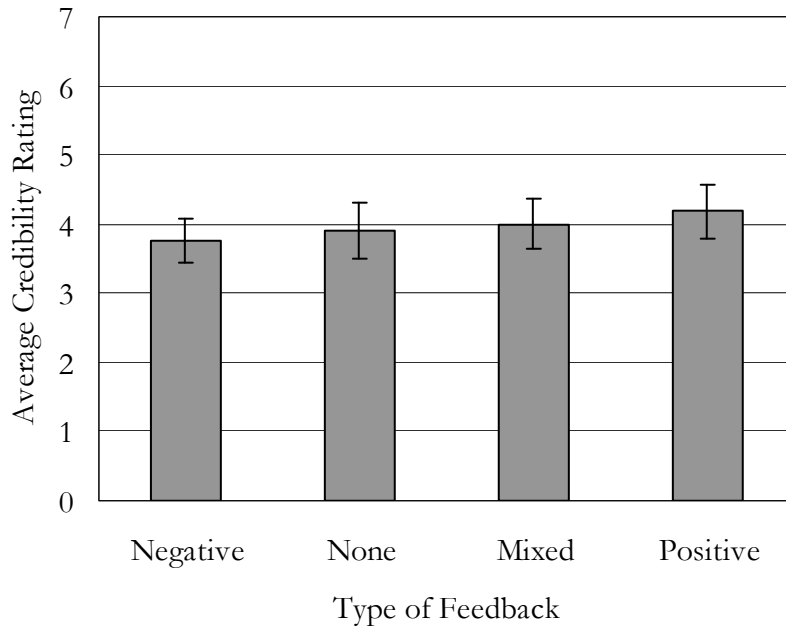


Figure 5. Average credibility rating by type of feedback in the pilot study

Hypothesis 3, that participants would be more likely to select treatments with positive audience feedback on them, was also not supported. Participants were not more likely to choose a treatment whose web page had positive feedback on it than treatments with either no, mixed, or negative feedback, $\chi^2(3, N = 51) = 4.29, p = .231$. Twenty percent of participants chose treatments whose pages had no audience feedback on them, 24% chose treatments whose pages had negative audience feedback on them, 20% chose treatments whose pages had mixed audience feedback on them, and 37% chose treatments whose pages had positive audience feedback on them.

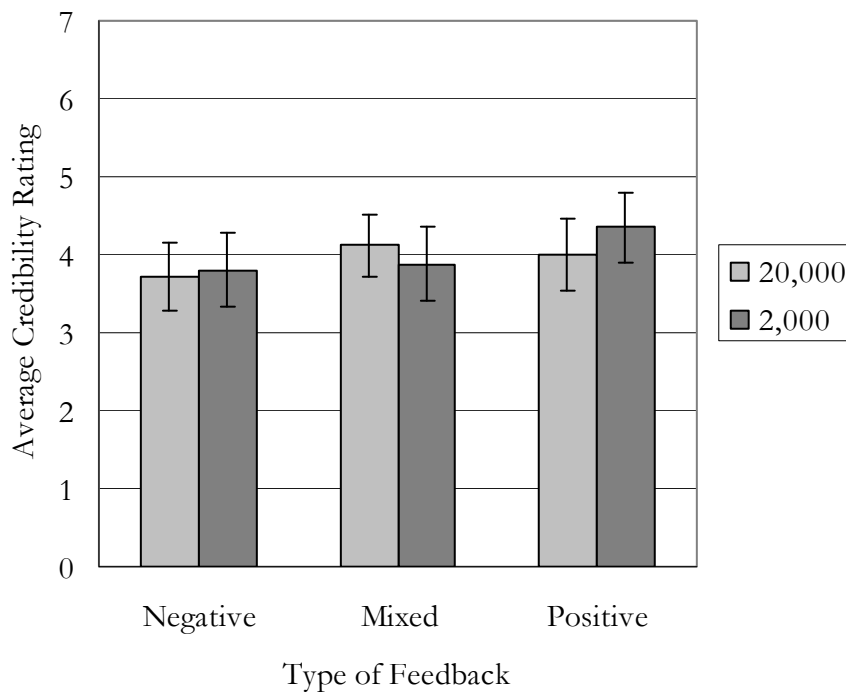


Figure 6. Average credibility rating by type of feedback and size of audience in the pilot study

A 2(Amount) x 3(Type) x 2(Motivation level) Mixed Between-Within ANOVA was used to examine Hypothesis 4, that a high level of motivation would lessen the impact of audience feedback on credibility ratings. The hypothesis was not supported as there was no interaction between type of audience feedback and motivation level, $F(2, 96) = 1.49, p = .168$. Observed power for this test was .311. There was also not an interaction between the size of the audience giving feedback and motivation level, $F(1, 48) = 1.28, p = .263$. Observed power for this test was .064. Finally, there was not a three way interaction between type and amount of feedback by motivation level, $F(2, 96) = 0.290, p = .749$. The observed power for this test was .095. Figure 7 gives the average credibility ratings obtained under the different types of feedback by motivation level.

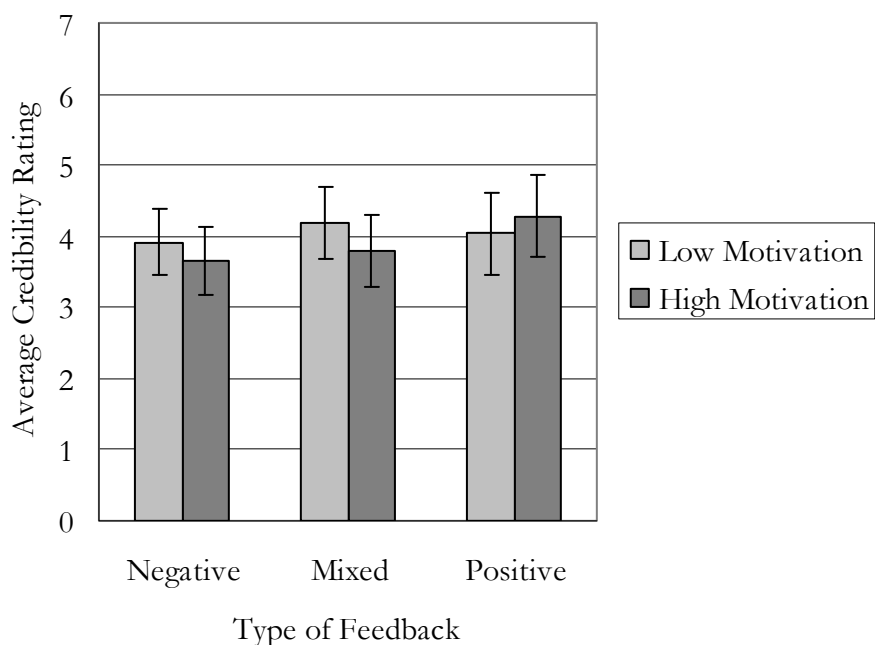


Figure 7. Average credibility rating by type of feedback and motivation level in the pilot study

Hypothesis 5, that participants high in motivation would use more items to assess credibility than participants low in motivation, was not supported, $t(48) = -.165, p = .869$. Members of the high motivation group reported using an average of seven items to assess the credibility of the web pages viewed in the experiment ($SD = 3.33$) while members of the low motivation group also reported using seven items on average ($SD = 3.51$). It was believed that participants in the high motivation condition would investigate more elements of the web page when determining credibility because of the increased importance of making a good decision from the information at hand. However, in the pilot study the reported number of elements used by the high motivation condition and the low motivation condition were essentially identical.

Hypothesis 6, that members of the low motivation group would be less likely to report using audience feedback to assess credibility than members of the high motivation group, was not supported. Members of the low motivation group were not more likely than members of the high motivation group to report using either audience feedback, $\chi^2(1, N = 50) = .397, p = .754$, or the number of audience members responding in the feedback, $\chi^2(1, N = 50) = .857, p = .538$, when assessing the credibility of the websites in the experiment. Twenty-four percent of participants in the low motivation group reported using audience feedback while 32% of participants in the high motivation group reported using audience feedback when making determinations about credibility during the experiment. Twenty-four percent of participants in the low motivation group reported using the size of the audience when determining credibility while 36% of participants in the high motivation group reported doing so.

In order to examine Hypothesis 7, it was necessary to compute a score representative of participant agreement with the audience feedback presented on the web pages they viewed during the experiment. Agreement with audience opinion was calculated by deriving a deviation score for each of the audience feedback conditions participants viewed. An audience deviation score was not calculated for the no feedback condition. The audience's opinion was calculated by multiplying the number of audience members giving a negative opinion by 1 and multiplying the number of audience members giving a positive opinion by 7. These two numbers were then added and divided by the total size of the audience to generate an overall audience opinion. Audience opinion in the negative feedback condition was 1.6, audience opinion in the mixed feedback condition was 4, and audience opinion in the positive feedback condition was 6.4.

The audience's opinion was then subtracted from each participant's credibility score to provide an indication of deviation from the audience's opinion. Participants with a negative deviation score on a page disagreed with the audience's opinion presented on that page in the negative direction (i.e., gave a lower credibility rating than the audience) while participants with a positive deviation score on a page disagreed with the audience's opinion in the positive direction (i.e., gave a higher credibility rating than the audience). Participant scores close to zero indicate overall agreement with the audience's opinion.

An average deviation score was calculated for each participant by averaging their six audience deviation scores. The absolute value of negative deviation scores was taken prior to averaging (Tabachnick & Fidell, 2001). These average deviation scores were then used in a test of Hypothesis 7, that participants high in motivation would deviate more from the audience's opinion than participants low in motivation. The hypothesis was not supported as an independent-samples t-test revealed that there was no significant difference between average audience deviation scores for the high and low motivation groups, $t(48) = 1.43, p = .159$. Participants in the low motivation condition deviated 2.09 ($SD = 0.61$) points from the audience's opinion on average while participants in the high motivation condition deviated 1.89 ($SD = 0.37$) points from the audience's opinion on average.

Motivation Manipulation Check

Since tests of Hypothesis 4, 5, 6, and 7 requires that participants be in a state of either high or low motivation, a motivation manipulation check was conducted based on participant responses to a question on the post-experiment questionnaire targeting their motivation level. This question asked participants to "Rate your level of motivation when reading the information you encountered during the experiment." The manipulation check

suggested that the high and low motivation groups did not differ significantly on self-reported level of motivation when reading the websites, $t(48) = -.334, p = .740$.

The results of the manipulation check suggest that the motivation conditions were either ineffective in inducing either a low or high state of motivation, or were not sensitive enough to pick up on the true level of motivation the participant experienced during the experiment. Participants may have also misunderstood the context of the motivation question on the post-experimental questionnaire. They may have mistakenly thought the motivation question was referring to their typical Internet behavior, not of their behavior during the experiment.

Corrections to these issues were implemented in Experiments 1 and 2 by (1) adopting a standardized measure of online motivation (Dutta-Bergman, 2004), (2) taking participant motivation level at multiple points during the experimental procedure following the presentation of each web page, and (3) re-wording the high motivation page to contain stronger and more emphasized language and context-relevant pictures. The high and low motivation conditions used in Experiments 1 and 2 can be viewed in Appendix D. The new motivation measure was given at multiple points in the study, following each web page viewing, and consisted of the final nine questions on the Article Opinion Questionnaire (Appendix C). In addition, the scale for all questionnaires and instruments used in the study was changed from a 1 to 7 scale to a Likert-type scale ranging from 1 to 6 in order to obtain more differentiation in participant response scores.

Page Credibility Ratings and Treatments Chosen

The pilot study also allowed for an examination of the characteristics of the web pages selected to be used in the experiments. In particular, the web pages were examined for

potential differences on those factors that have been shown in prior research to impact perceived credibility (Table 1). The pages used in the experiment appear to differ in characteristics believed to impact credibility ratings (see Table 5). Of the eight web pages tested during the pilot study, the Antibiotics page received the highest average credibility rating, the Coenzyme Q10 page received the second highest average credibility rating, and the Hyperbarics page received the third highest average credibility rating. Although the experimental web pages appear to differ in characteristics that can impact perceived credibility, audience feedback types and amounts used in the study were assigned randomly to these web pages. Therefore, it is assumed that differences in these characteristics will not overly impact tests of the experimental hypotheses (Miller & Chapman, 2001).

Table 6 gives the mean credibility rating for each of the experimental web pages, as well as the percentage and number of participants selecting the treatment described on the web page. Participant selection of treatments for Lyme disease aligned closely with the average credibility ratings for each of the experimental web pages. Fifty-eight percent of participants selected antibiotics as their chosen treatment while 20% of participants selected coenzyme Q10 as their method of treatment. There was a three-way tie for third most-selected treatment, with 5.9% of participants selecting either salt and vitamin c, hyperbaric therapy, or magnesium.

One reason why the Antibiotics page may have received both the highest average credibility rating and was the most frequently selected treatment choice is the likelihood of participant familiarity with the treatment. Twenty-eight participants reported familiarity with antibiotics as a treatment. In order to ensure the results of Experiments 1 and 2 were due to factors besides participant familiarity with the treatments described in the experimental web

pages, the Antibiotics page was replaced with a web page describing another treatment for Lyme disease, cat's claw herbal supplement, during data collection for Experiments 1 and 2.

Page Elements Used When Determining Credibility

Participants reported which elements they used when assessing the credibility of the experimental web pages using a form on the post-experiment questionnaire. This form contained the items in Table 3 that have been shown in prior studies to influence perceptions of credibility. While the items in this table are certainly do not include all possible factors, for the purposes of this study it was important to capture only those variables that have been shown to have high to medium influence on perceptions of credibility in past research.

Participants most frequently reported using author and message characteristics, as well as elements related to the web page's background or affiliation. For example, 72% of participants reported using the web page author's credentials as part of their criteria for determining credibility, 66% reported using the completeness of the web page's content, 56% reported using the domain of the web page, and 56% of participants reported using the web page's affiliation.

Experiment 1

Participants

183 participants completed the study. Of these, there were a total of 132 participants with a complete data set. The incomplete data sets were presumed to be predominately due to technical glitches, rather than attrition, since many of the incomplete data sets were

Table 5. Means for each attribute of the experimental web pages as measured in the pilot study

	Hyperbarics	Salt and Vitamin C	Magnesium	Marshall Protocol	Antibiotics	MMS	Silver Protein	Coenzyme Q10
Accurate	4.58 (1.33)	3.31 (1.35)	4.04 (1.75)	3.94 (1.68)	4.74 (1.52)	3.53 (1.84)	2.87 (1.41)	4.77 (1.51)
Unbiased	4.33 (1.46)	3.50 (1.33)	3.72 (1.49)	3.70 (1.70)	4.70 (1.62)	3.19 (2.02)	2.52 (1.46)	4.30 (1.68)
Complete	4.46 (1.62)	3.37 (1.41)	3.87 (1.78)	3.65 (1.80)	4.36 (1.72)	3.47 (1.82)	2.54 (1.61)	5.17 (1.61)
Commercial	3.96 (1.62)	3.29 (1.56)	3.61 (1.77)	4.39 (1.76)	3.87 (1.68)	5.70 (1.50)	5.17 (1.92)	4.42 (1.65)
Current	4.54 (1.52)	3.83 (1.46)	4.09 (1.47)	4.50 (1.51)	4.94 (1.37)	4.40 (1.65)	3.52 (1.52)	5.17 (1.38)
Personalized	3.92 (1.55)	3.88 (1.67)	3.33 (1.53)	4.13 (1.83)	3.96 (1.40)	3.98 (1.79)	3.33 (1.73)	4.28 (1.49)
Aesthetically Pleasing	4.00 (1.52)	3.38 (1.59)	3.15 (1.63)	3.85 (1.85)	4.49 (1.57)	3.74 (1.66)	3.60 (1.63)	4.17 (1.57)
Easy to Use	4.90 (1.25)	4.37 (1.49)	4.31 (1.69)	4.52 (1.66)	5.28 (1.36)	4.45 (1.78)	4.67 (1.56)	4.64 (1.41)
Author Knowledgeable	4.67 (1.59)	3.42 (1.41)	4.13 (1.71)	4.06 (1.75)	4.79 (1.57)	3.75 (1.75)	2.96 (1.68)	5.09 (1.45)
Favorable Reaction	4.12 (1.58)	3.27 (1.45)	3.54 (1.81)	3.57 (1.79)	4.68 (1.61)	3.11 (1.76)	2.54 (1.32)	4.25 (1.68)
Slow to Load	2.35 (1.77)	1.96 (1.29)	1.98 (1.40)	2.07 (1.41)	2.09 (1.47)	1.89 (1.25)	2.06 (1.51)	2.04 (1.55)
Used Evidence	4.33 (1.43)	3.46 (1.60)	3.61 (1.69)	3.67 (1.55)	3.70 (1.70)	3.45 (1.75)	2.38 (1.48)	4.70 (1.51)

	Hyperbarics	Salt and Vitamin C	Magnesium	Marshall Protocol	Antibiotics	MMS	Silver Protein	Coenzyme Q10
Easy to Understand	4.60 (1.49)	4.42 (1.63)	3.83 (1.82)	4.20 (1.64)	5.28 (1.59)	4.49 (1.81)	4.90 (1.70)	4.30 (1.85)
Author thinks Like me	3.40 (1.51)	2.92 (1.34)	2.91 (1.41)	3.09 (1.53)	3.74 (1.55)	2.87 (1.59)	2.63 (1.46)	3.64 (1.82)
Strong or weak argument	4.27 (1.44)	3.40 (1.33)	3.93 (1.76)	3.81 (1.64)	4.51 (1.70)	3.47 (1.82)	2.60 (1.68)	4.60 (1.54)
<i>Average Credibility Rating</i>	<i>4.46</i>	<i>3.56</i>	<i>3.98</i>	<i>3.93</i>	<i>4.79</i>	<i>3.28</i>	<i>2.87</i>	<i>4.75</i>

Note. The standard deviation for each variable is in parentheses. Bold items in each row indicate which page received the highest score in each category

Table 6. *Web page credibility ratings and treatments chosen in the pilot study*

Web Page (Treatment)	Mean Credibility Rating (<i>SD</i>)	Percent of participants selecting	Number of participants selecting
Antibiotics	4.79 (1.34)	58.8	30
Coenzyme Q10	4.75 (1.51)	19.6	10
Hyperbarics	4.46 (1.41)	5.9	3
Magnesium	3.98 (1.66)	5.9	3
Salt and Vitamin C	3.56 (1.47)	5.9	3
Marshall Protocol	3.93 (1.76)	1	2
Miracle Mineral Supplement	3.28 (1.68)	1	2
Silver Protein	2.87 (1.52)	0	0

started, but not completed due to technical issues or personal ability as outlined in the pilot study.

The mean age of participants was 21 years ($SD = 5.90$), with a minimum of 18 and a maximum of 51. The sample was approximately equal in terms of gender with 65 females and 67 males in the study sample. Participants' average Internet experience level was 4.97 ($SD = 1.00$) on a scale of 1 to 6, indicating that most participants believed themselves to have a medium to medium-high level of Internet experience. The average self-reported level of trust in the Web was 3.60 ($SD=1.04$) on a scale of 1 to 6, indicating that participants had, on average, a medium level of trust in the Web. Participants had an average of 10.7 years of Web experience ($SD = 3.43$) and reported using the Web about five hours per day on average ($SD = 3.02$). Taking the mean age of participants into account, the group appears to

be mainly composed of members of the Millennial generation who began using the Internet around the age of 11.

Participant average reported level of familiarity with Lyme disease was 2.25 ($SD = 1.20$) on a scale of 1 to 6, indicating that most participants believed themselves to be very unfamiliar with the disease. Thirty-four participants reported that they were born or had lived in the northeastern United States, an area of high activity for Lyme disease. These participants did not significantly differ from those not born in the northeastern United States on self-reported familiarity with Lyme disease, $t(130) = -0.247, p = .806$. Participants not born in the northeast reported an average level of familiarity with Lyme disease of 2.23 ($SD = 1.17$) while participants born in the northeast reported an average level of familiarity with Lyme disease of 2.29 ($SD = 1.31$). Four participants reported that they were born or had lived in either Wisconsin or Minnesota, another area of high activity for Lyme disease. These participants did not significantly differ from those not born in Wisconsin or Minnesota on self-reported familiarity with Lyme disease, $t(130) = -0.419, p = .676$. Participants not born in Wisconsin or Minnesota reported an average level of familiarity with Lyme disease of 2.24 ($SD = 1.20$) while participants born in Minnesota or Wisconsin reported an average level of familiarity with Lyme disease of 2.50 ($SD = 1.29$).

