

## ORIGINAL ARTICLE

**Social and Heuristic Approaches  
to Credibility Evaluation Online**

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*The tremendous amount of information available online has resulted in considerable research on information and source credibility. The vast majority of scholars, however, assume that individuals work in isolation to form credibility opinions and that people must assess information credibility in an effortful and time-consuming manner. Focus group data from 109 participants were used to examine these assumptions. Results show that most users rely on others to make credibility assessments, often through the use of group-based tools. Results also indicate that rather than systematically processing information, participants routinely invoked cognitive heuristics to evaluate the credibility of information and sources online. These findings are leveraged to suggest a number of avenues for further credibility theorizing, research, and practice.*

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Although research in the last decade has provided significant insight into how people assess the credibility of online information and sources, much of it has proceeded from dual assumptions that are currently untenable. Specifically, the majority of research almost exclusively considers individuals as making credibility judgments in isolation from one another, thereby ignoring more social means and tools of credibility evaluation. In addition, scholars have largely presumed that individuals must evaluate information in a cognitively effortful fashion to arrive at credibility judgments and have thus neglected the ways in which more heuristic evaluative strategies may be invoked to form credibility assessments.

This study extends conceptualizations of credibility assessment to incorporate new realities of the Web environment, as well as new theorizing in the areas of information processing and evaluation. Specifically, we suggest that recent sociotechnical developments offer new means for social- and group-based information evaluation and credibility assessment that have been entirely ignored by existing credibility research. In addition, mounting evidence in cognitive science and psychology suggests that, particularly within information-abundant environments such as the Web,

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heuristic—as opposed to systematic—cognitive processing is a common means of coping with information overload and uncertainty (Gigerenzer & Todd, 1999; Pirolli, 2005; Sundar, 2008; Taraborelli, 2008; Wirth, Bocking, Karnowski, & von Pape, 2007).

Given the nascence of research in this arena, the complexity of features of the Web environment, and the richness of the data required to understand the phenomenon, we conducted a series of in-depth focus group sessions with Internet users around the United States to examine these issues. These data provide a particularly deep and nuanced view of users' attitudes and behaviors that is rare in the credibility research literature, which has been heavily based on survey and quasi-experimental data. As discussed later, our findings have important implications for online credibility theory, practice, and research, both past and future.

### **Credibility and the evolving media landscape**

Recent changes in the media landscape suggest a compelling view of Internet use and users as vigorously *social*. In particular, the explosion of social computing in the last several years, whereby individuals engage in widescale communication, collective resource building, and collaboration online has undermined the characterization of Web use as a predominantly individualistic endeavor. Examples of social computing technologies and applications include blogs, wikis, social bookmarking (i.e., the sharing of favorite Web sites), social networking sites, and ratings, recommendation, reputation, and credentialing systems. The abundance and diversity of such information sources make traditional notions of credibility as originating from a central authority (e.g., a teacher, expert, doctor, or organization) problematic, and traditional credibility assessment strategies and techniques potentially outdated.

These concerns are reflected by Callister (2000), who argued that standard conventions of determining credibility break down in cyberspace. Traditional solutions to credibility include granting credibility to some representative believed to provide reliable information (e.g., the government) or granting it by credential (e.g., expertise). This works, he says, only when there are a limited number of sources and when there are high barriers for access to public dissemination of information because these conditions create a meritocratic filtering process—only those with something of merit to say are published, put on the air, or allowed to teach/practice (p. 412). In other words, these conditions create an environment of information scarcity where it is possible for gatekeepers to produce and filter much of the information available, and where those gatekeepers have incentive to uphold credibility standards. The Internet presents a very different environment—one of information abundance—which makes traditional models of gatekeeper oversight untenable. In such an environment, people must defer to external sources of knowledge on a very large scale, resulting in a “radical externalization of the processes involved in trust assessment” (Taraborelli, 2007, p. 1).

One form that this externalization takes, we argue, is greater reliance by individuals on more social means of online information processing and evaluation. Digital

media's ability to aggregate information and to connect individuals to one another, for example, provides new potential for determining information credibility and for undermining traditional authorities (Flanagin & Metzger, 2008). The potential for peer-to-peer credibility assessment can be seen in numerous Web-based applications, ranging from "credentialing" activities present on eBay or Amazon, to topical discussion forums in which individuals provide firsthand experiences and opinions on a host of topics. Paradoxically, then, although digital media and information abundance may complicate people's confidence in and knowledge of who is an authority, electronic networks and social computing applications make it easier for individuals to harness collective intelligence to help them assess and evaluate information and sources online. In the words of Madden and Fox (2006), social computing tools and applications can "replace the authoritative heft of traditional institutions with the surging wisdom of crowds" (p. 2). The result may be a shift from a model of single authority based on scarcity and hierarchy to a model of multiple distributed authorities based on information abundance and networks of peers.