Twenty-nine percent of participants indicated that they had participated in some type of information fluency training. Of those participants who indicated they had participated in information fluency training, 27% had participated within the last six months and 20% had participated in the training more than six months ago. Those participants who had participated in information fluency training did not report significantly less trust in the Web than those participants who had not completed information fluency training, $t(130) = -0.965, p = .337$. Participants who had completed some type of information fluency training reported

an average level of trust in the Web of 3.74 ($SD = 1.00$), while participants who had not completed some type of information fluency training reported an average level of trust in the Web of 3.54 ($SD = 1.06$).

The post-experiment questionnaire provided an opportunity to obtain data related to participant prior knowledge of the treatments described in the web pages used in the experiment as well as the websites the pages were taken from. Ninety-one percent of participants indicated they had never heard of the treatments described in the web pages they viewed during the experiment, while 9% indicated they had heard of at least one treatment described in the web pages presented during the experiment. Of those who had heard of at least one treatment, the most common were silver protein, coenzyme Q10, and magnesium (tie with four participants reporting knowledge of each of the treatments).

Eighty-six percent of participants reported that they had considered using at least one of the treatments described in the web pages they viewed during the experiment. Of those who reported they had considered using a treatment described in the web pages, salt and vitamin C was the most common with nine participants indicating they had considered using the treatment. Participant familiarity with and self-reported consideration of use of the treatments described on the experimental web pages may be inflated due to misconceptions about the treatments on the part of the participants. For example, participants may have heard of vitamin C or magnesium as a health supplement prior to the experiment and indicated they were familiar with it, even though they were not familiar with the protocol for its use as a medical treatment for Lyme disease as described in the experiment web pages.

Only three participants reported that they had previously visited any of the websites used to obtain the web pages presented during the experiment. One participant reported they had visited healthynewage.com (Cat's Claw/Samento), two participants reported they

had visited vrp.com (Silver Protein), and one participant reported they had visited BioMed.com (Miracle Mineral Supplement).

Tests of Hypotheses

The data showed no evidence of kurtosis, skewness, or outliers, therefore no transformations were necessary. All analyses were conducted with alpha set to .05 unless otherwise indicated. Bonferroni corrections were applied to all post-hoc pairwise comparisons. Table 7 provides the means, standard deviations, and correlations among the variables explored in tests of Hypothesis 1, 2, and 3.

A 2 (Amount) X 4 (Type) Within-Subjects ANOVA was performed on the data set. Hypothesis 1, that type of audience feedback would impact credibility ratings, was supported, $F(3, 378) = 7.33, p < .0001$. Participants gave a page with negative feedback an average credibility score of 3.12 ($SD = 1.17$), a page with no feedback 3.15 ($SD = 1.22$), a page with mixed feedback 3.50 ($SD = 1.18$), and a page with positive feedback a 3.59 ($SD = 1.13$). The observed power for this test was 0.97. Partial η^2 was .055, indicating that type of feedback, while significant, provided a small effect on overall credibility ratings. Post-hoc tests indicated that there were significant differences in credibility ratings between negative and mixed audience feedback ($p = .015, d = 0.32$) and negative and positive audience feedback ($p < .0001, d = 0.41$). Figure 8 shows the mean credibility rating obtained for each type of audience feedback.

A 2 (Amount) x 3 (Type) Within-Subjects ANOVA was conducted to examine Hypothesis 2, which states that the influence of audience feedback would increase as the size of the audience responding increased. Hypothesis 2 was not supported as there was no interaction between type and amount of feedback, $F(2, 256) = .158, p = .854$. The observed

Table 7. Table of means, standard deviations, and correlations among the study variables in Experiment 1

	M	SD	Negative Feedback Credibility Score	Mixed Feedback Credibility Score	No Feedback Credibility Score	Positive Feedback Credibility Score	High Audience Size Credibility Score	Low Audience Size Credibility Score
Negative Feedback Credibility Score	3.12	1.17	-	.343**	.245**	.350**	.694**	.621**
Mixed Feedback Credibility Score	3.50	1.18		-	.348**	.398**	.657**	.694**
No Feedback Credibility Score	3.15	1.22			-	.345**	.389**	.331**
Positive Feedback Credibility Score	3.59	1.13				-	.659**	.682**
High Audience Size Credibility Score	3.29	.96					-	.560**
Low Audience Size Credibility Score	3.36	.90						-

** - significant at the .01 level

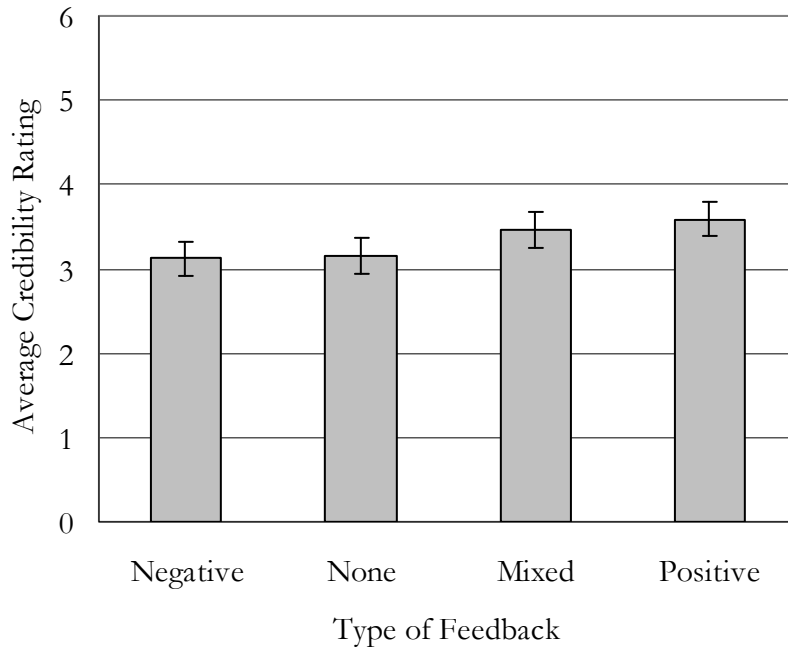


Figure 8. Average credibility rating by type of feedback in Experiment 1

power for this test was 0.07. Figure 9 shows the average credibility rating for each of the combinations of type and amount of audience feedback.

Hypothesis 3, that treatments with positive audience feedback on them would be more likely to be selected as a treatment choice, was not supported. Participants were not more likely to choose a treatment with positive feedback on the web page describing it than treatments with either no, mixed, or negative feedback on the page describing it, $\chi^2(3, N = 132) = 2.24, p = .524$. Twenty-three percent of participants chose treatments whose pages had no audience feedback on them, 25% of participants chose treatments whose pages had negative audience feedback on them, 22% of participants chose treatments whose pages had mixed audience feedback on them, and 30% of participants chose treatments whose pages had positive audience feedback on them.

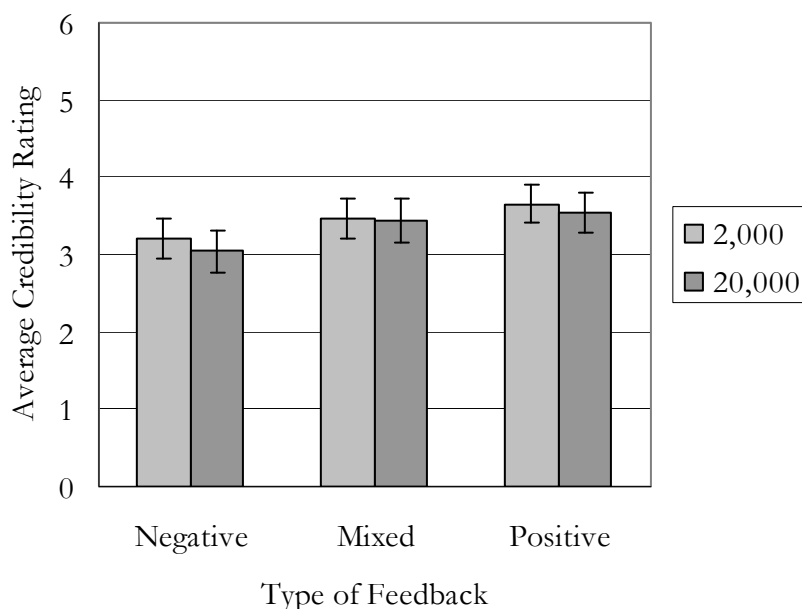


Figure 9. Average credibility rating by type of feedback and size of audience in Experiment 1

Page Credibility Ratings and Treatments Chosen

The Cat's Claw/Samento page received the highest average credibility rating ($M = 3.90$, $SD = 1.32$), the Coenzyme Q10 page received the second highest average credibility rating ($M = 3.89$, $SD = 1.43$), and the Hyperbarics page received the third highest average credibility rating ($M = 3.77$, $SD = 1.35$). Overall, credibility scores did not provide as much impact on choice of treatment in Experiment 1 as it did in the pilot study. The highest percentage of participants, 16.7%, chose coenzyme Q10 as a treatment even though it received the second highest credibility rating. Likewise, a large number of participants chose treatments that were lower in average credibility rating. For example, 22% of participants selected magnesium as their method of treatment and 22% of participants selected salt and vitamin C as their method of treatment. This may have been due to a familiarity effect since some participants reported familiarity with these treatments, although it is not known

whether they were familiar with the exact protocol described in the web pages. On the other hand, some treatments were not selected often by participants despite their pages receiving a high credibility rating. For example, the Cat's Claw/Samento page received the highest credibility rating in the study, yet was only selected as a method of treatment by seven participants. Table 8 lists the mean credibility rating given for each web page, as well as the percentage and number of participants selecting the treatment described in that web page.

Table 8. *Web page credibility ratings and treatments chosen in Experiment 1*

Web Page (Treatment)	Mean Credibility Rating (<i>SD</i>)	Percent of participants selecting	Number of participants selecting
Coenzyme Q10	3.89 (1.43)	24.2	32
Hyperbarics	3.77 (1.35)	16.7	22
Salt and Vitamin C	2.95 (1.40)	16.7	22
Magnesium	3.32 (1.26)	16.7	22
Marshall Protocol	3.44 (1.35)	7	9
Silver Protein	2.33 (1.48)	7	10
Cat's Claw/Samento	3.90 (1.32)	5.3	7
MMS	2.98 (1.49)	3.8	5

A one-way ANOVA revealed that there were significant differences in average credibility ratings among the eight experimental web pages, $F(7, 1051) = 20.685, p < .0001$, partial $\eta^2 = .121$. Specifically, the Hyperbarics page was rated on average 0.82 ($p < .0001, d = .42$) points higher than the Salt and Vitamin C page, 0.78 ($p < .0001, d = .40$) points higher than the Miracle Mineral Supplement page, and 1.44 ($p < .0001, d = .74$) points higher than the Silver Protein page. The Magnesium page was rated on average 0.99 ($p < .0001, d = .51$) points higher than the Silver Protein page while the Marshall Protocol page was rated on

average 1.11 points higher than the Silver Protein page ($p < .0001$, $d = 0.57$). Table 9 gives the mean credibility rating and average attribute characteristics for each of the experimental web pages. Figure 10 gives the average credibility rating obtained for each web page used in the experiment.

Page Elements Used When Determining Credibility

Participants indicated which web page elements they used when assessing the credibility of the pages they viewed during the experiment on the post-experiment questionnaire. In the post-experiment questionnaire, participants reported that they used, on average, seven elements ($SD=3.65$) to determine the credibility of the web pages they viewed during the experiment. Participants most frequently reported using page elements related to the source or message characteristics of the page. Seventy-three percent of participants reported using the web page author's credentials, 61% reported using the web page's affiliation, 58% reported using the completeness of the web page's content, and 55% reported using the writing style of the web page as part of their criteria for determining credibility. Thirty-two percent of participants reported using whether prior viewers liked the web page (i.e., type of audience feedback) in their evaluation and 30% of participants reported using how many prior viewers liked the web page (i.e., audience size) in their evaluation.

Experiment 2

Participants

406 participants completed the study. There were a total of 263 participants with a complete data set which were then used in final analyses. The incomplete data sets are presumed to be

Table 9. Means for each attribute of the experimental web pages as measured in Experiment 1

	Hyperbarics	Salt and Vitamin C	Magnesium	Marshall Protocol	Cat's Claw/Samento	MMS	Silver Protein	Coenzyme Q10
Accurate	3.74 (1.27)	2.96 (1.32)	3.34 (1.32)	3.38 (1.32)	3.90 (1.25)	2.89 (1.42)	2.41 (1.35)	3.98 (1.30)
Unbiased	3.62 (1.24)	3.08 (1.39)	3.43 (1.38)	3.23 (1.44)	3.74 (1.34)	3.08 (1.58)	2.30 (1.33)	3.80 (1.36)
Complete	3.59 (1.32)	2.90 (1.31)	3.25 (1.41)	3.23 (1.34)	3.89 (1.40)	3.11 (1.51)	2.26 (1.40)	4.04 (1.45)
Commercial	3.41 (1.28)	3.12 (1.51)	3.52 (1.40)	3.69 (1.45)	3.79 (1.37)	4.41 (1.54)	4.20 (1.79)	3.89 (1.31)
Current	3.92 (1.26)	3.46 (1.33)	3.70 (1.27)	3.74 (1.20)	4.08 (1.25)	3.71 (1.36)	2.92 (1.51)	4.11 (1.33)
Personalized	3.28 (1.23)	3.23 (1.47)	3.07 (1.36)	3.40 (1.45)	3.55 (1.53)	3.35 (1.38)	2.61 (1.51)	3.39 (1.37)
Aesthetically Pleasing	3.40 (1.48)	2.70 (1.43)	3.18 (1.47)	3.44 (1.45)	3.95 (1.57)	3.01 (1.37)	2.89 (1.53)	3.64 (1.41)
Easy to Use	3.77 (1.43)	3.38 (1.49)	3.87 (1.33)	3.80 (1.52)	4.32 (1.35)	3.59 (1.40)	3.77 (1.65)	3.89 (1.42)
Author Knowledgeable	3.27 (1.45)	2.62 (1.29)	3.15 (1.38)	3.67 (1.29)	3.65 (1.44)	2.79 (1.42)	2.09 (1.22)	3.90 (1.43)
Favorable Reaction	3.50 (1.34)	2.90 (1.41)	3.17 (1.37)	3.24 (1.25)	3.89 (1.37)	2.71 (1.36)	2.20 (1.30)	3.64 (1.45)
Slow to Load	2.02 (1.31)	1.92 (1.24)	2.18 (1.42)	2.14 (1.40)	2.05 (1.37)	2.05 (1.31)	1.86 (1.31)	2.14 (1.42)
Used Evidence	3.73 (1.33)	2.73 (1.34)	3.11 (1.42)	2.98 (1.34)	3.80 (1.30)	2.95 (1.38)	2.20 (1.32)	3.97 (1.38)
Easy to Understand	3.75 (1.31)	3.70 (1.40)	3.76 (1.41)	3.57 (1.41)	4.40 (1.20)	3.80 (1.31)	4.04 (1.59)	3.66 (1.36)

	Hyperbarics	Salt and Vitamin C	Magnesium	Marshall Protocol	Cat's Claw/Samento	MMS	Silver Protein	Coenzyme Q10
Author thinks Like me	3.02 (1.30)	2.59 (1.31)	2.66 (1.29)	2.70 (1.30)	3.23 (1.18)	2.50 (1.24)	2.06 (1.17)	3.01 (1.34)
Strong or weak argument	3.76 (1.29)	3.07 (1.36)	3.30 (1.41)	3.22 (1.33)	3.98 (1.25)	3.07 (1.45)	2.43 (1.43)	4.00 (1.33)
<i>Credibility Rating</i>	<i>3.77</i>	<i>2.95</i>	<i>3.32</i>	<i>3.44</i>	<i>3.90</i>	<i>2.98</i>	<i>2.33</i>	<i>3.89</i>

Note. The standard deviation for each variable is in parentheses. Bold items in each row indicate which page received the highest score in each category

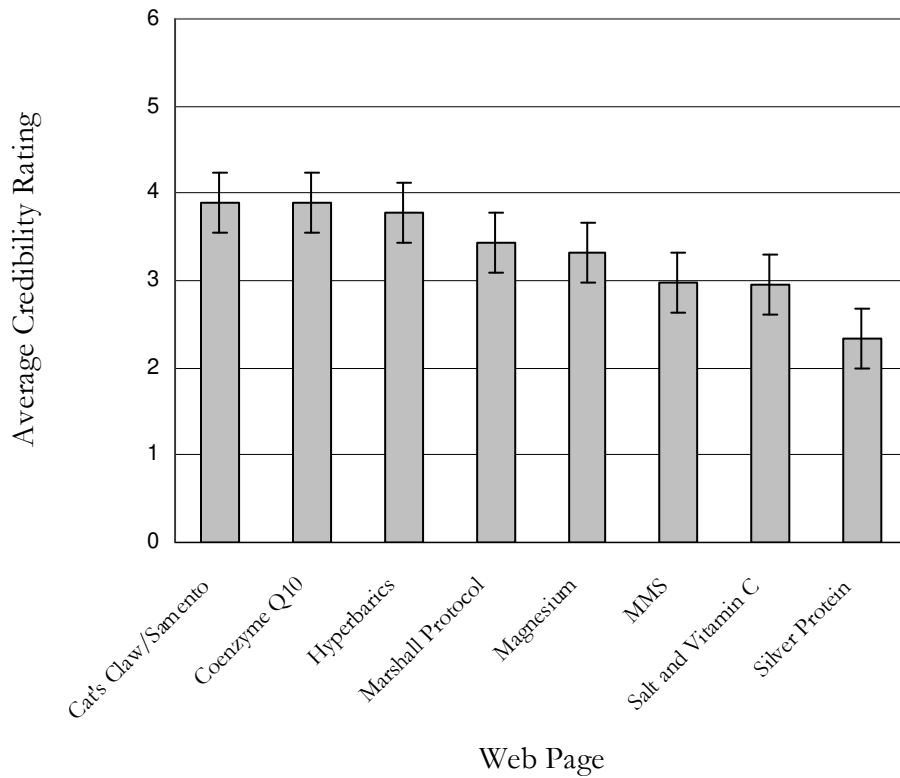


Figure 10. Average credibility rating by web page in Experiment 1

largely due to technical glitches, rather than attrition, since some participants reported technical difficulties as outlined in the pilot study. Many of the incomplete data sets were started, but not completed due to these issues. All participants were issued course credit whether they were able to complete the study or not.

The mean age of participants was 21 years ($SD = 3.51$) with a minimum of 18 and a maximum of 43. There were 131 females and 132 males in the experiment sample. Participants reported an average Internet experience level of 4.97 ($SD = 0.95$) on a scale of 1 to 6, indicating that most participants believed themselves to have a medium to medium-high level of experience. Participants reported having an average of 10 years of Web experience ($SD = 2.71$) and reported using the Web five hours per day ($SD = 4.12$) on

average. Participant self-reported average level of trust in the Web was 3.49 ($SD=1.03$) on a scale of 1 to 6 indicating that participants had a medium level of trust in the Web. Taking the mean age of participants into account, the participant sample appears to be composed predominately of members of the Millennial generation who began using the Internet around the age of 11.

Participant average reported level of familiarity with Lyme disease was 2.19 ($SD = 1.04$) on a scale of 1 to 6, indicating that most participants believed themselves to be unfamiliar with the disease. Sixty-three participants reported that they were born or had lived in the northeastern United States, an area of high activity for Lyme disease. These participants did not significantly differ from those not born in the northeastern United States on reported familiarity with Lyme disease, $t(261) = -0.589, p = .557$. Participants not born in the northeast reported an average level of familiarity with Lyme disease of 2.17 ($SD = 1.04$), while participants born in the northeast reported an average level of familiarity with Lyme disease of 2.25 ($SD = 1.07$). Thirteen participants reported that they were born or had lived in either Wisconsin or Minnesota, another area of high activity for Lyme disease. These participants did not significantly differ from those not born in Wisconsin or Minnesota on self-reported familiarity with Lyme disease, $t(261) = 0.659, p = .511$. Participants not born in Wisconsin or Minnesota reported an average level of familiarity with Lyme disease of 2.20 ($SD = 1.05$), while participants born in either Wisconsin or Minnesota reported an average level of familiarity with Lyme disease of 2.00 ($SD = 0.91$).

Since participants in the high motivation condition received a short descriptive scenario that contained some information about Lyme disease (see Appendix C), the question on the post-experiment questionnaire asking about familiarity with Lyme disease allowed for an examination as to whether this descriptive scenario made participants in the

high motivation condition more familiar with Lyme disease than participants in the low motivation condition. It appears that this was not the case, with participants in the high motivation condition reporting about the same level of familiarity with Lyme disease as participants in the low motivation condition following the experiment, $t(261) = -1.729, p = .085$. Participants in the high motivation condition reported an average familiarity with Lyme disease of 2.30 ($SD = 0.99$) while participants in the low motivation condition reported an average familiarity with Lyme disease of 2.08 ($SD = 1.08$).

Thirty percent of participants indicated that they had participated in some type of information fluency training. Of those participants who indicated they had participated in a type of information fluency training, 77% had participated within the last six months and 23% had participated in the training more than six months ago. Those participants who had participated in information fluency training did not have significantly less trust in the Web than those participants who had not completed information fluency training, $t(259) = 0.642, p = .521$. Participants who had completed some type of information fluency training reported an average level of trust in the Web of 3.43 ($SD = 0.99$) while participants who had not completed some type of information fluency training reported an average level of trust in the Web of 3.51 ($SD = 1.04$).

In the post-experiment questionnaire, 15% of participants indicated they had heard of at least one treatment described in the web pages presented during the experiment. Of those who had heard of at least one experimental treatment, the most common were salt and vitamin C, magnesium, and hyperbaric therapy. Fourteen percent of participants reported that they had considered using at least one of the treatments described in the web pages they viewed during the experiment. Of those who reported they had considered using a treatment

described in the web pages, salt and vitamin C was the most common with 28 participants indicating they had considered using the treatment.

Only nine participants reported that they had previously visited any of the websites used to obtain the web pages used during the experiment. Four participants reported they had visited rapidrecoveryhyperbarics.com (Hyperbarics), and five participants each reported having visited Health World (Coenzyme Q10) and Lymepotos.com (Salt and Vitamin C).

Motivation Manipulation Check

Participant motivation was analyzed using a validated measure for motivation for Web information use (Dutta-Bergman, 2004). The measure has three subscales: article involvement (Cronbach's $\alpha = .94$), website involvement (Cronbach's $\alpha = .94$), and article readership (how closely the participant read the article on the website). Participants high on all three subscales are assumed to have had a higher level of involvement and spent more cognitive effort in their analysis and use of the information contained on a web page than participants low on all three subscales. The motivation measure consists of the final nine items on the Article Opinion Questionnaire (see Appendix C), with items 20 – 23 measuring article involvement, items 24 – 27 measuring website involvement, and item 28 measuring article readership. All responses to items were obtained using a Likert-type scale ranging from 1 to 6. Total scores were calculated by adding the three subscale scores.

Participants in the low motivation condition reported a moderately high level of overall motivation, $M = 3.51$, $SD = 1.04$. Participants in the high motivation condition also reported a moderately high level of overall motivation, $M = 3.77$, $SD = 0.98$. There was a significant difference in overall average motivation level between the low and high motivation groups, $t(261) = -2.16$, $p = .031$, $d = .27$.

Tests of Hypotheses

The data collected in Experiment 2 provided for an examination of Hypotheses 4, 5, 6, and 7. The data showed no evidence of skewness, kurtosis, or outliers. Therefore, no transformations were conducted on the data set. All analyses were completed with alpha set to .05 unless otherwise indicated. Bonferroni corrections were applied to all post-hoc pairwise tests. Table 10 gives the means, standard deviations, and correlations among the variables investigated in Hypotheses 4, 5, 6, and 7.

A 2(Amount) x 3(Type) x 2(Motivation Level) mixed between-within ANOVA was conducted to examine Hypothesis 4, that the influence of audience feedback on credibility ratings would lessen for the high motivation group. The hypothesis that a high level of motivation would lessen the impact of audience feedback on credibility scores was not supported. There was no interaction between type of audience feedback and motivation level, $F(2, 502) = .515, p = .598$. Observed power for this test was .135. Figure 11 gives the mean credibility ratings given by the motivation groups for each type of audience feedback. There was also no interaction between the size of the audience giving feedback and motivation level, $F(1, 251) = .030, p = .863$. Observed power for this test was .053. Finally, there was no three way interaction between type and amount of feedback by motivation level, $F(2, 502) = 0.145, p = .865$. The observed power for this test was .072.

Hypothesis 5, that participants high in motivation would use more of the elements in Table 1 when making their credibility assessments during the experiment than participants low in motivation, was not supported. There was no significant difference between the low and high motivation groups in the number of self-reported elements used when determining credibility, $t(261) = -1.69, p = .091$. The low motivation group reported using seven elements on average when determining the credibility of the web pages they viewed in the experiment

Table 10. *Table of means, standard deviations, and correlations among the study variables in Experiment 2*

	M	SD	Number of elements used to determine credibility	Used type of audience feedback	Used size of audience	Average motivation score	Average audience opinion deviation score	Average credibility rating
Number of elements used to determine credibility	7.40	3.77	-	.082	.092	.239**	-.088	.003
Used type of audience feedback	0.35	0.48		-	.702**	-.138*	-.043	-.019
Used size of audience	0.34	0.48			-	-.028	.009	.101
Average motivation score	3.64	1.02				-	.083	.307**
Average audience opinion deviation score	1.64	0.48					-	-.096
Average credibility rating	3.36	0.80						-

** - significant at the .01 level

* - significant at the .05 level

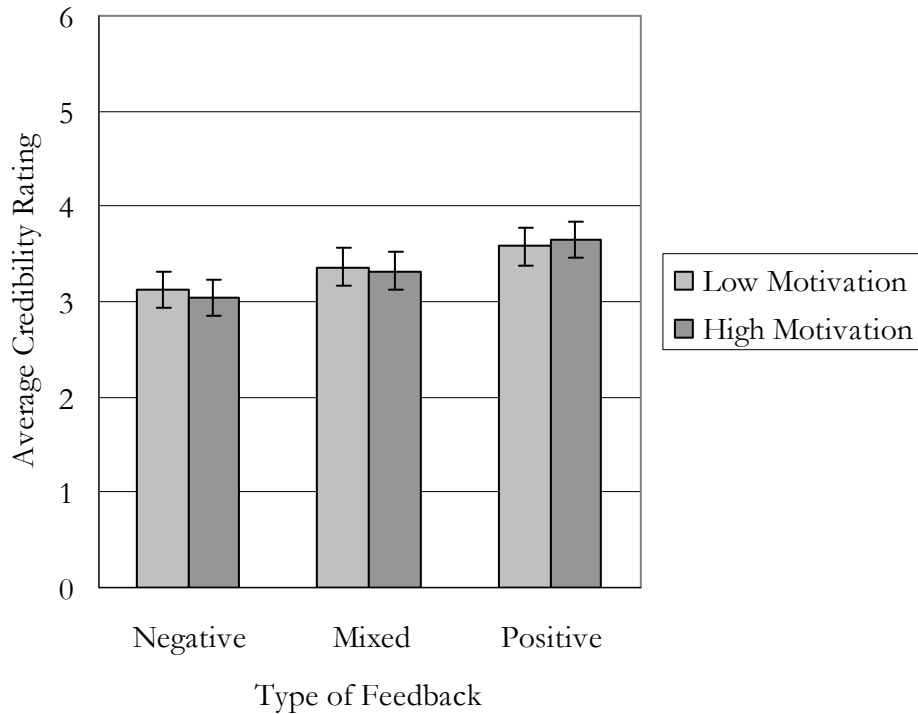


Figure 11. Average credibility rating by type of feedback and motivation level in Experiment

2

($SD = 3.72$), while the high motivation group reported using eight elements on average when determining the credibility of the web pages they viewed in the experiment ($SD = 3.79$).

Hypothesis 6, that members of the high motivation group would be less likely to report using audience feedback when making their assessments about credibility, was not supported. Members of the low motivation group were not more likely to report using either whether audience members liked the web page, $\chi^2(1, N = 263) = .115, p = .417$, or the number of audience members responding, $\chi^2(1, N = 263) = .092, p = .431$, when assessing the credibility of the web pages they viewed in the experiment. Seventeen percent of participants in the high motivation condition and 19% of participants in the low motivation

condition reported using whether audience members liked the web page in their assessments of web page credibility. Seventeen percent of participants in the low motivation condition and 18% of participants in the high motivation condition reported using how many audience members responded in their assessments of web page credibility

To examine Hypothesis 7, average audience deviation scores were calculated for each participant using the method described in the pilot study. As the credibility scale changed from the pilot study to be anchored by 1 and 6, the audience's opinion was re-calculated by multiplying the number of audience members giving a negative opinion by 1 and multiplying the number of audience members giving a positive opinion by 6. These two numbers were then added and divided by the total size of the audience to generate an overall audience opinion. Audience opinion in the negative feedback condition was 1.5, audience opinion in the mixed feedback condition was 3.5, and audience opinion in the positive feedback condition was 5.5.

The audience's opinion on each type of feedback was then subtracted from each participant's credibility score for that type of feedback to provide an indication of deviation from the audience's opinion. Participants with a negative deviation score on a page rated the page more negatively than the audience's opinion on that page, while participants with a positive deviation score on a page rated the page more positively than the audience's opinion on that page. Scores close to zero indicated overall agreement with the audience's opinion. An average deviation score was calculated for each participant for the six audience feedback conditions. The absolute value of negative deviation scores was taken prior to averaging (Tabachnick & Fidell, 2001).

Hypothesis 7, that participants in the high motivation condition would deviate more from the audience opinion than participants in the low motivation condition, was not

supported. There was no significant difference in average audience deviation scores between the low and high motivation groups, $t(251) = 1.16, p = .247$. Participants in the low motivation group deviated an average of 1.6 points ($SD = 0.47$) from the audience's opinion while participants in the high motivation group deviated an average of 1.6 points ($SD = 1.60$) from the audience's opinion. Overall, both groups appeared to have a relatively high level of agreement with the opinion expressed by the audience through the feedback presented on the web pages presented during the experiment.

Additional Analyses

The data set from Experiment 2 was used to examine whether there might be gender or expertise differences in the use of audience feedback to assess credibility. A 3 (Type) x 2 (Amount) x 2 (Gender) mixed between-within ANOVA was used to examine gender differences in credibility ratings by audience feedback type. There was not a significant main effect of gender, $F(1, 251) = .019, p = .889$. Male and female participants did not significantly differ on the credibility ratings they gave to web pages during the experiment, $t(249) = .001, p = .999$. Males gave the web pages they viewed an average credibility rating of 3.36 ($SD = .747$) while females gave the web pages an average credibility rating of 3.36 ($SD = .843$).

There was no significant interaction between type of audience feedback and gender, $F(2, 502) = 0.378, p = .686$. Males in the experiment gave a web page with negative feedback an average credibility rating of 3.11 ($SD = 1.08$), a page with mixed feedback a 3.31 ($SD = 1.14$), and a page with positive feedback a 3.59 ($SD = 1.07$). Females in the experiment gave a web page with negative feedback an average credibility rating of 3.05 ($SD = 1.07$), a page with mixed feedback a 3.37 ($SD = 1.13$), and a page with positive feedback a 3.63 ($SD =$

1.07). Figure 12 depicts the average credibility rating given to each of the audience feedback types by male and female participants in the study.

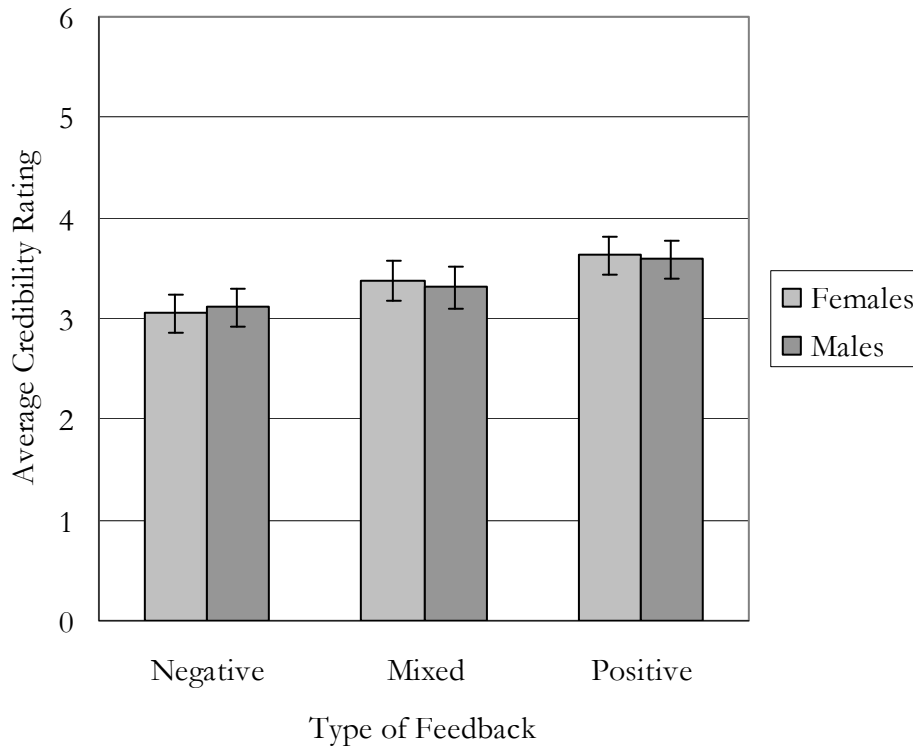


Figure 12. Average credibility rating for each type of audience feedback by gender

The ten physicians that determined the accuracy of the experimental web pages also participated in Experiment 2. Their data provides for a preliminary examination of the impact of audience feedback on credibility ratings under conditions of expertise and non-expertise. Ten randomly selected non-expert students who participated in Experiment 2 were used as the comparison sample for this analysis.

The medical doctors significantly differed from the students in familiarity with Lyme disease, $t(17) = -2.98, p = .008, d = 1.49$. The doctors reported an average level of familiarity with Lyme disease of 4.22 ($SD = 0.83$) on a scale of 1 to 6, while the students reported an

average level of familiarity of 2.40 ($SD = 1.64$). The doctors also significantly differed from the students in the number of elements they used to determine the credibility of the web pages they viewed during the experiment, $t(17) = 2.09, p = .051, d = 1.02$. The doctors reported using an average of five ($SD = 2.05$) elements to determine the credibility of the web pages they viewed while the students reported using an average of eight ($SD = 4.01$) elements.

A 4 (Type) x 2 (Amount) x 2 (Expert/Non-Expert) mixed between-within ANOVA was conducted to examine whether the students (non-experts) would be more influenced by audience feedback than the medical doctors (experts). There was a main effect of expertise, $F(1, 18) = 23.86, p < .0001, d = 2.33$, with the medical doctors giving a web page an average credibility rating of 1.68 ($SD = 0.24$) and the students giving a web page an average credibility rating of 3.35 ($SD = 0.24$). Partial η^2 for this test was .562 and observed power was .995. There was no interaction between type of feedback and expertise level, $F(3, 54) = .218, p = .883$. There was also not an interaction between audience size, audience feedback type, and expertise level, $F(3, 54) = .842, p = .497$. Figure 13 depicts the average credibility ratings given for each audience feedback type for experts and non-experts.

Experts and non-experts also appeared to differ in the treatment they chose. Experts most often chose coenzyme Q10 as their method of treatment (40%), followed by silver protein (20%) and hyperbaric therapy (20%). Non-experts also most often chose coenzyme Q10 as their method of treatment (40%). However, the next most frequently chosen treatments were the Marshall protocol (20%) and magnesium (20%).

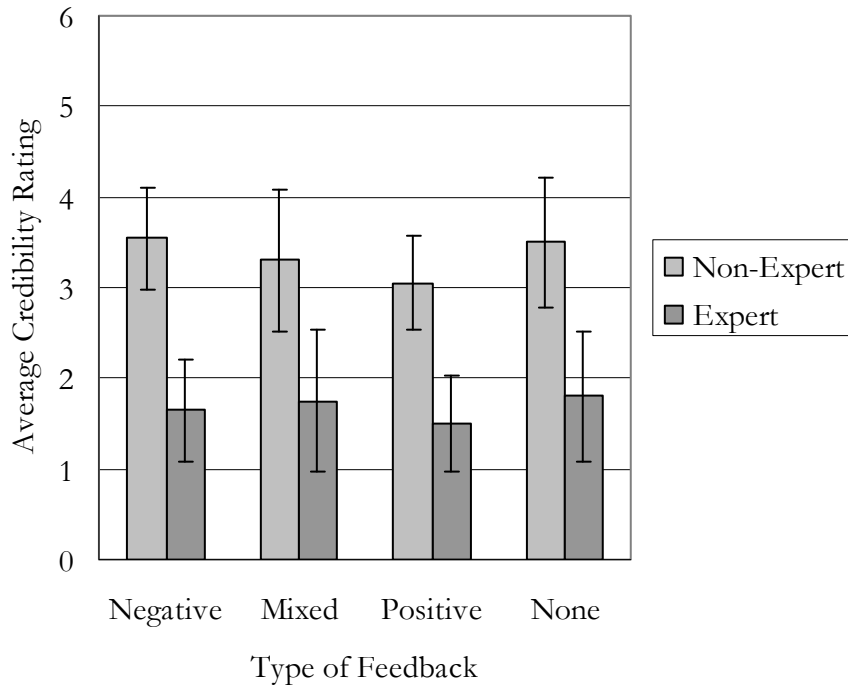


Figure 13. Average credibility rating for each type of audience feedback by expertise level

CHAPTER FIVE: DISCUSSION

The results of the experiments provided support for some of the experimental hypotheses but not for others. Hypothesis 1, that type of audience feedback would affect credibility ratings, was supported. The results of Experiment 1 suggest that the overall direction of audience feedback presented on a page (e.g., positive, mixed, or negative) can impact assessments of web page credibility. There appear to be particularly strong effects for positive and negative feedback, with the difference in average credibility ratings being greatest when comparing positive and negative feedback.

The remaining hypotheses were not supported by the results of Experiments 1 and 2. The size of the audience that has given feedback on a web page does not appear to impact viewer assessments of credibility, nor does it modify the overall effect of type of feedback. Treatment choice does not appear to be impacted by audience feedback on the treatments. Participants were not more likely to select treatments that had been given positive feedback. However, the results of the study do suggest that participants' overall assessment of credibility may influence treatment decision as treatments from web pages that received the highest credibility ratings were selected most often.

Participant motivation impacted the likelihood of use of audience opinion in ways not predicted by the experimental hypotheses. High motivation did not increase deviation from the audience's opinion, reduce the effect of type of feedback on credibility assessments, or decrease the likelihood that a participant would report using audience feedback use in making their assessments. High motivation also did not increase the average number of page elements that participants used when making assessments about credibility in comparison to participants with low motivation.

It was hypothesized that participants under high levels of motivation would evaluate the credibility of the web pages in the experiment using a spectral process, with many web page elements being used to assess credibility. In particular, it was hypothesized that audience feedback would be less influential, if used at all, during a spectral assessment where many web page elements are examined to determine credibility since more important source and message characteristics would possibly act to override the impact of audience feedback. However, the results of the study suggest that audience feedback can impact credibility assessments even under conditions of high motivation.