At the same time, however, social computing tools and applications pose difficulties for credibility assessment. Anonymous and multiple authors make the concept of "source" difficult to understand or authenticate and, as such, users know little about the expertise, qualifications, and potential biases that may be infused into the information they obtain from these types of resources (Fritch & Cromwell, 2001; Sundar, 2008). Recently, the credibility of Wikipedia information has been debated due precisely to these problems, and opinions vary about the degree to which information found in such environments can be trusted (BBC News, 2007).

These recent developments in the media landscape are virtually absent in the credibility research literature. As mentioned earlier, studies have focused nearly exclusively on how individuals assess the trustworthiness and accuracy of information they find on typical, institutionally created, and/or sponsored Web sites, such as traditional news media organization sites, e-commerce sites, or health sites. Almost no studies have sought to understand credibility processes and perceptions of user-created and shared content (for exceptions, see Banning & Sweetser, 2007; Johnson & Kaye, 2004), nor have researchers explicitly investigated how individuals employ or access social collaborative efforts to evaluate information online. We argue that changes in the nature of both Web content and Web content providers now require research exploring how individuals use *social-* and *group-based* information to arrive at credibility decisions. Hence, our first set of research questions is:

**RQ1:** Do people use social- and group-based means of evaluation to help them determine the credibility of information and sources online and, if so, in what ways do they do so?

**RQ2:** Do people perceive social computing tools and applications to provide credible information?

### Current perspectives on information processing and evaluation

Research shows that few Internet users engage in laborious information evaluation tasks, opting instead to base decisions on factors like Web site design and navigability (Fogg, 2003a; see also Metzger, 2007 for a review). Fogg et al. (2003), for example, found that online information consumers' predominant credibility consideration was "site presentation," or the visual design elements of Web sites, rather than any content or source information. They argue that because Web users do not spend long amounts of time at any given site, they likely develop strategies for assessing credibility very quickly and, thus, "one could argue that people typically process Web information in superficial ways, that using peripheral cues is the rule of Web use, not the exception" (p. 15). Walther and Burkell (2002) similarly found that users first evaluate Web information based on its surface characteristics, such as the appearance of a Web site or its layout. Moreover, across a series of five studies, Flanagin and Metzger found that people reported verifying the information they found online only "rarely" to "occasionally" and tended to use verification strategies that required the least time and mental effort to perform (Metzger, 2007).

Overall, research in this area finds that Internet users will exert more or less effort in determining the credibility of online information depending on the information-seeking context (Metzger, 2007; Taraborelli, 2008). Accordingly, Metzger proposed a dual processing model of credibility assessment, based on Petty and Cacioppo's elaboration likelihood model and Chaiken and Eagly's heuristic-systematic model of information processing. Under conditions of high motivation, online information seekers will likely pay more attention to information quality cues and perform more rigorous information evaluation than when motivation is lower. Stated in dual processing terms, Internet users will be more likely to use "central" or "systematic" processing to establish the credibility of information they encounter online when motivated and able to do so and will likely rely on more "peripheral" or "heuristic" credibility cues and processing strategies when motivation or ability to judge the quality and trustworthiness of online sources or information is low.

Recent credibility studies (Hilligoss & Rieh, 2008) and theories from information processing and cognitive science (Sundar, 2008; Taraborelli, 2008) provide preliminary support for this model. For example, the limited capacity model of message processing (Lang, 2000) argues that because people do not have unlimited cognitive capacity to process messages, they rarely process all aspects of messages, instead selecting only salient features to encode, store, and retrieve. Similarly, the prominence-interpretation theory of Web credibility (Fogg, 2003b) suggests that not all elements of a Web site will necessarily be noticed or selected and therefore evaluated. These perspectives have at their core the notion that people do not always invest their full mental capacities in information-processing tasks.

Indeed, cognitive scientists have long understood that people have constraints on their ability to process information. *Bounded rationality* (Simon, 1955), for instance, stipulates that people are not always able to act perfectly rationally due to limitations imposed by the human mind (e.g., noninfinite computational resources) and external

conditions (e.g., noninfinite time). It operates on the principle of least effort and takes into account the fact that decision makers “must arrive at their inferences using realistic amounts of time, information, and computational resources” (Gigerenzer & Todd, 1999, p. 24). As such, individuals’ behavior is *adaptive*, meaning that people seek to find an optimal balance between cognitive effort and efficient outcomes. One form of bounded rationality in the area of information processing is *satisficing*, whereby people do not use all their cognitive resources to obtain optimal outcomes, but instead use just enough to provide a sufficiently optimal outcome for the context.

These ideas have been applied recently in information-foraging theory (Pirolli, 2005; Pirolli & Card, 1999), which claims that whenever feasible humans will choose behaviors that “tend to optimize the utility of information gained as a function of interaction cost” (Pirolli, 2005, p. 351). Even though the Web has reduced some costs of information search by increasing information distribution and accessibility, there are still significant costs of interacting within the informational environment of the Web in terms of time, given the vast amount of available information. Consequently, satisficing may be a common strategy of Internet information seekers (see Pirolli, 2005). In fact, Gigerenzer and Todd (1999) argue that information processing employing highly rational, true optimizing strategies is actually quite rare.

Taken together, these theories of information processing suggest that Internet information seekers are likely to cope with the perceived costs of information search and overload by seeking strategies that *minimize* their cognitive effort and time, through the use of *cognitive heuristics*. Cognitive heuristics thus constitute information-processing strategies consisting of useful mental short cuts, rules-of-thumb, or guidelines that reduce cognitive load during information processing and decision making.<sup>1</sup> According to Gigerenzer and Todd (1999), “heuristics employ a minimum of time, knowledge, and computation to make adaptive choices” and “can be used to solve problems of sequential search through objects or options” (p. 14). Although in some views heuristics are thought to lead to biased or faulty information processing and, thus, decision making (Tversky & Kahneman, 1974), evidence is mounting to suggest that heuristics are not only more common and more efficient information-processing strategies but can also be *equally* effective as more cognitively demanding strategies in inference and decision making (Gigerenzer & Todd, 1999; Gladwell, 2005).

We contend that credibility research can profit by incorporating notions of information evaluation that place more emphasis on the use of cognitive heuristics in information-processing tasks. Indeed, recent work (Hilligoss & Rieh, 2008) finds evidence that the use of heuristic-based cognitive processing governs online information seekers’ credibility judgments, at least to some extent. To probe the uses of cognitive heuristics further and to extend work in this area, we propose the following research questions:

**RQ3:** Is there evidence that information seekers rely on cognitive heuristics to discern the credibility of online information?

**RQ4:** If so, what kinds of cognitive heuristics do people use to assess credibility in online contexts, and under what conditions?

## Method

Although the vast majority of extant credibility research is based on survey and experimental evidence, focus groups were used in this study to empirically investigate credibility assessment processes and strategies. Focus groups offer several advantages over other methods, including (a) their ability to provide a deeply nuanced view of Internet users' information evaluation strategies, (b) their utility in exploring cognitive heuristics that are not easily quantifiable or measurable using conventional methods, and (c) the degree to which focus groups encourage participants to reflect upon personally relevant and real information-seeking activities, rather than contrived laboratory experiences or survey scenarios imposed by the researcher. In addition, focus groups are effective at eliciting comments and experiences that might not otherwise be raised through one-on-one interviews by virtue of the natural, extended interaction that takes place among multiple group members during focus group sessions. They also allow for immediate comparison and cross-validation of practices and experiences between participants that could not be revealed in individual interviews.

Market research firms operating in several cities in the United States were employed to conduct the focus group sessions used in this study. To maintain consistency across research sites, a standard discussion guide was created and was adhered to by a professional moderator at each location, who conducted the focus group session. The discussion guide was pilot-tested by two separate focus groups consisting of undergraduate students ( $N = 20$ ). Feedback from these groups was used to modify the discussion guide, which was then administered to the 11 focus groups that generated the data used for analysis.

The discussion guide asked participants about their online information-seeking behavior generally (e.g., types of information typically accessed online and usual sources of online information), overall concern about the credibility of online information and the trustworthiness of specific tools and applications (i.e., ratings, wikis, and blogs), strategies for evaluating information (including use of both individual and social means of credibility assessment), conditions where credibility is more and less important, problems of credibility assessment, and feelings about and strategies for coping with information overload.