Implications for the Design of Web Pages

Several considerations for the design of audience feedback can be gleaned from the results of this study. Firstly, it appears that audience feedback can act as a potential heuristic for web page credibility (Metzger, Flanagin, & Medders, in press). Web page designers may want to facilitate use of an audience feedback heuristic in the case of product review or entertainment news websites and discourage the use of an audience feedback heuristic in the case of more consequential information such as what might be found on an educational or health website. To facilitate the use of an audience feedback heuristic, web page designers might place audience ratings of information close to the top left of the web page or very close to the heading of the article. These web page locations have been shown to be among the first that are scanned by a viewer after arriving on a web page (Nielsen, 2006). Similarly, a web page designer can decrease the impact of audience feedback by moving it further down the web page so that the article and other content on the page is likely to be encountered prior to viewing the audience feedback.

Also, for audience feedback to be able to serve as a heuristic for credibility it must be quickly and easily understood by viewers. Evidence that audience feedback might be a type of heuristic cue was evidenced in this study by the fact that feedback type, and not amount, had an impact on credibility assessments. Additional information such as the number of audience members, or the characteristics of the audience responding, may not be processed by readers who use this information. In addition, the number of audience members responding may not be attended to by readers if they are aware that each audience member can respond multiple times. Ease of use issues should also be paramount. By ensuring that users can rate information using only one click (i.e., not requiring registration) and by immediately updating the feedback on the web page, site owners can ensure that the greatest range of audience opinions are expressed in the audience feedback ratings (Bergstrom, 2008).

Although web page designers often have little influence over the actual ratings that are left on a web page, some additional information may increase or decrease the impact of the audience feedback. Information about who has given feedback produces a “nested credibility” situation, where the credibility of the responders themselves must also be assessed. Dependent upon the perceived credibility of the audience members, this additional information may make the impact of audience feedback either stronger or weaker.

While most types of audience feedback currently in use on the Web are fairly simple, one could imagine much more complex systems that take into account responder reputation (e.g., recommender ratings on sites like Amazon.com and on online forums). These types of systems are being integrated on more websites as the interest in ranking information on the Web using forms of audience feedback increases (Cashmore, 2010). Social information distribution sites such as Digg.com not only provide audience feedback in terms of how

many users have recommended an article, but also rank order web pages by the amount of recommendations received so that the most recommended pages remain at the top of search results. In this case, audience feedback impacts not only the information appraisal component of the information search process, but also the search and information retrieval component (see Figure 1).

Information Search Process and Information Appraisal Model Impacts

Based on the results of the Experiments 1 and 2, audience feedback should be added to the list of known factors that can influence the credibility of information sources (Table 1), as well as considered to be a component of the credibility establishment process of Information Appraisal (IA) (Figure 3). While the experiments provide support for the addition of an audience characteristics component to the credibility determination model, it is not yet known exactly how audience factors may interact, or not interact, with the other components in the Information Search Process (ISP) model (Figure 1). In the present set of studies, the audience component appeared to provide a relatively small impact on the perception of overall credibility. However, the factors in Table 1 may interact such that audience feedback is able to influence the perception of other factors in the model, such as source or message characteristics. Thus, audience feedback may act to influence credibility through increasing perception of accuracy or objectivity, for example.

As a next step, the integration of audience factors and the other factors listed in Table 1 into an overall model of credibility formation would be beneficial to the research community and would provide numerous research questions to be explored. Following development of a model of credibility formation, this model can be integrated into the models of Information Appraisal (Figure 3) and the model of the Information Search

Process (Figure 1) to allow for a more thorough examination of how trust develops from credibility and how the surrounding context of the information search process influences reliance on the different components of credibility.

Directions for Future Research

Future research should examine components of audience feedback that were not examined in the present study. The impact of non-anonymous audience feedback and different methods of presenting audience feedback are prime candidates for investigation. Knowledge about the audience that has provided information ratings may greatly impact likelihood of use of that feedback to assess credibility. For example, knowledge that the feedback has been provided by experts may increase likelihood of the use of the feedback while knowing that the feedback has been provided by non-experts may decrease the likelihood of the use of the feedback (Hof, 2009).

There is a current trend on the Web of linking information about website and article use with social networking tools (Newman 2010; Sutter, 2010; Tynan, 2010). This can let users know who among and outside of their social network has viewed or recommended a website or article. Receiving recommendations or feedback from those within your social network is likely to have a very different impact on perceived credibility than feedback from anonymous individuals. Specifically, it may increase the impact of audience feedback on credibility by decreasing the need to simultaneously assess recommender credibility (Byerly & Brodie, 2005; Deutsch & Gerard, 1955; Fogg & Tseng, 1999). In addition, audience feedback information that is highly influential and consequential to readers, such as the names of friends who provided positive or negative feedback, may succeed in capturing their

attention and increase the likelihood that the audience feedback will be used in assessments of credibility.

Only one type of audience feedback was examined in the current study. However, there are several different methods that are currently used to present audience feedback to viewers of Web content. Presenting audience feedback in non-binary ways including star ratings, typically on a scale of 1 to 5, is more common on commercial and product review websites. Audience feedback can also be given through text comments or product reviews that can be more difficult for the user to consolidate into an overall audience rating, but that typically are more detailed than a set of rating icons. Use of text-type feedback might be moderated by the motivation of the user, as it requires more cognitive processing to understand the feedback and relies on their ability to understand the feedback through some level of knowledge about the topic.

There is a need to further examine the impact of expertise, gender, and age on the likelihood of using audience feedback in credibility assessments. The present study suggests that audience feedback does not play a role in credibility assessments for experts in the topic. Audience feedback may still play a role for material the individual does not have expertise in. Gender differences in the use of audience feedback may be more evident for different topic domains and may also interact with individual expertise in a topic. In addition, future research should examine age-related differences in the likelihood of using audience feedback to assess credibility.

There are some limitations to the present research that should be addressed in future studies on audience feedback and credibility. The study examined only one domain: that of health websites. Audience feedback might be more influential in other contexts, especially for commercial websites where readers are making immediate product purchase decisions or

reading reviews in anticipation of a purchase. Audience feedback on a commercial website represents approval or disapproval of the concrete item or service for sale, as opposed to a reaction about the information on the website, and thus might be viewed as less subjective and, therefore, more likely to be used by readers in evaluating both the product and the website. Audience feedback might also be more likely to be used to determine the credibility of non-consequential information such as entertainment news or the quality of online videos or games.

Also, in the present study participants only viewed each web page for 60 seconds. While this presentation rate is representative of the majority of Web search behavior, it is likely that allowing participants to view web pages for a longer time period will reduce the impact of audience feedback on perceptions of credibility as they would be better able to evaluate components of credibility that require more time to assess (e.g., objectivity, accuracy). However, if participants view the web pages for a shorter time period they may be more likely to use heuristics, such as audience feedback, to quickly assess credibility.

Audience feedback is likely to continue to become a commonplace feature on the Web. It is important for future research to expand upon the work presented here to examine ways in which audience feedback influences perceptions of credibility and ways in which it can influence subsequent use of that information within the context of the information search process. As social networks migrate onto the Web, the social component of information use will become increasingly important. The experiments conducted in this dissertation provide a starting point for future research on this important topic.

APPENDIX A: HUMAN SUBJECTS APPROVAL FORM



University of Central Florida Institutional Review Board
Office of Research & Commercialization 12201
Research Parkway, Suite 501 Orlando, Florida 32826-
3246 Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Exempt Human Research

From: **UCF Institutional Review Board #1 FWA00000351, IRB00001138**

To: **Katherine V. DelGiudice**

Date: **December 03, 2009**

Dear Researcher:

On 12/3/2009, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review: Exempt Determination Project Title: An investigation of the factors involved in the use of Web-based information Investigator: Katherine V. DelGiudice
IRB Number: SBE-09-06572 Funding Agency: Grant Title: Research ID: N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Joseph Bielitzki, DVM, UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 12/03/2009 11:39:34 AM EST

A handwritten signature in black ink that reads 'Joanne Muratori'.

IRB Coordinator

APPENDIX B: EXPERIMENT CONSENT FORM



EXPLANATION OF RESEARCH

Title of Project: An investigation of factors involved in the use of Web-based information

Principal Investigator: Katherine Del Giudice

Faculty Supervisor: Dr. Peter Hancock

IRB Approval Number: SBE-09-06572

You are being invited to take part in a research study. Whether you take part is up to you.

The purpose of this research is to examine how people use information provided on the Web. During the study you will be shown several websites and asked to rate each website on several criteria. You will also complete several questionnaires. This research will take place entirely online using your home computer at a time convenient to you.

It is expected that your participation in this research study will take approximately 30 - 40 minutes.

You must be 18 years of age or older to take part in this research study.

If you are participating using the Psychology Department's Sona Systems recruitment system you will be issued 0.5 hours of course credit following participation in the study.

Contact for questions about the study or to report a problem: If you have questions, concerns, or complaints please contact Katherine Del Giudice by phone at (407) 275-9289 or by email at katherined@knights.ucf.edu.

IRB contact about your rights in the study or to report a complaint: Research at the University of Central Florida involving human participants is carried out under the oversight of the Institutional Review Board (UCF IRB). This research has been reviewed and approved by the IRB. For information about the rights of people who take part in research, please contact: Institutional Review Board, University of Central Florida, Office of Research & Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246 or by telephone at (407) 823-2901.

I certify that I am 18 years of age or older

APPENDIX C: EXPERIMENT QUESTIONNAIRES

Demographics Questionnaire

Please answer the following questions as they relate to you

1) Gender _____ Male _____ Female

2) Age: _____

3) Rate your level of Internet/Web experience

Low Experience	1	2	3	4	5	6	High Experience
-------------------	---	---	---	---	---	---	--------------------

4) How many years have you used the Internet/Web? _____

5) Approximately how many hours per day do you typically use the Internet/Web?

Credibility Rating Form

How credible (believable) is the information on the web page you just viewed?

Not at all credible	1	2	3	4	5	6	Highly credible
---------------------------	---	---	---	---	---	---	--------------------

Article Opinion Questionnaire

Please rate the web page you just viewed on the following characteristics.

I perceived the web page's information to be:

1) Believable

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
-------------------	---	---	---	---	---	---	----------------

2) Accurate

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
-------------------	---	---	---	---	---	---	----------------

3) Objective/Unbiased

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
-------------------	---	---	---	---	---	---	----------------

4) Complete

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
-------------------	---	---	---	---	---	---	----------------

5) Commercial

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
-------------------	---	---	---	---	---	---	----------------

6) Current

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
-------------------	---	---	---	---	---	---	----------------

7) Personalized

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
-------------------	---	---	---	---	---	---	----------------

8) How beautiful was the web page you just viewed?

Not at all beautiful	1	2	3	4	5	6	Very beautiful
----------------------	---	---	---	---	---	---	----------------

9) The site would be easy to use

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
-------------------	---	---	---	---	---	---	----------------

10) The author of the web page could be considered an expert on the topic

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
-------------------	---	---	---	---	---	---	----------------

11) I had an overall favorable reaction to the message contained in the web page

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
-------------------	---	---	---	---	---	---	----------------

12) The web page was slow to load

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
-------------------	---	---	---	---	---	---	----------------

13) The web page used evidence to make its point

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
-------------------	---	---	---	---	---	---	----------------

14) The writing style on the web page was easy to understand

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
-------------------	---	---	---	---	---	---	----------------

15) I feel that the author of the information thinks like me

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
-------------------	---	---	---	---	---	---	----------------

16) The argument given for the treatment described in the web page was

Very Weak	1	2	3	4	5	6	Very Strong
-----------	---	---	---	---	---	---	-------------

17) My thoughts in response to the message were

Very Negative	1	2	3	4	5	6	Very Positive
---------------	---	---	---	---	---	---	---------------

18) The confidence I have in regards to my thoughts about the message is

Very Low	1	2	3	4	5	6	Very High
----------	---	---	---	---	---	---	-----------

19) I trust the information contained in the message

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
-------------------	---	---	---	---	---	---	----------------

20) I tried hard to evaluate the communication

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
-------------------	---	---	---	---	---	---	----------------

21) I thought a lot about the arguments in the message

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
-------------------	---	---	---	---	---	---	----------------

22) I spent a lot of effort evaluating the arguments

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
----------------------	---	---	---	---	---	---	-------------------

23) I put a lot of effort into evaluating the communication

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
----------------------	---	---	---	---	---	---	-------------------

24) I put a lot of effort into evaluating the site

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
----------------------	---	---	---	---	---	---	-------------------

25) I was highly involved in evaluating the site

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
----------------------	---	---	---	---	---	---	-------------------

26) I tried hard to evaluate the information on the site

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
----------------------	---	---	---	---	---	---	-------------------

27) I thought a lot about the arguments presented in the article on the site

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
----------------------	---	---	---	---	---	---	-------------------

28) I read the article presented on the site very thoroughly

Strongly Disagree	1	2	3	4	5	6	Strongly Agree
----------------------	---	---	---	---	---	---	-------------------

Treatment Decision Recording Form

Based on the information from the web pages I just viewed, if I had to make a decision from just this information I would choose to treat my recently diagnosed Lyme disease with (choose **ONE**):

	Cat's Claw/Samento Herbal Supplement
	Salt and Vitamin C
	Mild Silver Protein
	High Pressure Oxygen (Hyperbaric) Therapy
	The Marshall Protocol
	Coenzyme Q10
	Miracle Mineral Supplement (MMS)
	Magnesium Treatment

Post-experiment Questionnaire

1) How familiar are you with Lyme disease?

Not at all familiar	1	2	3	4	5	6	Highly familiar
---------------------	---	---	---	---	---	---	-----------------

2) Have you ever heard of any of the treatments described in the websites you viewed during the experiment? _____ Yes _____ No

3) If you answered yes to question 2, which treatments have you heard of? (Check all that apply)

<input type="checkbox"/>	Cat's Claw/Samento Herbal Supplement
<input type="checkbox"/>	Salt and Vitamin C
<input type="checkbox"/>	Mild Silver Protein
<input type="checkbox"/>	High Pressure Oxygen (Hyperbaric) Therapy
<input type="checkbox"/>	The Marshall Protocol
<input type="checkbox"/>	Coenzyme Q10
<input type="checkbox"/>	Miracle Mineral Supplement (MMS)
<input type="checkbox"/>	Magnesium Treatment

4) Have you considered using any of the treatments described in the websites you viewed during the experiment? _____ Yes _____ No

5) If you answered yes to question 4, which treatments have you considered using? (Check all that apply)

<input type="checkbox"/>	Cat's Claw/Samento Herbal Supplement
<input type="checkbox"/>	Salt and Vitamin C
<input type="checkbox"/>	Mild Silver Protein
<input type="checkbox"/>	High Pressure Oxygen (Hyperbaric) Therapy
<input type="checkbox"/>	The Marshall Protocol

	Coenzyme Q10
	Miracle Mineral Supplement (MMS)
	Magnesium Treatment

6) Have you previously visited any of the websites or web pages you viewed in the experiment?

_____ Yes _____ No

7) If you answered yes to question 7, which websites/web pages have you previously visited?

	Healthynewage.com
	Lymepotos.com
	Lyme Disease (vrp.com)
	Rapid Recovery Hyperbarics
	Planet Thrive
	Health World
	BioMed/Lyme Book
	Lyme Info

8) Rate your level of trust in the Internet/Web

Low Trust	1	2	3	4	5	6	High Trust
-----------	---	---	---	---	---	---	------------

9) Which of the following did you use when determining the credibility of the web pages **you just viewed** during the experiment? Check as many as apply.

	The web page's author's credentials
	The domain of the web page (.com, .org, etc.)
	The web page's affiliation
	My prior experience with the web page/website
	The similarity of the web page or web page author to myself
	The writing style of the web page
	The completeness of the web page's content

	The accuracy of the web page's content
	How objective the web page was
	How strong the argument for the treatment was
	My trust in the Internet/Web
	The physical design of the web page
	How easy I thought the website/web page would be to use
	How fast the web page downloaded/displayed
	My familiarity with Lyme disease
	My prior Internet experience
	The fact that I had previously heard of the treatment described on the web page
	The fact that I had previously used the treatment described on the web page
	My thoughts and feelings about the web page
	Whether prior viewers liked the web page
	How many prior viewers liked the web page

10) Rate the following on **how important** they were when determining the credibility of the web pages you viewed during the experiment you just completed.

a) The web page author's credentials

Not at all important	1	2	3	4	5	6	Very Important
----------------------	---	---	---	---	---	---	----------------

b) The domain of the web page (.com, .org, etc.)

Not at all important	1	2	3	4	5	6	Very Important
----------------------	---	---	---	---	---	---	----------------

c) The web page's affiliation

Not at all important	1	2	3	4	5	6	Very Important
----------------------	---	---	---	---	---	---	----------------

d) My prior experience with the web page/website

Not at all important	1	2	3	4	5	6	Very Important
----------------------	---	---	---	---	---	---	----------------

e) The similarity of the web page or web page author to myself

Not at all important	1	2	3	4	5	6	Very Important
----------------------	---	---	---	---	---	---	----------------

f) The writing style of the web page

Not at all important	1	2	3	4	5	6	Very Important
----------------------	---	---	---	---	---	---	----------------

g) The completeness of the web page's content

Not at all important	1	2	3	4	5	6	Very Important
----------------------	---	---	---	---	---	---	----------------

h) The accuracy of the web page's content

Not at all important	1	2	3	4	5	6	Very Important
----------------------	---	---	---	---	---	---	----------------

i) How objective the web page was

Not at all important	1	2	3	4	5	6	Very Important
----------------------	---	---	---	---	---	---	----------------

j) How strong the argument for the treatment was

Not at all important	1	2	3	4	5	6	Very Important
----------------------	---	---	---	---	---	---	----------------

k) My trust in the Internet/Web

Not at all important	1	2	3	4	5	6	Very Important
----------------------	---	---	---	---	---	---	----------------

l) The physical design of the web page

Not at all important	1	2	3	4	5	6	Very Important
----------------------	---	---	---	---	---	---	----------------

m) How easy I thought the website/web page would be to use

Not at all important	1	2	3	4	5	6	Very Important
----------------------	---	---	---	---	---	---	----------------

n) How fast the web page downloaded/displayed

Not at all important	1	2	3	4	5	6	Very Important
----------------------	---	---	---	---	---	---	----------------

o) My familiarity with Lyme disease

Not at all important	1	2	3	4	5	6	Very Important
----------------------	---	---	---	---	---	---	----------------

p) My prior Internet/Web experience

Not at all important	1	2	3	4	5	6	Very Important
----------------------	---	---	---	---	---	---	----------------

q) The fact that I had previously heard of the treatment described on the web page

Not at all important	1	2	3	4	5	6	Very Important
----------------------	---	---	---	---	---	---	----------------

r) The fact that I had previously used the treatment described on the web page

Not at all important	1	2	3	4	5	6	Very Important
----------------------	---	---	---	---	---	---	----------------

s) My thoughts and feelings about the web page

Not at all important	1	2	3	4	5	6	Very Important
----------------------	---	---	---	---	---	---	----------------

t) Whether prior viewers liked the web page

Not at all important	1	2	3	4	5	6	Very Important
----------------------	---	---	---	---	---	---	----------------

u) How many prior viewers liked the web page

Not at all important	1	2	3	4	5	6	Very Important
----------------------	---	---	---	---	---	---	----------------

11) Have you ever used a ratings tool on a web page to rate the information you read on a website?

_____ Yes _____ No

12) Were you born in or have you ever lived in the Northeastern United States (Maine, Vermont, New Hampshire, Massachusetts, New York, Connecticut, New Jersey, Pennsylvania, Rhode Island, Delaware, Maryland)?

_____ Yes _____ No

13) Were you born in or have you ever lived in Wisconsin or Minnesota?

_____ Yes _____ No

14) Have you ever participated in any training or classroom exercises related to information literacy/fluency or learning how to critically evaluate information you find on the Web?

_____ Yes _____ No

15) If you answered yes to question 14, how long ago did you complete the training?

_____ less than 6 months ago

_____ more than 6 months ago

16) Provide a one or two sentence description about what you think this study is investigating.

17) Did you experience any problems when using this experiment website? If so, please describe them so we can correct the problem for future participants.

Need for Approval/Social Desirability Scale

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is *true* or *false* as it pertains to you personally.

- 1) Before voting I thoroughly investigate the qualifications of all the candidates (T/F)
- 2) I never hesitate to go out of my way to help someone in trouble. (T/F)
- 3) It is sometimes hard for me to go on with my work if I am not encouraged. (T/F)
- 4) I have never intensely disliked anyone. (T/F)
- 5) On occasion I have had doubts about my ability to succeed in life. (T/F)
- 6) I sometimes feel resentful when I don't get my way. (T/F)
- 7) I am always careful about my manner of dress. (T/F)
- 8) My table manners at home are as good as when I eat out in a restaurant. (T/F)
- 9) If I could get into a movie without paying and be sure I was not seen I would probably do it. (T/F)
- 10) On a few occasions I have given up on doing something because I thought too little of my ability. (T/F)
- 11) I like to gossip at times. (T/F)
- 12) There have been times when I felt like rebelling against people in authority even though I knew they were right. (T/F)
- 13) No matter who I'm talking to, I'm always a good listener. (T/F)
- 14) I can remember "playing sick" to get out of something. (T/F)
- 15) There have been occasions when I took advantage of someone. (T/F)
- 16) I am always willing to admit it when I make a mistake. (T/F)
- 17) I always try to practice what I preach. (T/F)
- 18) I don't find it particularly difficult to get along with loud mouthed, obnoxious people. (T/F)
- 19) I sometimes try to get even rather than forgive and forget. (T/F)
- 20) When I don't know something I don't at all mind admitting it. (T/F)
- 21) I am always courteous, even to people who are disagreeable. (T/F)
- 22) At times I have really insisted on having thing my own way. (T/F)
- 23) There have been occasions when I felt like smashing things. (T/F)

- 24) I would never think of letting someone else be punished for my wrongdoings. (T/F)
- 25) I never resent being asked to return a favor. (T/F)
- 26) I have never been irked when people expressed ideas very different from my own. (T/F)
- 27) I never make a long trip without checking the safety of my car. (T/F)
- 28) There have been times when I was quite jealous of the good fortune of others. (T/F)
- 29) I have almost never felt the urge to tell someone off. (T/F)
- 30) I am sometimes irritated by people who ask favors of me. (T/F)
- 31) I have never felt that I was punished without cause. (T/F)
- 32) I sometimes think when people have a misfortune they only got what they deserved.
(T/F)
- 33) I have never deliberately said something that hurt someone's feelings. (T/F)

Locus of Control Scale

Please read each statement. Where there is a blank, decide what your normal attitude, feeling, or behavior would be and write the corresponding letter into the blank. Of course, there are always unusual situations in which this would not be the case, but think of what you would do or feel in most normal situations.

A	B	C	D	E
Rarely	Occasionally	Sometimes	Frequently	Usually
(less than 10% of the time)	(about 30% of the time)	(about half the time)	(about 70% of the time)	(more than 90% of the time)

- 1) When faced with a problem, I ____ try to forget it.
- 2) I ____ need frequent encouragement from others for me to keep working at a difficult task.
- 3) I ____ like jobs where I can make decisions and be responsible for my own work.
- 4) I ____ change my opinion when someone I admire disagrees with me.
- 5) If I want something I ____ work hard to get it.
- 6) I ____ prefer to learn the facts about something from someone else rather than have to dig them out for myself.
- 7) I will ____ accept jobs that require me to supervise others.
- 8) I ____ have a hard time saying “no” when someone tries to sell me something I don’t want.
- 9) I ____ like to have a say in any decisions made by any group I’m in.
- 10) I ____ consider the different sides of an issue before making any decisions.
- 11) What other people think ____ has a great influence on my behavior.
- 12) Whenever something good happens to me I ____ feel it is because I’ve earned it.
- 13) I ____ enjoy being in a position of leadership.
- 14) I ____ need someone else to praise my work before I am satisfied with what I’ve done.
- 15) I am ____ sure enough of my opinions to try and influence others.
- 16) When something is going to affect me I ____ try to learn as much about it as I can.

- 17) I ____ decide to do things on the spur of the moment.
- 18) For me, knowing I've done something well is ____ more important than being praised by someone else.
- 19) I ____ let other peoples' demands keep me from doing things I want to do.
- 20) I ____ stick to my opinions when someone disagrees with me.
- 21) I ____ do what I feel like doing not what other people think I ought to do.
- 22) I ____ get discouraged when doing something that takes a long time to achieve results.
- 23) When part of a group I ____ prefer to let other people make all the decisions.
- 24) When I have a problem I ____ follow the advice of friends or relatives.
- 25) I ____ enjoy trying to do difficult tasks more than I enjoy trying to do easy tasks.
- 26) I ____ prefer situations where I can depend on someone else's ability rather than just my own.
- 27) Having someone important tell me I did a good job is ____ more important to me than feeling I've done a good job.
- 28) When I'm involved in something I ____ try to find out all I can about what is going on even when someone else is in charge.

Evaluation Apprehension Scale

Read each of the following statements carefully and indicate how characteristics it is of you.

1) I worry about what other people will think of me even when I know it doesn't make any difference.

1	2	3	4	5
Not at all characteristic of me	Slightly characteristic of me	Moderately characteristic of me	Very characteristic of me	Extremely characteristic of me

2) I am unconcerned even if I know people are forming an unfavorable impression of me

1	2	3	4	5
Not at all characteristic of me	Slightly characteristic of me	Moderately characteristic of me	Very characteristic of me	Extremely characteristic of me

3) I am frequently afraid of other people noticing my shortcomings

1	2	3	4	5
Not at all characteristic of me	Slightly characteristic of me	Moderately characteristic of me	Very characteristic of me	Extremely characteristic of me

4) I rarely worry about what kind of impression I am making on someone

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely
characteristic of	characteristic of	characteristic of	characteristic of	characteristic of
me	me	me	me	me

5) I am afraid that others will not approve of me

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely
characteristic of	characteristic of	characteristic of	characteristic of	characteristic of
me	me	me	me	me

6) I am afraid that people will find fault with me

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely
characteristic of	characteristic of	characteristic of	characteristic of	characteristic of
me	me	me	me	me

7) Other people's opinions of me do not bother me

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely
characteristic of	characteristic of	characteristic of	characteristic of	characteristic of
me	me	me	me	me

8) When I am talking to someone, I worry about what they may be thinking about me

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely
characteristic of	characteristic of	characteristic of	characteristic of	characteristic of
me	me	me	me	me

9) I am usually worried about what kind of impression I make

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely
characteristic of	characteristic of	characteristic of	characteristic of	characteristic of
me	me	me	me	me

10) If I know someone is judging me, it has little effect on me

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely
characteristic of	characteristic of	characteristic of	characteristic of	characteristic of
me	me	me	me	me

11) Sometimes I think I am too concerned about what other people think of me

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely
characteristic of	characteristic of	characteristic of	characteristic of	characteristic of
me	me	me	me	me

12) I often worry that I will say or do the wrong things

1	2	3	4	5
Not at all	Slightly	Moderately	Very	Extremely
characteristic of	characteristic of	characteristic of	characteristic of	characteristic of
me	me	me	me	me

APPENDIX D: EXPERIMENT MATERIALS

Audience Rating Icons



High Negative Icon



Low Negative Icon



High Mixed Icon



Low Mixed Icon



High Positive Icon



Low Positive Icon



No Feedback Icon




Low Positive Practice – Used on the practice pages only



High Negative Practice – Used on the practice pages only

Web Pages Used in the Experiment



Health Enhancement | Medical Dictionary | Press Releases | Organizations For Assistance | Guestbook

- Home
- Mission
- Our Staff
- What is HBOT?
- FAQ
- Your Child & HBOT
- Brain S.P.E.C.T. Scans
- Testimonials/Pictures
- Living & Logistics Lodging/Map/Airport
- Suggested Reading
- Scheduling
- Client's Handbook
- HBOT Studies
- Contraindications
- Indications
- Disclaimer

Legal Disclaimer



The content and information provided within this site is for informational and educational purposes only. Consult a doctor before pursuing any form of therapy, including Hyperbaric Oxygen Therapy. The information provided within this site is not to be considered Medical Advice. In Full Support of the F.D.A., Hyperbaric Oxygen Therapy is considered Investigational, Experimental, or Off Label.

Please consult with your Treating Medical Physician

Research References

High Pressure Oxygen Offers Hope For Lyme Disease, Post-Polio Syndrome

Reader feedback for this article

 9995  10195

COLLEGE STATION—Breathing high-pressure oxygen may provide relief from the often-dripping symptoms of chronic Lyme disease and post-polio syndrome, medical researchers say.

Two weeks of treatment with hyperbaric or high-pressure, oxygen appears to provide relief — apparently often permanent — from the symptoms of chronic Lyme disease, researchers in Texas A&M University's Hyperbaric Laboratory told a meeting of the Southwest and Rocky Mountain Division of the American Association for the Advancement of Science Tuesday morning in College Station Tuesday (May 20).

Similar treatment with high-pressure oxygen appears to stave off muscle weakness, pain and stiffness associated with post-polio syndrome, a sometimes-dripping legacy of polio epidemics that swept the United States in the 1940s and 1950s, another Texas A&M hyperbaric researcher told the conference.

Student-researcher Alan T. Flanigan said a continuing study of people suffering from chronic Lyme disease suggests that hour-long doses of hyperbaric oxygen administered daily for two weeks will relieve the joint pain, neurologic symptoms and other complications of the tick-borne disease in most cases. Flanigan stopped short of claiming that the oxygen treatment cures Lyme disease, however.

The treatment relieves the symptoms of the disease, Flanigan said. He said the researchers suspect the oxygen may kill the *Borrelia burgdorferi* bacterium that causes Lyme disease, but current laboratory tests can't tell the difference between live bacteria and antibodies to those bacteria produced by the immune system.

Another student-researcher, David T. Walker, reported that treatment with high-pressure oxygen also relieves muscle weakness, pain and stiffness associated with post-polio syndrome, a condition that sometimes develops in people who contracted polio during epidemics of the 1940s and 1950s.

As many as 900,000 people in the United States are affected by post-polio syndrome.

Unlike the Lyme disease treatment, hyperbaric oxygen provides only temporary relief from post-polio syndrome, Walker said. Regular treatments must be continued or the symptoms reappear, he said. Many post-polio syndrome patients are able to resume almost normal activities, he said.

Physiologist William P. Fife, director of the Hyperbaric Laboratory, and physician Donald M. Freeman, Hyperbaric Laboratory medical director, supervise the Lyme disease and post-polio syndrome research.

Hyperbaric oxygen also is used to treat illnesses and injuries ranging from gas gangrene to skin ulcers, severely broken bones and, sometimes, so-called closed-head injuries. Treatment involves breathing pure oxygen while under the same pressure as SCUBA divers experience under 45 feet of water.


Lyme disease's early symptoms often include a circular rash surrounding the tick bite, fever, headache and nausea. It is often effectively treated with antibiotics, but some patients don't respond to treatment. Untreated, symptoms can range from arthritis-like joint damage to neurological, psychological, heart and liver complications.

The disease has been reported in at least 34 states, including Texas. The federal Centers for Disease Control and Prevention call it the fastest spreading disease in the United States.

Printed with Permission

[← Research Index](#)

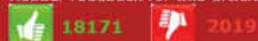
[← Back to Index](#)



Are These Things Crawling Through Your Body?



Reader feedback for this article:



After 13 years of suffering with Lyme disease, a possible cure has been stumbled upon. A cumulative effect of much research has produced the possibility that salt and vitamin C may be all that is needed to beat this elusive illness. Without going into a lot of detail, our theory is that Lyme is not just a bacterial disease, but also an infestation of microfilarial worms. Bacteria, worms, internal mites and the possibility of other creatures have been quite horrifying. Ticks can transfer many types of pathogens into the body of their host. It is also possible that the tick could pick up a new pathogen and pass it on to their next host, explaining why Lyme patients have different types of organisms within their bodies. Shortly after starting the treatment, we were shocked by the presence of the worms. Microfilarial worms live symbiotically with bacteria. They protect the bacteria from being exterminated by the antibiotics. Our theory is that the microfilarial worm, though possibly a nematode, is a parasitic nematomorph which we name Paragordius Lyme Incorporumani. The Lyme bacteria is *Borrelia burgdorferi*, named after Willy Burgdorfer.

From experimenting with the treatment of salt and vitamin C, we settled on a dosage of 3 grams of salt and 3,000 mg of vitamin C, each dose taken 4 times per day. Depending upon one's weight this would approximate one gram for each ten pounds of body weight. We think total daily dosage should *not* exceed 18 grams of salt or Vitamin C per day, and *15 grams would be the average adult's dosage for a full 24 hour period*. If the pills cause a problem they can be crushed or dissolved in water. To get an idea of the dosage, one teaspoon equals 5 grams; thus, one tablespoon would equal 15 grams. Please remember to drink plenty of water. We had been using CMC (Consolidated Midland Corporation), NDC#0223-1760-01, ordered through a pharmacy (no prescription required). This seems to be currently unavailable and pure salt in tablet form may be hard to find. However, the brand of salt is not important, nor is its form, only its purity; do not use salt with any additives, such as table salt. Pure salt can be ordered over the internet at [Saltworks](#). And the vitamin C used is a GNC product, though any good quality vitamin C pill should work. We have no relationship with either company.

The Treatment can be grueling; taking it with food may aid in digestion. The results should be almost instantaneous. The Herxheimer reaction is an excretion of toxins from dying organisms; this will be experienced. Diarrhea will occur as your body sheds itself of the pathogens. The die-off will occur in cycles. Try to stick with it; it is well worth the inconvenience. Remember to drink plenty of water. Water is an important factor, not just in keeping yourself hydrated, but to make sure the treatment is circulating through your entire body. Salt is an electrolyte which your body needs to function properly. Please proceed through the next 16 pages on our journey to a cure. You can click on any photo and get a larger view and a little more info. The photographs are untouched and no dyes were added. Our specimens have been saved in case the integrity of the website is questioned. The last page will attempt to explain how this conclusion was reached.

Frequently Asked Questions

© 2002-2009 lymephotos.com

Revised 10/18/09

All Rights Reserved. Nothing may be reproduced from this site in any medium, including electronic, without the express written permission of lymephotos.com

DISCLAIMER: This site is presented for informational purposes only and is not a substitute for professional medical advice. This site details the personal experiences of real Lyme sufferers and no one presently connected with the site is a medical professional. For a diagnosis of any condition and before undertaking any medical treatments one should speak with a medical doctor. This website is personally funded and has not received contributions from any organizations, commercial or otherwise. If you contact us, we will not sell or give away your name or email address.

Lyme Info

[Home](#) |
 [Disease Info](#) |
 [Medical Literature](#) |
 [Advocacy](#) |
 [Prevention](#) |
 [Patient Issues](#) |
 [International](#)

Return to:
[Alternative Remedies](#)

Quote:
 "Magnesium malate has been promoted for people with fibromyalgia to help break up lactic acid that seems to be part of the fibromyalgia picture."

- Dr. Carolyn Dean, *The Miracle of Magnesium*

Did you know?
 Vitamin B6 increases the intracellular magnesium levels.

MAGNESIUM TREATMENT

Reader feedback for this article:



Many Lyme disease patients experience symptoms that mimic magnesium deficiency. In 2003, a case report of magnesium deficiency with Lyme disease was reported in the Magnesium Research journal. [See here](#). Symptoms of magnesium deficiency include muscle cramps and weakness, pain, fatigue and insomnia, confusion, heart problems and stress intolerance. Magnesium plays a very important role in energy production.

Magnesium deficiency is common amongst Lyme patients and also in the general population. The deficiency is often missed by physicians due to the reliance on serum tests instead of the magnesium levels within the red blood cells as well as signs and symptoms. To further complicate matters, the antibiotics used to treat Lyme disease can deplete magnesium and other important nutrients.

After an extensive review of the literature, Marnie on online forums has proposed the following treatment for chronic Lyme patients:

MAGNESIUM PROTOCOL:

- Magnesium Malate, approximately 200mg 6 times a day (every 2 hours).
- Sublingual B6, approximately 12mg with each magnesium dose.
- Selenium, approximately 12mcg with each magnesium dose.

ADDITIONAL SUGGESTIONS:

- An immune booster such as "Host Defense" or beta glucans.
- Multiple vitamin and mineral supplementation
- A good alkalizing diet

The dosing schedule is based on Dr. Valetta's protocol. Marnie writes, "In 2001, an Italian, by the name of Valletta got a U.S. patent - # 6,248,368. It is titled: Magnesium for autoimmune. Valletta used Mg pyrophosphate and sub. B6 to cure RA, ulcerative colitis and INVASIVE CANCER in 6 months time. The turning point is 3 months (perhaps because of the AVERAGE normal cell lifespan?). It is the TIMING that is absolutely critical! Higher levels must be maintained for several hours per day, due in part to our body's constant attempt to regulate the acid-base balance (kidneys) perhaps."

Pills for the B6 and selenium will most likely need to be split, as it is difficult to buy those dosages. Products, along with a pill cutter, can be purchased for good prices at [iherb.com](#). (No connection with this website)

Some Products:

- [Source Naturals Magnesium](#)
- [Pill Cutter](#)
- [Host Defense](#)

For more information, see:

- [Article- The Magnesium Miracle](#)
- [Book- The Miracle of Magnesium](#)
- [The Magnesium Website](#)
- [Alteration of tissue magnesium levels by vitamin B6](#)
- [Depression recovery with magnesium](#)

[posted in](#) <<[Autoimmune Disease](#)> <[Chemical Sensitivity](#)> <[Chronic Fatigue Syndrome / ME](#)> <[Digestive Disease](#)> <[Electrical Sensitivity](#)> <[Fibromyalgia](#)> <[Gulf War Syndrome](#)> <[Lyme & Co-Infections](#)> <[Treatments](#)>

Marshall Protocol

developed by **Trevor Marshall, PhD** and **Linda Marshall**, based on the work of **Lida Mattman**
 Reader feedback for this article

 219  1971



Controversial and demanding protocol that was originally developed for treating the symptoms of the 'Th1' inflammatory disease sarcoidosis, and now being used with some success by patients with chronic fatigue syndrome, fibromyalgia, lupus, Lyme disease, and other chronic environmental and autoimmune diseases

From the website [MarshallProtocol.com](#)

"The Marshall Protocol is a curative treatment for diseases having a Th1 type immune response. Patients having been diagnosed with one or more of a wide range of diseases have been successfully treated using this protocol. It works by enabling the immune system to destroy the intracellular bacteria that are thought to be the root cause of the illness.

An ARB (angiotensin II receptor blocker) medication, Benicar, is taken, and sunlight, bright lights and foods and supplements with vitamin D are diligently avoided. This enables the body's immune system, with the help of small doses of antibiotics, to destroy the intracellular bacteria. It can take approximately one to three years to destroy all the bacteria.

The specific disease diagnosis is not as important as the results of a D-Metabolites blood test along with clinical assessments by a knowledgeable MD in determining whether you can be successfully treated with the Marshall Protocol.

The Th1 inflammatory diseases are characterized by the generation of Interferon-gamma and with it, 1,25-dihydroxyvitamin D in response to intracellular bacteria.

Th1 inflammatory diseases currently being treated with the Marshall Protocol include:

- ALS (Lou Gehrig's) see notes below
- Ankylosing Spondylitis
- CFS / CFIDS / ME /
- Chronic Lyme/Borreliosis
- Crohn's Disease
- Diabetes type II
- FM (Fibromyalgia)
- Lofgren's syndrome
- Lupus In 'Overlap' With Other Connective Tissue Diseases
- MCS (Multiple Chemical Sensitivity)
- Multiple Sclerosis
- OCD (Obsessive Compulsive Disorder)
- Osteoarthritis
- Parkinsons
- Psoriasis
- Psoriatic Arthritis
- Rheumatoid Arthritis
- Sarcoidosis
- Scleroderma
- Sjogren's

SAFETY WARNING TO ALL

Combining other protocols with the Marshall Protocol (MP) is contraindicated

Do NOT take Benicar with any other antibiotics or antifungals or antimetabolites. It can be dangerous to do that. Benicar can potentiate the action of these drugs."

source(s): [MarshallProtocol.com](#) [ProHealth's Interview with Trevor Marshall](#)

posted by [earthwalker](#) on June 26, 2009 | 70 views | tags: ALS, Amyotrophic Lateral Sclerosis, autoimmune disease, CFS, chemical sensitivity, chronic fatigue syndrome, Crohn's disease, environmental illness, fibromyalgia, FM, Lou Gehrig's Disease, Lyme disease, Marshall protocol, MCS, multiple sclerosis

you might also like:



vitamin D supplementation
 Dear Stephen, I recently consulted with a holistic pharmacist who is also a clinical nutritionist. She...



to go on Cavden protocol
 Dear Stephen, Hello, I have had MCS for 12 years (along with CPDS and PD). The last six years I have...