## Procedure

Moderators were provided with a copy of the final discussion guide in advance of the focus group sessions they were to conduct and were trained by the moderator who conducted the two pilot focus group sessions. Through this process, any ambiguous information on the discussion guide was clarified and specific points of focus were accentuated for each moderator.

Focus group participants were recruited by the various market research firms either by local online and newspaper advertisements or through standing panels of subjects available to each firm, where panelists were invited to take part in studies no more than two times per year. Potential participants were screened on a number of factors (e.g., demographic characteristics and Internet experience and expertise) in order to garner a relatively diverse yet balanced group of subjects, particularly as considered across research sites. In all cases, subjects participated in the focus groups in a dedicated small conference room facility, and all sessions were video and audio recorded. Subjects received monetary compensation for their participation, and sessions ranged from 75 to 100 minutes in duration. All focus group sessions were fully transcribed from the audio and video files, and the transcripts served as the basis for subsequent analyses.

### Participants

A total of 109 ( $N = 109$ ) participants took part in 11 different focus group sessions, ranging from 7 to 12 participants each ( $M = 10$ ). Focus group sessions were conducted in moderately to highly populated cities in 10 different U.S. states, including Alabama, Arizona, California, Florida, Maryland, Massachusetts, Minnesota, Ohio, Texas, and Washington. Self-report data indicated that 83 participants (76%) used the Internet “frequently,” 20 participants (18%) used the Internet “sometimes,” and 6 participants (6%) “rarely” used the Internet. Thirty-eight participants (35%) reported they were “advanced” Internet users, 44 (40%) claimed they were “intermediate” users, and 27 (25%) said they were “beginners.”

Regarding the demographic characteristics of the sample, 55 participants (51%) were female and 54 (49%) were male. Thirty participants (28%) were between the ages of 18 and 32, 43 (39%) were between the ages of 33 and 54, and 36 (33%) were 55 years of age or older. Twenty-one participants (19%) indicated their highest degree was a high school diploma, 15 participants (14%) indicated they held Associate’s degrees, 29 (27%) indicated they had attended some college (or were still in college), 28 (26%) had obtained either a BA or a BS degree, and 16 (15%) held graduate or professional degrees. Seventy-nine (72%) were White, 14 (13%) were African American, 9 (8%) were Latino, 2 (2%) were Asian, 1 (1%) was Native American, 1 (1%) was a Pacific Islander, and 3 (3%) were “other” races. Finally, among the participants, 18 (17%) earned less than \$35,000 annually, 30 (28%) earned between \$35,000 and \$49,000 per year, 19 (17%) made between \$50,000 and \$64,000 yearly, 9 (8%) earned between \$65,000 and \$79,000 annually, 11 (10%) made between \$80,000 and \$100,000 annually, and 15 (14%) had salaries greater than \$100,000 per year. Seven people (6%) refused to provide their salaries.<sup>2</sup>

### Data analysis

The 11 focus group transcripts were analyzed using the constant comparison method (Krueger & Casey, 2000). Responses to the focus group protocol from each of the sites were analyzed by grouping similar responses together, which sets aside



unique responses for further analysis. Due to the large number of focus groups, individual site responses were then compiled in a series of summary documents to compare answers across sites, again grouping similar responses together and setting aside those that were unique. From these documents, a master summary was created that incorporated items that met the following criteria: frequency, specificity, extensiveness, and similarity (Krueger & Casey, 2000; Morgan, 1988). For example, those responses that were most frequent across all research sites, were most similar across all sites, or contained substantial detail were included. Additionally, compelling but unique comments were included to preserve the richness of the data and are represented as such in the results. From the categorized responses, emergent themes were identified. Researchers then reviewed and double checked these summaries and themes to verify the interpretations.

## Results

Data from the focus groups provided insight into participants' social means of credibility assessment and also shed light on the types of cognitive heuristics that online information seekers use to judge credibility. The first section of the results discusses four central themes that arose from the data analysis in regard to the first two research questions concerning social- and group-based means of credibility assessment. The second section discusses the third and fourth research questions and five heuristics that emerged from the focus group discussions.

### **The role of social information and social influence on credibility assessment**

Although evaluating information online has often been depicted as a lonely and singular endeavor (Flanagin & Metzger, 2008), participants in our focus groups provide a very different image. A strong theme throughout the focus groups was the importance of using social networks, both online and offline, to help find, evaluate, and verify information on the Internet. Although diverse, the social- and group-based credibility assessment strategies coalesced into four categories: social information pooling, social confirmation of personal opinion, enthusiast endorsements, and resource sharing via interpersonal exchange.