Use of antibiotics with protocol
 Dear Stephen, I have been naturally diagnosed with Lyme, and am wondering if you can comment on whether...

IT APPEALS TO YOU

get daily email updates!

ARTS & CULTURE

[cartoons](#) | [horoscopes](#) | [games](#) | [celebrity watch](#) | [thriller](#) | [tv](#) | [thriller](#) | [cinema](#) | [art](#) | [word](#) | [e-cards](#)

NON-PROFIT SUPPORTERS



FOCUS ON

- autism spectrum
- autoimmune disease
- cancer
- chemical sensitivity (cs)
- chronic fatigue syndrome (cfs)
- encephalomyelitis (me)
- digestive wellness
- electrical sensitivity (es)
- fibromyalgia (fm)
- gulf war syndrome
- lyme disease & co-infections
- mercury poisoning
- mold illness
- viruses and bacteria
- brain plasticity
- the environment

COMMUNITY HAPPENINGS


- Libby replied to Libby's discussion 'how to change something in profic' in the group Newbie Q & A
- Beck left a comment for Earthwalker
- jeny took a long nap after a cologne hit at PetSmart... happy! was able to go and meet some boxer rescue people.
- Beck left a comment for Div & Kathryn Boyers
- jeny commented on Earthwalker's group 'Living with MCS'
- Earthwalker commented on Earthwalker's group 'Living with MCS'
- bb52 commented on Earthwalker's group 'Living with MCS'
- Claudia Vogel left a comment for Hope
- jeny and Earthwalker are now friends.
- Hope commented on Earthwalker's group 'Living with MCS'

LIVE DISCUSSIONS



13 visitors online now
 13 guests, 0 members

[Home](#) | [About Us](#) | [Contact Us](#) | [Privacy Policy](#) | [Terms of Service](#) | [Sitemap](#) | [Feedback](#)



[Check out our New! - Click Here](#)

Holistic Health Newsletter - Arming Yourself Naturally Against Lyme Disease and Cancer!

Reader feedback for this article:

This special Lyme disease herbal newsletter covers Lyme disease with a focus on naturally supporting the body's own ability to heal itself through natural remedies, vitamins and herbs.

Learn who is at risk of getting Lyme Disease, and what you can do should you feel you have symptoms and find natural remedies for Lyme Disease.

The early stage of Lyme disease can sometimes seem like a flu or an allergic reaction. Symptoms of Lyme Disease often appear as one or more of the following signs:

- swollen lymph nodes
- fatigue
- muscle and joint pain
- chills and fever
- headaches
- erythema migrans (This is a skin rash that is characteristic to LD)

What Makes Lyme Disease Tick and How Samento Eliminates It

The pandemic that is currently spreading depicts how Lyme disease is more infectious and insidious than most known diseases and it is already prevalent in six continents throughout the world.

It is even less understood than AIDS, and although it is not feared as fatal by those who do not understand it, it greatly affects the lives of its victims because of the various symptoms which can be quite severe. Many times the symptoms seem to mimic or resemble so many other dysfunction and ailments. For example, LD is symptomatic of diseases such as Rheumatism, Rheumatoid arthritis, multiple sclerosis, chronic fatigue syndrome, multiple chemical sensitivity syndrome, fibromyalgia, lupus erythematosus, amyotrophic lateral sclerosis, and even depression and anxiety along with many other disorders such as Alzheimer's.

The cause of Lyme Disease is a result of an anaerobic spiral shaped (spirochetes) bacterium known as Borrelia burgdorferi; when the first signs of the disease became recognized in the US, it was in Lyme Connecticut back in 1977. It was first thought to be an outbreak of juvenile Rheumatoid arthritis. Then in 1984 entomologist William "Bill" Burgin for, Ph.D., began studying the various carriers of this disease and noted a variety of ticks, or a legless arachnids were the subjects to the fast spreading malady.

Now this organism has spread to about 100 American and over three hundred states of various forms of Borrelia exist worldwide. We know how the transmission of this organism can pass from being bitten by the infected tick, as well as feces, mosquitoes, mites, congenital transfer, sexual contact, and also through food infection.

The organism also has the ability to change shape which made diagnostic testing quite difficult and inaccurate. And on top of that the microorganisms are able to hide within body tissues which makes it hard for a person's immune system to respond.

Currently, Lyme disease continues to spread and also is misdiagnosed as no less than 300 diseases.

Lyme Disease Treatments

Pharmaceuticals, and vaccines have not been all that successful at treating the disease for a variety of reasons. A vaccine which was manufactured for the disease is no longer available due to severe side effects. Now the standard method of treatment is ongoing doses of the conventional antibiotics for patients diagnosed early which also has some very negative side effects because prolonged antibiotic use destroys intestinal flora and can bring on severe candidiasis or other infections. If antibiotic treatment is proffered then it is not effective so this is clearly a problem in treating Lyme Disease through medical drug intervention.

Non Toxic Herbal Remedy for Lyme Disease

In Great Britain, Dr. Andrew Wright, a physician and surgeon began treating his patients who were suffering from chronic fatigue syndrome, Lyme disease, and other similar conditions a non-toxic herbal remedy derived from cat's claw. Cat's claw is also known in the jungles of Peru as Uncaria tomentosa.

He discovered his patients began to respond very well and became his first therapy choice when treating clients. We went on to treat for lower extremity neuropathy and found it also responded and came to determine that it was also brought on by Lyme Disease.

Through self-administering Samento, Dr. Wright discovered the Borrelia organisms were eliminated from his body along with all neuropathy symptoms. He discovered that as long as he continued taking this herbal remedy he resumed normal functions, but if he stopped all symptoms began to return after a few days. Thus Samento is now a regular daily supplement for relieving symptoms that are associated with Lyme Disease complications.

Currently it is recognized that everyone is at risk to catch this disease because it is so difficult to detect and may have already reached epidemic proportions. One Dr. Charles Ray Jones, a pediatric specialist from Connecticut, goes on to explain that out of the five thousand children he had treated over two hundred and forty five had been born with this disease.

Another expert on Lyme disease, Dar Kunderfink, M.D., was on the Today show where he stated the disease to be more under reported by as much as ten times, even though over 1.8 million cases had been cited by the U.S. Center for Disease Control and Prevention (CDC) in Atlanta, Georgia. This leads to the estimation that there may be as many as 250,000 to 300,000 new cases of Lyme Disease contracted each year which makes it vital to develop early diagnostic detection mandatories which would aid in immediate treatment which may be the only way to prevent chronic Lyme Disease throughout the country and eventually cure the widespread effects of the disease.

Herbal Remedies Effectively Treat Symptoms Allowing Patients to Return to Normal Lifestyle

Since Cat's Claw or Samento is exceedingly valuable as an antimicrobial therapeutic agent it may be one of the best solutions as discussed by a panel of four doctors who share their experiences treating patients. Along with the herbal treatment for Lyme Disease, digestive enzymes and detox remedies when combined provide a three fold treatment. One of the doctors reports, "I could offer hundreds of successful case histories in which Samento was my treatment of choice."

[Click here for More Information > Cat's Claw and Samento Supplements](#)

Pet Natural Remedy for Lyme Disease

If your pet is suffering from Lyme Disease, you might want to learn more about feline Remedies products that can help provide effective immune system and joint and muscular-skeletal system health and mobility support.

[To learn more visit > Samento Remedies for Pets](#)

[Herbal Remedies for Lyme Disease](#)

WE ARE HERE FOR YOU!
 800-888-8888 | help@herald.com | @HeraldOne
 Copyright 2010-2018

[Home](#) | [About Us](#) | [Contact Us](#) | [Privacy Policy](#) | [Terms of Service](#) | [Sitemap](#) | [Feedback](#)

[Home](#) | [About Us](#) | [Contact Us](#) | [FAQ](#) | [Privacy Policy](#) | [Terms of Service](#)

MMS (Muscle Mineral Supplement)



What is MMS? (Muscle Mineral Supplement)

MMS is a natural, non-toxic, and safe supplement that provides essential minerals and vitamins to support muscle health and overall well-being. It is formulated with high-quality ingredients and is suitable for all ages.

Key Benefits:

- Supports muscle strength and endurance.
- Helps reduce muscle fatigue and soreness.
- Improves overall energy levels.
- Supports healthy bone density.
- Enhances immune system function.



How to Use MMS:

Take 1-2 capsules 2-3 times daily with meals. For best results, take with water. Consult your healthcare provider for personalized advice.

Ingredients: MMS contains a blend of essential minerals including Calcium, Magnesium, Potassium, and Zinc, along with vitamins B1, B6, and C.

Manufactured by: [Company Name]

Customer Support: We are committed to providing the highest quality products and excellent customer service. Contact us at [Phone Number] or [Email Address].

Shipping & Returns: Free shipping on orders over \$50. 30-day money-back guarantee.

Follow Us: Stay updated on the latest news and offers. Follow us on Facebook, Twitter, and Instagram.



Disclaimer: MMS is not intended to diagnose, treat, cure, or prevent any disease. It is a dietary supplement. Consult your healthcare provider before use.

Terms of Service: See our website for full terms and conditions.

Contact Us: [Address], [Phone], [Email]





What is Lyme Disease?

- Why Lyme Disease is so difficult to diagnose.
- Why Lyme Disease is so difficult to treat.
- A letter from the President of Vitamin Research Products
- Lyme Disease success stories
- People sickened by Lyme vaccine urge FDA action

As science discovers the secrets to living longer, you'll be the first to know.

- 1 Click to receive our monthly newsletter
- 2 Click to receive our weekly news updates
- 3 Click to receive both

There is Hope on the Horizon

Reader feedback for this article:

1105 1085

Many sufferers of Lyme Disease are using Mild Silver Protein, a time-honored, extremely safe substance. By 1939, penicillin and other antibiotic drugs with patent-protection began to replace the widespread use of silver. At that time, the American Medical Association recognized at least 96 different proprietary silver-based treatments in clinical use. In burn centers around the world, silver sulfadiazine is the undisputed gold standard and is considered by many medical experts to be the superior anti-infective of choice.

Today, at a time when antibiotic-resistant bacteria is flourishing, this almost-forgotten, safe 'antibiotic' is trusted by thousands of Lyme Disease sufferers as being the only way to suppress and control their disease.



Oronima 610

Oronima 610 is a powerful, natural, mineral-rich probiotic with 10 billion CFUs of 10 different strains of beneficial bacteria. It is a powerful, natural, mineral-rich probiotic with 10 billion CFUs of 10 different strains of beneficial bacteria. It is a powerful, natural, mineral-rich probiotic with 10 billion CFUs of 10 different strains of beneficial bacteria.

How Does Oronima 610 Work?

Oronima 610 works by introducing a diverse population of beneficial bacteria to the gut. These bacteria help to restore the natural balance of the gut microbiome, which is essential for overall health and well-being. The probiotics in Oronima 610 help to improve digestion, reduce inflammation, and support the immune system.

Additional Function of Oronima 610

Oronima 610 also contains a blend of natural minerals, including calcium, magnesium, and potassium. These minerals are essential for bone health, muscle function, and overall vitality. The combination of probiotics and minerals in Oronima 610 provides a comprehensive approach to supporting gut health and overall wellness.

Related Products

- Oronima 610
- Oronima 610
- Oronima 610
- Oronima 610
- Oronima 610

Customer Reviews

5.0 out of 5 stars

100% of customers recommend this product.

Customer Questions

1 question answered.

Related Products

- Oronima 610
- Oronima 610
- Oronima 610
- Oronima 610
- Oronima 610

Featured on MedicineNet
Treat to Ease Nighttime Pain
Check Your Fibromyalgia Symptoms
Depression Tips Sidelights
Are You at Risk for Diabetes? Take a Test!

Steroid for Chronic Fatigue Syndrome? Related Articles
Chronic Fatigue Syndrome
corticosteroids and Fibromyalgia

Medication Topics
Insulin for Pain
Pain Management
Drug Interactions
Common Medication Errors
Risperidone Identification Tool
Medication RSS

Daily Health News
Flu Shot Cuts H1N1 Flu Risk?
Drug to Lift Resistance to Heart Disease
Check Data for Gun Deaths
How Obesity Impairs
Stroke May Delay Brain Waking
Health News Feed
Newsletter Signup

Steroid for Chronic Fatigue Syndrome?

Reader feedback for this article:



Doctor Says He's Had Success With Hydrocortisone for CFS and Fibromyalgia Patients

By [Suzanne Douglas](#)
HealthID Health News

Reviewed By [Laurie Chabot, MD](#)

March 21, 2008 — Boosting levels of the stress hormone cortisol with low doses of hydrocortisone could help patients with chronic fatigue syndrome and fibromyalgia, a California doctor says.

Kent Hodson, MD, says the simple treatment comes significantly less risk and greater potential for benefit than widely accepted treatments for the two conditions. But chronic fatigue syndrome (CFS) and fibromyalgia experts who spoke to WebMD were not so sure.

Hodson believes the majority of CFS and fibromyalgia patients have low levels of the steroid hormone cortisol due to dysfunction in a brain system that regulates responses to stress, known as the hypothalamic-pituitary-adrenal (HPA) axis.

The problem is that very sophisticated testing is needed to identify this dysfunction.

As a result, while a number of studies have shown lower-than-normal cortisol levels to be common in CFS and fibromyalgia patients, many others have failed to show the association.

"The overwhelming majority of these patients have [cortisol] dysfunction, whether testing shows this or not," he says (WebMD). His review of the research is published in the latest issue of the *Journal of Chronic Fatigue Syndrome*.

Low-Dose Treatment

Hodson treated nearly 100 patients with chronic fatigue syndrome and fibromyalgia with low doses (7 to 15 milligrams a day) of the steroid hydrocortisone, in addition to other treatments, to boost cortisol levels.

Of 500 consecutive patients treated with the steroid at his Torrance, Calif., clinic, Hodson says 94% showed some improvement and 52% showed substantial improvement by the fourth visit.

William C. Reeves, MD, director of the chronic viral diseases branch of the CDC, believes that most patients with CFS and fibromyalgia could benefit from taking low-dose hydrocortisone, but he says the treatment is not without risks.

Reeves and CDC colleagues recently published a study showing that women with CFS symptoms tend to have lower-than-normal cortisol levels upon waking in the morning — a time when levels typically spike.

"It does appear that there is something different in HPA axis function in these patients, but that doesn't necessarily mean that this treatment is the answer," Reeves says.

Hydrocortisone Benefits and Risks

He cites a 1998 study from the National Institutes of Health examining low-dose hydrocortisone for the treatment of chronic fatigue syndrome.

Although the treatment was shown to have some benefit, a significant number of patients also exhibited a common side effect seen with higher steroid doses — adrenal suppression, a reduction in the amount of hormones made by the adrenal glands.

The researchers concluded that "the degree of adrenal suppression precludes the steroid's practical use for CFS."

"The idea of using low-dose steroids has been around for a long time, but it may not be as simple as simply raising cortisol levels. And even if it does help, it is not without risks," Reeves says.

Fibromyalgia researcher Leslie Arnold, MD, agrees.

"The evidence in favor of using steroids to treat these conditions just isn't there," the University of Cincinnati associate professor of psychiatry tells WebMD. "We just don't have enough consistent data about abnormalities in the HPA axis."

Arnold points out that some studies in fibromyalgia patients have shown the HPA axis actually to be increased and some have shown it to be decreased. "The only thing that has been consistent is that there is usually some kind of abnormality in function."

SOURCES: Hodson. *Journal of Chronic Fatigue Syndrome*, vol. 15, no. 1-4, March 2008. MD, medical adviser. *Medical Therapy* (Nov. 2008). [Torrance, Calif.](#) [William C. Reeves, MD](#), medical adviser. *Journal of Chronic Fatigue Syndrome*, vol. 15, no. 1-4, March 2008. [CDC](#), [Leslie Arnold, MD](#), medical adviser. *Journal of Chronic Fatigue Syndrome*, vol. 15, no. 1-4, March 2008. [The Journal of the American Medical Association](#), Sept. 23, 1998, vol. 280, pp. 1041-1046.

[Back to Top](#) | [Print this Page](#)

Think Your Pain Might Be Fibromyalgia?
Understand Fibro Pain
Learn about Symptoms and Triggers
Partner with Your Doctor



WebMD medicinenet.com
Chronic Pain/Back Pain
Find tips and advice on treatment.

[Sign Up Now](#)

STATEMENT ON CFIDS

Robert F. Cathcart, M. D.

Reader feedback for this article:



382



96

In retrospect, I saw the first patients with CFIDS in Incline Village about 1978. The epidemic officially started sometime in 1983 in Incline Village. I left Incline Village January 1, 1980 but continued to treat patients for chronic fatigue. My treatment was mainly with massive doses of vitamin C but it also included many other nutrients. The rationale has been that CFIDS is a free radical disease involving damaged mitochondria.

My suspicion that chronic fatigue was a free radical disease involving mitochondria was because of the beneficial effect of massive doses of vitamin C. I was using the massive doses of vitamin C not for the vitamin C but for the electrons carried by the vitamin C. Ordinarily, when a vitamin C molecule gives up its two extra electrons to scavenge two free radicals, the vitamin C is refueled with two more electrons from the mitochondria. **When the mitochondria are damaged and cannot provide the electrons then the spent vitamin C is rapidly irreversibly lost. By giving massive doses of C, this loss is prevented, and the continuing supply of fresh vitamin C substitutes for the inability of the mitochondria to provide the electrons to refuel the spent vitamin C (dehydroascorbate.)**

Not incidentally, a major function of the mitochondria is to provide electrons in the form of ATP to the muscles. Without sufficient ATP to fuel the muscles, fatigue results.

The mitochondria are damaged by either viruses, bacteria (sometimes cell wall deficient bacteria, L-forms), yeast toxins, sensitivity to chemicals (including some drugs), allergic reactions, etc. Probably, it usually involves two or more of the above. **The damaged mitochondria become the major source of free radicals.** A free radical cascade results. Free radicals from a damaged mitochondria damage adjacent mitochondria and cause them to produce more free radicals. A domino effect results. **Because all this up-regulates the immune system, various autoimmune phenomena frequently result** which may include aching in muscles, trigger points, etc. (fibromyalgia).

The oral doses of ascorbic acid necessary to substitute for the inability of the mitochondria to supply electrons to refuel the free radical scavengers are at least [bowel tolerance](#) doses (see my other papers on this [website](#).) Many patients have found that intravenous ascorbate is effective and necessary from time to time. The main problem has been with insurance not paying for intravenous ascorbate. While there is some expense involved with intravenous ascorbate it has been more effective than that drug costing \$15,000 to \$19,000 a year. \$15,000 of intravenous ascorbate would probably have a chronic fatigue patient dancing a jig.

Ascorbate is not usually a cure for CFIDS but in patients who tolerate massive doses orally (almost everyone tolerates IV ascorbate), it ameliorates the disease better than other treatments. This more effective amelioration is because replacing the mitochondria function of providing the electrons for free radical scavenging gets more at the basic pathological processes in the disease and it helps protect the mitochondria so they can try to repair themselves. The disinterest in the use of ascorbate is hard to understand and it has contributed to not discovering basic causes of the disease. I doubt that short of killing a virus that may be the cause of many cases that there will be found a more effective method of ameliorating the symptoms of the disease.

See also Dr. Cathcart's articles [Symptoms of Wilson's Syndrome](#), the effects of Chronic low body temperature, and [Titrating to Bowel Tolerance](#) on determining vitamin C dosage.

Content (C) 2009 and prior years, Dr. Robert F. Cathcart.