#### *Social information pooling*

The use of social information pooling was in ample evidence throughout the discussions in participants' comments about their use of user-generated content to help navigate and evaluate information online. Participants spontaneously and frequently discussed their use of social means of information sharing via tools such as feedback systems, testimonials, and reputation systems as ways to help them make credibility evaluations. For instance, many participants indicated that they looked at the number of testimonials or reviews available online, paid attention to the proportion of negative to positive reviews, or relied more heavily on negative versus positive reviews. At every focus group site, participants reported using these tools



to help them evaluate claims made about products, verify information needed for offline purposes like health care, and learn about new ways to engage their personal hobbies or special interests.

Most participants agreed that the more testimonials available to them on a Web site, the more likely it was that the rating or assessment was credible. As a participant from Gainesville, Florida noted, if there were very few opinions or testimonials, “then I assume it’s the guy’s mother.” Moreover, the presence of at least *some* negative reviews on a site lent the overall rating more credibility, because negative reviews reveal a more balanced representation of the entity being reviewed. For instance, a Seattle, WA, participant explained that having all positive reviews suggested “it might be a little sketchy because nothing’s all good” and a participant in Baltimore, MD, stated “When [testimonials] give you both sides, you’re more likely to give them more credence or believe them.” Accordingly, some participants noted that negative comments were more credible than positive comments because they found them to be more honest. Others, however, suggested that negative testimonials are written by people who have an “axe to grind” and are therefore biased. These contradictory sentiments highlight the authenticity dilemma inherent in social computing tools: In an environment where one can never be sure of the actual identity of a reviewer, our participants developed strategies to assess a source’s credibility as best they could.

More generally, participants suggested that tips provided by real people were highly useful. Participants noted that knowledge derived from individuals’ actual use or practice was often more reliable than information provided by a company or manufacturer, which might be biased. One Santa Barbara, CA, participant, for example, felt that he could trust testimonials, noting that:

There’s a lot I don’t trust about the Internet, but I do trust the reviews somehow. When I read them through they give me a different slant on it than the overview or the advertising. It’s a more personal response . . . This really gives me a wider look at it, and it saves me from doing research by [other] people taking the time to do that.

Indeed, participants indicated that social recommendations are both useful and valuable. One participant in Minneapolis, MN, for example, said that posts on discussion boards help “personalize” the information found online by providing answers to his specific questions. A participant from Seattle remarked that he turned to others online in order to get credible and trustworthy information about potential purchases, above and beyond the manufacturer’s description:

I play music, so if I’m looking at a particular piece of music equipment, you know, maybe I’ll go to the site that’s the brand name of that [equipment], and you can usually find blogs and chat room discussions about it to research and see all the flaws, [from] people that already own it and understand it.

On the other hand, some social computing tools such as blogs, wikis, and social networking sites were mentioned far less frequently as being used and useful. These particular tools seemed to engender greater skepticism, especially among older participants. For instance, many participants spontaneously questioned the credibility of Wikipedia. In some cases, this concern was born out of news reports in the media about the potential for fraud by individual users or editors (e.g., BBC News, 2007). For others who had not heard of Wikipedia prior to the focus group session, they were very uncomfortable with its self-editing nature and immediately voiced that this type of system could never be trusted. Contrary to previous comments about the benefits of testimonials and feedback systems, both of which are inherently self-edited, some participants were clearly uneasy with the open-content system of Wikipedia. For them, encyclopedias require a higher evaluative burden that ordinary Wikipedia contributors could not meet.

Those participants who did use Wikipedia felt that it was especially good for getting the basic facts on a topic, information on technical matters, or information regarding timely and ongoing current events. These participants, in particular, considered Wikipedia as “a good starting point” for their information searches, and generally arrived at Wikipedia through a Google search. They said that Wikipedia entries provided them with “good” information, key search terms, and basic facts that supplemented future search queries, as illustrated by a Birmingham, AL, participant who explained that once information was found on Wikipedia, you could then “back out of it and go and look at another source that’s listed under it there” as a way of verifying the information obtained.