[Dr. Cathcart](#)

650-949-2822

Related Resource Lists:

[Aids](#) * [Allergy](#) * [Candida / Yeast](#) * [Chron.Fatigue](#) * [Immune](#)
[Enviro Illness / Multi-Chem Sensitivity](#) * [Health](#) * [Med](#) *

For your web space and web photography needs, contact webmaster@mall-net.com

[Mall-Net](#)

Alternative Health Blog

Probiotics in Yogurt Can Improve Chronic Fatigue Syndrome

By Bob Condon, Ph.D. Editor - Published March 13, 2009

Reader feedback for this article
 3076 12307

Living the life-altering condition of chronic fatigue syndrome is a huge challenge for anyone facing the illness. New Swedish research suggests probiotics or "good" bacteria found in the live active cultures of yogurt can reduce chronic fatigue symptoms for a significant percentage of individuals.

Here's an important caveat: Eating yogurt or taking probiotic supplements, while it can help some people feel better, can make others feel worse. In sum, the researchers at Karolinska Institute in Stockholm ventured that probiotics were "worth trying" if a person feels better and no worse in the first three weeks. Keep taking the supplement if the chronic fatigue seems worse, then stop taking the supplement.

The works-for-some-and-not-for-others division of outcomes is common in the treatment of chronic fatigue syndrome, say alternative health practitioners. Research is clearly pointing to a need for customized or individualized treatment plans. A primary reason is that the root cause of the ongoing fatigue is undetermined. There are some researchers who contend it's hormonal and neurochemical imbalance while others suspect the immune system is central to the symptoms.

The nervous system and immune system connections prompted the Swedish researchers to investigate the effect of probiotics. The intestinal tract or gut is closely associated with the immune system and is often called the "second brain" because of neurochemicals located there that are processed in the brain too. A gain from a probiotics supplement provided additional modulation and, of course, funding.

The idea was to see if restore the balance between healthy and unhealthy bacteria in the gut can reduce chronic fatigue. This study followed 15 people with chronic fatigue, ten women and five men. Six of the participants reported improvements in physical symptoms, while said things were worse. The other eight reported no significant physical improvement but, interestingly, three said their mental health had improved.

More research is necessary to make any conclusions about probiotics and, perhaps even more importantly, determine just which chronic fatigue patients would benefit most from upgrading the bacteria balance in the gut.

Yet, honestly, it's hard to argue against anyone with chronic fatigue syndrome adding yogurt and other probiotic yogurt to their daily menus. When possible, look for brands that offer a number of live active cultures, such as Stonfield Farm, and always look for yogurt with natural ingredients and no artificial sweeteners. Plus, a healthy yogurt is often more satisfying in both taste and curbing hunger!

Bob Condon blogs for Alternative Health Journal every Monday, Tuesday, Thursday, Friday and Saturday.

[All About](#) | [Subscribe](#)

Comments

561 Comments

No Comments Yet!

- [Caring for Aging Parents and Raising Kids Puts Women at Heart Risk](#)
- [The Not-So-Great Outdoors for Today's Kids](#)
- [Obesity's Still Lower Your LDL or Bad Cholesterol](#)
- [Better Sleep is Key to Losing Weight](#)
- [Dish Glass of Wine Protects Against Esophageal Problems](#)
- [Six Simple Fish Oil, Two or Three Resizable Ideas for a Slimmer Waist](#)
- [Adding Protein to Your Diet Can Speed Fat Loss, Boost Cholesterol](#)
- [Dish Glass of Two or Two Can Boost a Mother's Bone Health](#)
- [Adding Exercise Intensity Boosts Weight Loss, Heart Health](#)
- [Tack Stress Leads to Auto Inflammation, Possible Heart Disease](#)
- [Mushrooms, Green Tea Reduce Breast Cancer Risk](#)
- [Game On: Social Support Improves Sports Performance](#)
- [Probiotics in Yogurt Can Improve Chronic Fatigue Symptoms](#)
- [Lack of Sleep Leads to Blood Sugar Spikes, Higher Risk of Diabetes](#)
- [Chemical Damage Hardest on the Wives Health](#)
- [Being Calm and Organized Can Lead to a Longer Life](#)
- [High LDL, Tardig Can Be Hazardous to Your Health](#)
- [Finding a Natural Ingredient Energy Bar? Not Easy, But Here's One](#)
- [Avoid These Foods That Feed Harmful Bacteria in Your Teeth](#)
- [Poor Sleep Habits Lead to Weight Gain, Diabetes and Heart Disease](#)

- [January 2010](#)
- [December 2009](#)
- [November 2009](#)
- [October 2009](#)
- [September 2009](#)
- [August 2009](#)
- [July 2009](#)
- [June 2009](#)
- [May 2009](#)
- [April 2009](#)
- [March 2009](#)
- [February 2009](#)
- [January 2009](#)
- [December 2008](#)
- [November 2008](#)
- [October 2008](#)
- [September 2008](#)
- [August 2008](#)
- [November -0001](#)

Name:
 Bob Condon
 Contributor Since
 August 17, 2008



Bob
 Along with bringing the latest news and trends about alternative health, Bob will help you get the most of your insider health research. Bob is the Long Time Columnist for the Seattle Post-Intelligencer the country's health and quality of life for the award-winning newspaper and online magazine for national magazines. He is a former spy.

Transition Page - Procedure Explanation

You are about to begin the experiment. Please read the instructions below carefully before continuing.

During this part of the experiment you will view eight web pages. You will be able to view each web page for 60 seconds only. The web page will advance on its own once the 60 seconds is over. You will NOT be able to return to any web page that you previously viewed. Please do not use the back button on the browser or any other mechanism to return to a previously viewed page.

Following the presentation of each web page, you will be given two questionnaires asking for your opinion about that web page. Please answer each of the questions as accurately as possible and completely answer the first questionnaire before moving on to the second. You will NOT be able to return to any of the previously answered questionnaires later on in the study so answer carefully. You will use a “Next” button to move between questionnaires and to begin viewing the next web page after completing the second questionnaire.

You will answer the same two questionnaires in response to each of the eight web pages. Please remember to respond to each questionnaire in regards to the web page you just viewed only!

You will now view three practice web pages to help you become familiar with the procedure just described. You will move through the experiment procedure as just described, but the following three web pages are only for practice.

To review:

- You will view each web page for 60 seconds. The page will automatically advance after 60 seconds.
- Do not use your browser's back button or any other browser feature to return to a previously viewed page.
- Do not click on any links on any of the web pages, only read and look at them.

- Answer the two questionnaires following each web page in regards to that web page only.

Click the button below to indicate you understand the experimental procedure and to begin viewing the first of the practice web pages.

I understand the experimental procedure

Transition Page – Preparation for Experimental Web Pages
(High Motivation Condition)

This concludes the three practice web pages. You will now begin viewing the eight web pages. Please read the short paragraph below to inform you about the position we want you to take while viewing these eight web pages.

You recently returned from a hiking trip. Three weeks after the trip, your friend noticed that you had a small red circular rash surrounding what looked like a tiny black dot on your upper shoulder. You were extremely concerned, and visited your doctor who immediately recognized the small black dot as an embedded tick (a small parasite that feeds on the blood of humans and animals).

The doctor removed the tick from your shoulder, but was concerned about the rash that had grown around where the tick had bitten you. He said the rash suggests that you had contracted Lyme disease from the tick, a potentially serious condition. He indicated that untreated Lyme disease can lead to early-onset arthritis, chronic neurological and skin problems, long-lasting fatigue, and in some cases even death. You decided to investigate potential treatment options for yourself. The doctor scheduled an appointment for you to return to his office in 2 days to discuss treatment.



An adult deer tick



Typical rash associated with Lyme disease

You will be asked to make a decision concerning treatment after viewing the eight web pages. Your answer will be scored.

Check the box below to indicate you understand the above information and then click “Next” to begin with viewing the first of the eight web pages.

I understand the information above and agree to take this stance while viewing the eight web pages

Transition Page – Preparation for Experimental Web Pages

(Low Motivation Condition)

This concludes the three practice web pages. You will now begin viewing the eight web pages. Please read the short paragraph below to inform you about the position we want you to take while viewing these eight web pages.

You are at home and decide to browse the Internet to pass the time. Please view the eight web pages you will see next as if you were just attempting to pass the time.

Check the box below to indicate you understand the above information and then click “Next” to begin with viewing the first of the eight web pages.

I understand the information above and agree to take this stance while viewing the eight web pages

Transition Page – Instructions for Post-experiment Questionnaires

You will now answer four general questionnaires asking for your opinions and attitudes. Use the “Next” button at the bottom of each of these questionnaires to lock in your answers and move on to the next.

Transition Page - Debriefing

In this experiment you viewed several web pages and completed a series of questionnaires about the web pages themselves and about your attitudes relating to the web pages.

This research is investigating whether audience feedback can impact how people evaluate information they find on the Internet. You might have noticed that audience feedback (provided using approval ratings, star ratings, or recommendations) on Internet-based information is becoming common. It is thought that people might use these types of ratings and recommendations as shortcuts to establish whether or not they trust information they find on the Internet.

Current research has not yet investigated the potential impact of audience feedback on how people decide what information to trust on the Internet. Your participation in this research provides valuable input into our investigation of this issue. The results of this research may be used to improve the design of websites, search engines, and other online tools that aim to use audience feedback either in displaying or retrieving information.

Please remember that your individual information will be kept strictly confidential and anonymous and that only group means will be used in determining the results of the experiment.

We thank you for your participation in this study. If you have any further questions or would like to receive a copy of the results when they become available, please email Katherine Del Giudice at katherined@knights.ucf.edu.

Thank you!

LIST OF REFERENCES

- Abell, A. (2000, July). Skills for knowledge environments. *The Information Management Journal*, 33-41.
- Abilock, D. (2004). Information literacy from prehistory to K-20: A new definition. *Knowledge Quest*, 32(4), 9-11.
- Agosto, D.E. (2002a). Bounded rationality and satisficing in young people's web-based decision making. *Journal of the American Society for Information Science and Technology*, 53(1), 16-27.
- Agosto, D.E. (2002b). A model of young people's decision-making in using the web. *Library & Information Science Research*, 24, 311-341.
- Ajzen, I., & Fishbein, N. (1980). *Understanding attitudes and predicting social behavior*. Upper Saddle River, NJ: Prentice Hall.
- Alexander, J.E., & Tate, M.A. (1999). *Web wisdom: How to evaluate and create information quality on the web*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Anderson, N.H. (1981). *Foundations of information integration theory*. New York: Academic Press.
- Anderson, T.D. (2005). Relevance as process: Judgments in the context of scholarly research. *Information Research*, 10(2), Paper 226. Retrieved May 27, 2009 from <http://informationr.net/ir/10-2/paper226.html>.
- Asch, S. E. (1951). Effects of group pressure upon the modification distortion of judgments. In H. Guetzkow (Ed.), *Groups, leadership and men* (pp. 177-190). Pittsburgh, PA: Carnegie Press.
- Asch, S. E. (1955). Opinions and social pressure. *Scientific American*, 193, 31-35.
- Austin, E.W., & Dong, Q. (1994). Source vs. content effects on judgments of news

- believability. *Journalism Quarterly*, 71, 973-983.
- Bambauer, D. (2006). Shopping badly: Cognitive biases, communications, and the fallacy of the marketplace of ideas. *University of Colorado Law Review*, 77, 101- 169.
- Baron, R.S., Vandello, J.A., & Brunsman, B. (1996). The forgotten variable in conformity research: Impact of task importance on social influence. *Journal of Personality and Social Psychology*, 71(5), 915-927.
- Barry, C.L., & Schamber, L. (1998). Users' criteria for relevance evaluation: A cross-situational comparison. *Information Processing & Management*, 34(2/3), 219-236.
- Bennett, S., Maton, K., & Kervin, L. (2008). The 'digital natives' debate: A critical review of the evidence. *British Journal of Educational Technology*, 39(5), 775-786.
- Bergstrom, A. (2008). The reluctant audience: Online participation in the Swedish journalistic context. *Westminster Papers in Communication and Culture*, 5(2), 60-80.
- Berners-Lee, T. (1999). *Weaving the web: The original design and ultimate destiny of the world wide web by its inventor*. New York: Harper One.
- Berners-Lee, T., Cailliau, R., Luotonen, A., Nielsen, H.F., & Secret, A. (1994). The world wide web. *Communications of the ACM*, 31(1), 76-82.
- Bickchandani, S., Hirshleifer, D., & Welch, I. (1992). A theory of fads, fashion, custom, and cultural change as informational cascades. *Journal of Political Economy*, 100, 992-1026.
- Borlund, P. (2003). The concept of relevance in IR. *Journal of the American Society for Information Science and Technology*, 54(10), 913-925.
- Boyd, J. (1996). *The essence of winning and losing*. Retrieved May 22, 2009 from http://www.chetrichards.com/modern_business_strategy/boyd/essence/eowl_frameset.htm
- Briggs, P., Burford, B., De Angeli, A., & Lynch, P. (2002). Trust in online advice. *Social*

- Science Computer Review*, 20(3), 321-332.
- Brin, S., & Page, L. (1998). The anatomy of a large-scale hypertextual web search engine. *Computer Networks and ISDN Systems*, 30(1-7), 107-117.
- Brinol, P., & Petty, R.E. (2009). Persuasion: Insights from the self-validation hypothesis. In M.P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 41, pp. 69-118). London: Elsevier.
- Burns, C. (2008). *Deadly decisions: How false knowledge sank the Titanic, blew up the shuttle, and led America into war*. Amherst, NY: Prometheus Books.
- Bush, V. (1945, July). As we may think. *Atlantic Monthly*, 101-108.
- Byerly, G., & Brodie, C.S. (2005, April). *Internet (and/or institutional) credibility and the user*. Paper presented at the Internet Credibility and the User Symposium conducted at the University of Washington, Seattle, WA.
- Cashmore, P. (2010). *Google's nightmare: Facebook 'like' replaces links*. Retrieved June 12, 2010 from <http://www.cnn.com/2010/TECH/04/29/cashmore.google.facebook/index.html>.
- Chaiken, S. (1980). Heuristic versus systematic information processing and the use of source versus message cues in persuasion. *Journal of Personality and Social Psychology*, 39(5), 752-766.
- Chaiken, S. (1987). The heuristic model of persuasion. In M.P. Zanna, J.M. Olson, & C. P. Herman (Eds.), *Social Influence: The Ontario Symposium* (Vol. 5, pp. 165-184). Hillsdale, NJ: Lawrence Erlbaum.
- Charnock, D., & Shepperd, S. (2004). Learning to DISCERN online: Applying an appraisal tool to health websites in a workshop setting. *Health Educational Research*, 19(4), 440-446.

- Clason, D.L., & Dormody, T.J. (1994) Analyzing data measured by individual Likert-type items. *Journal of Agricultural Education*, 35(4), 31-35.
- Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd Ed.). Hillsdale, NJ: Lawrence Erlbaum.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155-159.
- Corritore, C.L., Kracher, B., & Wiedenbeck, S. (2003). On-line trust: Concepts, evolving themes, a model. *International Journal of Human-Computer Studies*, 58, 737-758.
- Crowne, D. P., & Marlowe, D. (1960). A new scale of social desirability independent of psychopathology. *Journal of Consulting Psychology*, 24, 349-354.
- Crowne, D.P., & Marlowe, D. (1964). *The approval motive: Studies in evaluative dependence*. New York: Wiley.
- Dieberger, A., Dourish, P., Hook, K., Resnick, P., & Wexelblat, A. (2000, December). Social navigation: Techniques for building more usable systems. *Interactions*, 7(6), 36-45.
- Deutsch, M., & Gerard, H.B. (1955). A study of normative and informational social influences upon individual judgment. *The Journal of Abnormal and Social Psychology*, 51, 629-636.
- Dhamija, R., Tygar, J.D., & Hearst, M. (2006, April). Why phishing works. *Proceedings of CHI 2006*, Montreal, Canada, 581-590.
- Drapeau, M. (2009). Trust, but verify web 2.0 sources. *Federal Computer Week*. Retrieved July 19, 2009 from <http://www.fcw.com/Articles/2009/07/20/COMMENT-Drapeau-info-sharing-and-rumormill.aspx>.
- Duck, S.W., & Baggaley, J. (1975). Audience reaction and its effect on perceived expertise. *Communication Research*, 2(1), 79-85.
- Dutta-Bergman, M. (2003). Trusted online sources of health information: Differences in

- demographics, health beliefs, and health-information orientation. *Journal of Medical Internet Research*, 5(3), Paper e21.
- Dutta-Bergman, M. (2004). The impact of completeness and Web use motivation on the credibility of e-health information. *Journal of Communication*, 54, 253-269.
- Duttweiler, P.C. (1984). The internal control index: A newly developed measure of locus of control. *Educational and Psychological Measurement*, 44, 209-221.
- Encyclopedia Britannica, Inc. (n.d.). *Fatally flawed: refuting the recent study on encyclopedic accuracy by the journal Nature*. Retrieved May 30, 2009 from http://corporate.britannica.com/britannica_nature_response.pdf.
- Endsley, M.R. (2000). Theoretical underpinnings of situation awareness: A review. In M.R. Endsley & D.J. Garland (Eds.), *Situation awareness analysis and measurement*. (pp. 3-32). Mahwah, NJ: Lawrence Erlbaum Associates.
- Eysenbach, G., & Kohler, C. (2002). How do consumers search for and appraise health information on the world wide web? Qualitative study using focus groups, usability tests, and in-depth interviews. *British Medical Journal*, 324, 573-577.
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, 7, 117-140.
- Fink-Shamit, N., & Bar-Ilan, J. (2008, December). Information quality assessment on the web – an expression of behaviour. *Information Research*, 13(4), Paper 357. Retrieved March 20, 2009 from <http://informationr.net/ir/13-4/paper357.html>.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior*. Reading, MA: Addison-Wesley.
- Flanagin, A.J., & Metzger, M.J. (2007). The role of site features, user attributes, and information verification behaviors on the perceived credibility of web-based information. *New Media & Society*, 9(2), 319-342.

- Fogg, B.J., & Tseng, H. (1999). The elements of computer credibility. *Proceedings of CHI '99*, Pittsburgh, PA: USA, 80-87.
- Fogg, B.J., Marshall, J., Laraki, O., Osipovich, A., Varma, C., Fang, N., et al. (2001). What makes web sites credible? A report on a large quantitative study. *Proceedings of the SIGCHI Annual Conference*, 3(1), 61-68.
- Fogg, B.J., Soohoo, C., Danielson, D., Marable, L., Stanford, J., & Tauber, E.R. (2002). *How do people evaluate a web site's credibility? Results from a large study*. Palo Alto, California: Stanford University, Persuasive Technology Lab.
- Fox, S. (2006, October 29). *Online health search 2006*. Washington, DC: Pew Internet and American Life Project.
- Fox, S., & Jones, S. (2009, June). *The social life of health information: Americans' pursuit of health takes place within a widening network of both online and offline sources*. Washington, D.C.: Pew Internet and American Life Project.
- Fox, S., & Rainie, L. (2002, May 22). *Vital decisions: How internet users decide what information to trust when they or their loved ones are sick*. Washington, DC: Pew Internet and American Life Project.
- Fragale, A.R., & Heath, C. (2004). Evolving information credentials: The (mis)attribution of believable facts to credible sources. *Personality Social Psychological Bulletin*, 30, 225-236.
- Freeman, K.S., & Spyridakis, J.H. (2004). An examination of factors that affect credibility of online health information. *Technical Communication*, 51(2), 239-263.
- Fritch, J.W., & Cromwell, R.L. (2001). Evaluating internet resources: Identity, affiliation, and cognitive authority in a networked world. *Journal of the American Society for Information Science and Technology*, 52(6), 499-507.
- Gigerenzer, G., & Goldstein, D.G. (1996). Reasoning the fast and frugal way: Models of

- bounded rationality. *Psychological Review*, 103(4), 650-669.
- Giles, J. (2005). Internet encyclopaedias go head to head. *Nature*, 438(15), 900-901.
- Gladwell, M. (2005). *Blink: The power of thinking without thinking*. Boston: Little, Brown and Company.
- Greisdorf, H. (2003). Relevance thresholds: A multi-stage predictive model of how users evaluate information. *Information Processing and Management*, 39, 403-423.
- Grifantini, K. (2009, September 16). Can you trust crowd wisdom? Researchers say online recommendation systems can be distorted by a minority of users. *Technology Review*. Retrieved September 18, 2009 from <http://www.technologyreview.com/web/23477/?a=f>.
- Gugerty, L., Billman, D., Pirolli, P., & Elliott, A. (2007). An exploratory study of the effect of domain knowledge on internet search behavior: The case of diabetes. *Proceedings of the Human Factors and Ergonomics Society*, 51, 775-779.
- Hardey, M. (1999). Doctor in the house: The internet as a source of lay health knowledge and the challenge to expertise. *Sociology of Health & Illness*, 21(6), 820-835.
- Hart, A., Henwood, F., & Wyatt, S. (2004). The role of the internet in patient-practitioner relationships: Findings from a qualitative research study. *Journal of Medical Internet Research*, 6(3), Paper e36.
- Higgins, M. (1999). Meta-information and time: Factors in human decision making. *Journal of the American Society for Information Science*, 50(2), 132-139.
- Hilligoss, B., & Rieh, S.Y. (2008). Developing a unifying framework of credibility assessment: Construct, heuristics, and interaction in context. *Information Processing and Management*, 44, 1467-1484.
- Hitlin, P., & Rainie, L. (2004, October). *Online rating systems: 33 million American internet users*

- have reviewed or rated something as part of an online rating system.* Washington, DC: Pew Internet and American Life Project.
- Hof, A.W. (2009). *The credibility of online content ratings.* Unpublished master's thesis, Maastricht University, Maastricht, The Netherlands.
- Hoffman, D.L., Novak, T.P., & Venkatesh, A. (2004, July). Has the internet become indispensable? *Communications of the ACM*, 47(7), 37-42.
- Holmes, J., & Robins, D. (2008). Visceral and cognitive levels of credibility judgment in an authorless environment: A factor analysis of the influence of visual design. *Proceedings of the American Society for Information Science and Technology*, 44(1), 1-10.
- Holscher, C., & Strube, G. (2000). Web search behavior of internet experts and newbies. *Computer Networks*, 33, 337-346.
- Hong, T. (2006). The influence of structural and message features on web site credibility. *Journal of the American Society for Information Science and Technology*, 57(1), 114-127.
- Hovland, C.I., & Weiss, W. (1951). The influence of source credibility on communication effectiveness. *The Public Opinion Quarterly*, 15(4), 635-650.
- Hovland, C.I., Janis, I.L., & Kelley, J.J. (1953). *Communication and persuasion: Psychological studies of opinion change.* New Haven, CT: Yale University Press.
- Howe, M., & Strauss, W. (2000). *Millennials rising: The next great generation.* London: Vintage.
- Ingwersen, P. (1996). Cognitive perspectives of information retrieval interaction: Elements of a cognitive IR theory. *Journal of Documentation*, 52(1), 3-50.
- Ingwersen, P., & Jarvelin, K. (2005). *The turn: Integration of information seeking and retrieval in context.* The Netherlands: Springer.
- Jadad, A., & Gagliardi, A. (1998). Rating health information on the internet: Navigating to knowledge or babel?. *Journal of the American Medical Association*, 279(8), 611-614.

- Jansen, B.J., & Spink, A. (2003). An analysis of web documents retrieved and viewed. Proceedings of the 4th International Conference on Internet Computing, Las Vegas, NV, 65-69.
- Jenkins, C., Corritore, C.L., & Wiedenbeck, S. (2003). Patterns of information seeking on the web: A qualitative study of domain expertise and web expertise. *IT & Society*, 1(3), 64-89.
- Jian, J., Bisantz, A.M., & Drury, C.G. (2000). Foundations for an empirically determined scale of trust in automated systems. *International Journal of Cognitive Ergonomics*, 4(1), 53-71.
- Johnson, T.J., & Kaye, B.K. (2000). Using is believing: The influence of reliance on the credibility of online political information among politically interested internet users. *Journalism and Mass Communication Quarterly*, 77, 865-879.
- Johnson, T.J., & Kaye, B.K. (2002). Webelievability: A path model examining how convenience and reliance predict online credibility. *Journalism and Mass Communication Quarterly*, 79, 619-642.
- Katerattanakul, P., & Siau, K. (1999, December). Measuring information quality of web sites: Development of an instrument. *Proceedings of the International Conference on Information Systems*. Charlotte, NC: USA, 279-285.
- Kelly, D. (2005). Implicit feedback: Using behavior to infer relevance. In A. Spink & C. Cole (Eds.), *New directions in cognitive information retrieval* (pp. 169-186). The Netherlands: Springer.
- Kelley, H.H., & Woodruff, C.L. (1954). Members' reactions to apparent group approval of a counternorm communication. *Journal of Abnormal and Social Psychology*, 52, 67-74.
- Kennedy, G., Dalgarno, B., Gray, K., Judd, T., Waycott, J., Bennett, S., et al. (2007). The net

- generation are not big users of web 2.0 technologies: Preliminary findings. In *ICT: Providing choices for learners and learning. Proceedings ascilite Singapore 2007*. Retrieved August 12, 2009 from <http://www.ascilite.org.au/conferences/singapore07/procs/kennedy.pdf>.
- Kim, P., Eng, T.R., Deering, M.J., & Maxfield, A. (1999). Published criteria for evaluating health related web sites: Review. *British Medical Journal*, *318*, 647-649.
- Kim, Y.A., & Srivastava, J. (2007, August). *Impact of social influence in e-commerce decision making*. Paper presented at the ICEC Conference, Minneapolis, MN: USA.
- Klein, G. (1998). *Sources of power: How people make decisions*. Cambridge, MA: MIT Press.
- Kleinberg, J.M. (1999). Authoritative sources in a hyperlinked environment. *Journal of the ACM*, *46*(5), 604-632.
- Kuhlthau, C.C. (1991). Inside the search process: Information seeking from the user's perspective. *Journal of the American Society for Information Science*, *42*(5), 361-371.
- Kuhlthau, C.C. (1993). A principle of uncertainty for information seeking. *Journal of Documentation*, *49*(4), 339-355.
- Kunst, H., Groot, D., Latthe, P., Latthe, M., & Kahn, K. (2002). Accuracy of information on apparently credible websites: Survey of five common health topics. *British Medical Journal*, *324*, 581-582.
- Landau, E. (2009). *Retweeting: 'Followers' look to 'leaders' as social networks grow*. Retrieved June 6, 2009 from <http://www.cnn.com/2009/TECH/06/23/why.retweet.twitter/index.html>.
- Landy, D. (1972). The effects of an overheard audience's reaction and attractiveness on opinion change. *Journal of Experimental Social Psychology*, *8*(3), 276-288.
- Lash, S. (2002). *Critique of information*. London: Sage Publications.

- Lau, A., & Coiera, E.W. (2008). Impact of web searching and social feedback on consumer decision making: A prospective online experiment. *Journal of Medical Internet Research*, *10*(1), Paper e2.
- Lazar, J., & Preece, J. (2003). Social considerations in online communities: Usability, sociability, and success factors. In H. van Oostendorp (Ed.), *Cognition in a digital world* (pp. 97-126). Mahwah, NJ: Lawrence Erlbaum Associates.
- Leary, M.R. (1983). A brief version of the fear of negative evaluation scale. *Personality and Social Psychology Bulletin*, *9*(3), 371-375.
- Lee, J.D., & See, K.A. (2004). Trust in automation: Designing for appropriate reliance. *Human Factors*, *46*(1), 50-80.
- Lenhart, A., Madden, M., & Hitlin, P. (2005). *Teens and technology: Youth are leading the transition to a fully wired and mobile nation*. Washington, DC: Pew Internet and American Life Project.
- Lindgaard, G., Fernandes, G., Dudek, C., & Brown, J. (2006, March). Attention web designers: You have 50 milliseconds to make a good first impression! *Behavior & Information Technology*, *25*(2), 115-126.
- Locher, D.A. (2002). *Collective behavior*. Upper Saddle River, NJ: Prentice Hall.
- Loo, R., & Loewen, P. (2006). Confirmatory factor analysis of scores from full and short versions of the Marlowe-Crowne Social Desirability Scale. *Journal of Applied Social Psychology*, *34*(11), 2343 - 2352.
- Mackay, C. (1841). *Extraordinary popular delusions and the madness of crowds*. London: George G. Harrap & Co.
- Marshall, L.A., & Williams, D. (2006). Health information: Does quality count for the consumer? How consumers evaluate the quality of health information materials

- across a variety of media. *Journal of Librarianship and Information Science*, 38(3), 141-156.
- McCroskey, J. C., Richmond, V. P., & Daly, J. A. (1975). The development of a measure of perceived homophily in interpersonal communication. *Human Communication Research*, 1(4), 323-332.
- McLuhan, M. (1964). *Understanding media: The extensions of man*. New York: McGraw-Hill.
- Meola, M. (2004). Chucking the checklist: A contextual approach to teaching undergraduates web-site evaluation. *Libraries and the Academy*, 4(3), 331-344.
- Metzger, M.J. (2005, April). *Understanding how users make sense of credibility: A review of the state of our knowledge and recommendations for theory, policy, and practice*. Paper presented at the Internet Credibility and the User Symposium at the University of Washington, Seattle, WA.
- Metzger, M.J. (2007). Making sense of credibility on the web: Models for evaluating online information and recommendations for future research. *Journal of the American Society for Information Science and Technology*, 58(13), 2078-2091.
- Metzger, M.J., & Flanagin, A.J. (Eds.). (2008). *Digital media, youth, and credibility*. Cambridge, MA: MIT Press.
- Metzger, M. J., Flanagin, A. J., & Medders, R. (in press). Social and heuristic approaches to credibility evaluation online. *Journal of Communication*.
- Metzger, M. J., Flanagin, A. J., Eyal, K., Lemus, D. R., & McCann, R. M. (2003). Credibility for the 21st century: Integrating perspectives on source, message, and media credibility in the contemporary media environment. *Communication Yearbook*, 27, 293-336.
- Miller, N. (2005, January). Wikipedia and the disappearing "author". *ETC*, 62(1), 37-40.

- Miller, G.A., & Chapman, J.P. (2001). Misunderstanding analysis of covariance. *Journal of Abnormal Psychology, 110*(1), 40-48.
- Miller, G.A., Galanter, E., & Pribram, K.H. (1960). *Plans and the structure of behavior*. New York: Holt, Rhinehart, & Winston.
- Millham, J., & Jacobson, L.I. (1978). The need for approval. In H. London & J.E. Exner, Jr. (Eds.), *Dimensions of personality* (pp. 365-390). New York: Wiley.
- Morville, P., & Rosenfeld, L. (2007). *Information architecture for the world wide web* (3rd ed.). Sebastopol, CA: O'Reilly Media.
- Newman, J. (2010). *Facebook's 'like' button: What we know so far*. Retrieved June 13, 2010 from http://www.pcworld.com/article/194500/facebooks_like_button_what_we_know_so_far.html.
- Nielsen, J. (2006). *F shaped pattern for reading web content*. Retrieved May 12, 2010 from http://www.useit.com/alertbox/reading_pattern.html.
- Nyce, M., & Kahn, P. (Eds.). (1991). *From memex to hypertext: Vannevar Bush and the mind's machine*. Boston: Academic Press.
- O'Reilly, T. (2005, September 30). *What is web 2.0? Design patterns and business models for the next generation of software*. Retrieved June 20, 2009 from <http://oreilly.com/web2/archive/what-is-web-20.html>.
- Palfrey, J., & Gasser, U. (2008). *Born digital: Understanding the first generation of digital natives*. New York: Basic Books.
- Paas, F., Tuovinen, J.E., Tabbers, H., & Van Gerven, P.W.M. (2003). Cognitive load measurement as a means to advance cognitive load theory. *Educational Psychologist, 38*(1), 63-71.
- Peterson, G., Aslani, P., & Williams, K.A. (2003). How do consumers search for and

- appraise information on medicines on the internet? A qualitative study using focus groups. *Journal of Medical Internet Research*, 5(4), Paper e33.
- Pettigrew, K.E., Fidel, R., & Bruce, H. (2001). Conceptual frameworks in information behavior. In M.E. Williams (Ed.), *Annual Review of Information Science and Technology* (Vol. 35, pp. 43-78). Medford, NJ: Information Today Inc.
- Petty, R. E., Priester, J. R., & Wegener, D. T. (1994). Cognitive processes in attitude change. In R. S. Wyer & T. K. Srull (Eds.) *Handbook of social cognition* (Vol. 2, 2nd ed., pp.69-142). Hillsdale, NJ: Erlbaum.
- Pirolli, P. (n.d.) *Social information foraging and sensemaking*. Retrieved March 30, 2009 from <http://dmrussell.googlepages.com/Pirolli-final.pdf>
- Pirolli, P., Wollny, E., & Suh, B. (2009). So you know you're getting the best possible information: A tool that increases wikipedia credibility. *Proceedings of the CHI Conference*, Boston, MA, 1505-1508.
- Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon*, 9(5), 1-6.
- Rafaeli, S., & Noy, A. (2002). Online auctions, messaging, communication, and social facilitation: A simulation and experimental evidence. *European Journal of Information Systems*, 11, 196-207.
- Rainie, L., Estabrook, L., & Witt, E. (2007, December 30). *Information searches that solve problems*. Washington, DC: Pew Internet and American Life Project. Retrieved June 12, 2009 from http://www.pewinternet.org/~media/Files/Reports/2007/Pew_UI_LibrariesReport.pdf.
- Resnick, P., & Varian, H.R. (1997, March). Recommender systems. *Communications of the ACM*, 40(3), 56-58.
- Resnick, P., Zeckhauser, R., Friedman, E., & Kuwabara, K. (2000, December). Reputation

- systems. *Communications of the ACM*, 43(12), 45-48.
- Rieh, S.Y. (2002). Judgment of information quality and cognitive authority in the web. *Journal of the American Society for Information Science and Technology*, 53(2), 145-161.
- Robins, D., & Holmes, J. (2008). Aesthetics and credibility in web site design. *Information Processing and Management*, 44, 386-399.
- Rubin, R. E. (2004). *Foundations of Library and Information Science*. New York: Neal-Schuman Publishers, Inc.
- Ruthven, I. (2005). Integrating approaches to relevance. In A. Spink & C. Cole (Eds.), *New directions in cognitive information retrieval* (pp. 61-80). The Netherlands: Springer.
- Sarasohn-Kahn, J. (2008, April). *The wisdom of patients: Health care meets online social media*. Report prepared for the California HealthCare Foundation. Retrieved May 15, 2009 from <http://www.chcf.org/topics/chronicdisease/index.cfm?itemID=133631>.
- Shardanand, U., & Maes, P. (1995). *Social information filtering: Algorithms for automating "word of mouth"*. Paper presented at CHI, Retrieved May 12, 2009 from http://sigchi.org/chi95/proceedings/papers/us_bdy.htm.
- Shon, J., Marshall, J., & Musen, M.A. (2000). The impact of displayed awards on the credibility and retention of web site information. *Proceedings of the AMLA Symposium*. Retrieved June 3, 2009 from <http://www.pubmedcentral.nih.gov/picrender.fcgi?artid=2243830&blobtype=pdf>.
- Sillence, E., & Briggs, P. (2007). Please advise: Using the internet for health and financial advice. *Computers in Human Behavior*, 23, 727-748.
- Sillence, E., Briggs, P., Harris, P., & Fishwick, L. (2006). A framework for understanding trust factors in web-based health advice. *International Journal of Human-Computer Studies*, 64, 697-713.

- Sillence, E., Briggs, P., Harris, P., & Fishwick, L. (2007a). How do patients evaluate and make use of online health information? *Social Science & Medicine*, *644*, 1853-1862.
- Sillence, E., Briggs, P., Harris, P., & Fishwick, L. (2007b). Health websites that people can trust – the case of hypertension. *Interacting with Computers*, *19*, 32-42.
- Simon, H.A. (1979). *Models of thought*. New Haven, CT: Yale University Press.
- Slater, M.D., & Rouner, D. (1997). How message evaluation and source attributes may influence credibility assessment and belief change. *Journalism and Mass Communication Quarterly*, *73*(4), 974-991.
- Spink, A., & Cole, C. (Eds.).(2006). *New directions in human information behavior*. The Netherlands: Springer.
- Spink, A., & Greisdorf, H. (1997). Users' partial relevance judgments during online searching. *Online and CDROM Review: The International Journal of Online & Optical Information Systems*, *21*(5), 271-280.
- Srite, M., & Karahanna, E. (2006). The role of espoused national cultural values in technology acceptance, *MIS Quarterly*, *30*(3), 679-704.
- Steinmetz, W., & Ward, B. (2008). *Wicked cool PHP: Real-world scripts that solve difficult problems*. San Francisco, CA: No Starch Press.
- Steinfatt, T.M. (1995). Communication and personality: Improving the predictive fit. In C.R. Berger & M. Burgoon (Eds.), *Communication and social influence processes* (pp. 53-72). East Lansing, MI: Michigan State University Press.
- Stiff, J.B. (1995). Conceptualizing deception as a persuasive activity. In C.R. Berger & M. Burgoon (Eds.), *Communication and social influence processes* (pp. 73-90). East Lansing, MI: Michigan State University Press.
- Surowiecki, J. (2005). *The wisdom of crowds*. New York: Anchor Books.

- Sutter, J.D. (2010). *Facebook makes it easier for users to share interests across the Web*. Retrieved May 12, 2010 from <http://www.cnn.com/2010/TECH/04/21/facebook.changes.f8/index.html>.
- Swets, J.A. (1996). *Signal detection theory and ROC analysis in psychology and diagnostics*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Tabachnick, B.G., & Fidell, L.S. (2001). *Using multivariate statistics* (4th ed). Boston: Allyn and Bacon.
- Talja, S. (2002). Information sharing in academic communities: Types and levels of collaboration in information seeking and use. *The New Review of Information Behavior Research*, 3, 143-159.
- Thompson, H.M., & Henley, S.A. (2000). *Fostering information literacy: Connecting national standards, goals 2000, and the SCANS report*. Englewood, Colorado: Libraries Unlimited.
- Tormala, Z.L., & Petty, R.E. (2004). Source credibility and attitude certainty: A metacognitive analysis of resistance to persuasion. *Journal of Consumer Psychology*, 14(4), 427-442.
- Tormala, Z.L., Brinol, P., & Petty, R.E. (2006). When credibility attacks: The reverse impact of source credibility on persuasion. *Journal of Experimental Social Psychology*, 42, 684-691.
- Tractinsky, N., Cokhavi, A., Kirschenbaum, M., & Sharfi, T. (2006). Evaluating the consistency of immediate aesthetic perceptions of web pages. *International Journal of Human-Computer Studies*, 64, 1071-1083.
- Tseng, S., & Fogg, B.J. (1999). Credibility and computing technology. *Communications of the ACM*, 42(5), 39-44.

- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185(4157), 1124-1131.
- Tynan, D. (2010). *Yet another reason to hate Facebook's like button*. Retrieved June 13, 2010 from http://www.pcworld.com/article/198635/yet_another_reason_to_hate_facebooks_like_button.html?tk=hp_new.
- Vakkari, P., & Hakala, N. (2000). Changes in relevance criteria and problem stages in task performance. *Journal of Documentation*, 56(5), 540-562.
- Walther, J.B., Wang, Z., & Loh, T. (2004). The effect of top-level domains and advertisements on health web site credibility. *Journal of Medical Internet Research*, 6(3), Paper e24.
- Wang, Z., Walther, J.B., Pingree, S., & Hawkins, R.P. (2008). Health information, credibility, homophily, and influence via the internet: Web sites versus discussion groups. *Health Communication*, 23, 358-368.
- Wathen, C.N., & Burkell, J. (2002). Believe it or not: Factors influencing credibility on the web. *Journal of the American Society for Information Science and Technology*, 53(2), 134-144.
- Wilson, T.D. (1999). Models in information behavior research. *Journal of Documentation*, 55(3), 249-270.
- Wen, J. (2003, Winter). Post-valued recall web pages: User disorientation hits the big time. *IT & Society*, 1(3), 184-194.
- World Internet Usage Statistics, News, and World Population Stats*. (2009). Retrieved May 22, 2009 from <http://www.internetworldstats.com/stats.htm>.
- Zalesny, M.D., & Ford, J.K. (1990). Extending the social information processing perspective: New links to attitudes, behaviors, and perceptions. *Organizational Behavior and Human Decision Processes*, 47, 205-246.