In addition, many participants said that testimonials demanded a higher level of skepticism than Web sites whose content was sponsored or created by a single source. These participants were concerned about the authenticity of the sources in testimonials. Many complained about the difficulty of knowing whether a contributor to these types of venues was who they said they were, as noted by one participant who said “I think I’m always going to be skeptical that there’s somebody that might be affiliated with that product, or that hotel or that individual that’s really leaving feedback to kind of boost it.” Authenticity of the source and, hence, its credibility was very much on the mind of these participants when it came to socially pooled information.

Finally, the degree to which information was thought to be objective or subjective, and the type of venue where it was found, also affected the level of participants’ scrutiny of pooled information. Many participants distinguished between subjective and objective information, noting that “objective” information (e.g., descriptions of specific physical dimensions of a product) was easier to assess with regard to its credibility than more subjective information (e.g., descriptions of the attractiveness of a product). As one participant in Tempe, AZ, said:

I think it depends on what information you’re looking for too, whether it’s something that’s subjective or objective . . . If you’re going to look for a cabin

to rent, well they're going to give you the measurements you can pretty much figure that's probably right. But to say that it's, you know, a beautiful little cottage in the meadow, that's a little more subjective. I think I would not maybe believe everything I read.

Participants believed that subjective information dictated greater care and analysis to assess and that the "trustworthiness" of this type of information hinges on each individual's preference. Thus, different strategies of credibility assessment seem to operate for each type of information.

#### *Social confirmation of personal opinion*

Some participants brought up the importance of finding like-minded individuals to aid in their search for credible information. A Minneapolis participant stated that, "a lot of the [Web sites] I go to are people that basically I trust, and we have similar views." They suggested that similar personalities and shared interests and viewpoints guide their evaluations. Another participant from Minneapolis proposed that "You'll hook up with people that you're most like, so you'll respect their opinions."

Indeed, the match between some information and one's existing belief, opinion, or perspective was mentioned frequently as a good indicator of credibility. If information found during a search matched the existing beliefs of the participant or originated from a source substantially similar to him or her, then these sources or pieces of information were likely to be considered credible. This seemed to especially be true for some participants when searching for information about politics and current events. A participant from Baltimore explained that,

You don't know which is really true and which isn't, except by what you believe. Like if Rush Limbaugh said it, I wouldn't believe it. If someone more liberal said it, I would probably trust it more, because I lean more that way.

Another participant in Tempe described helping her daughter find credible information on Wikipedia for a school report:

For me it was one of those places I was looking up information for my daughter's report, and so it was information that I already had a basic knowledge of, I was just confirming it and having to print it out in a form that she could use to help make her report.

Sometimes, participants indicated that once they found information that confirmed their own belief, they stopped their search. For instance, one participant in Seattle said that he would settle arguments with friends by going to Wikipedia. "If I'm in an argument with my roommate, and I just want to prove her wrong or something, and it's like 'well let's check Wikipedia and if it says it's right then I'm right.'" Selectivity, therefore, likely plays an important role in online credibility assessments.

Indeed, the diversity of information and viewpoints available online, coupled with the control afforded to users to decide what content to expose themselves to, has created a resurgence of research on selective exposure and its effects (Stroud, 2007). Not surprisingly, studies are finding that Internet users tend to select content that is consistent with their attitudes and opinions and that people tend to evaluate attitudinally consistent information more favorably than inconsistent information (Fischer, Jonas, Frey, & Schulz-Hardt, 2005; Johnson, Zhang, & Bichard, 2008). Moreover, the tendency to be biased toward attitudinally consistent information may be accentuated when gathering information online, where time and motivation restrict users' ability to process and evaluate all the information retrieved in a typical search (Fischer *et al.*, 2005). In line with this work, our data show that by avoiding information that is contrary to existing beliefs and ending a search when the information found is in agreement with those beliefs, participants appear to employ selective filters to assist them in determining the credibility of information found online.

#### *Enthusiast endorsements*

Another form of social engagement that our participants used to help determine credibility was relying on "enthusiasts," or presumed but noncredentialed experts who offer guidance via public forums, wikis, blogs, and testimonials. People ranging from hobbyists to those seeking alternatives to medical treatments mentioned this strategy. One participant from Minneapolis discussed seeking help on a photography-oriented Web site:

You know, somebody will say "I took this picture and it looks like this. What am I supposed to do" and so . . . I'll say, "oh yeah, I've done that before" and . . . somebody's who's maybe a better photographer than I am will say "you know, try this."

The process by which participants came to trust enthusiasts is instructive. At first, participants mentioned testing the information provided by enthusiasts to verify its credibility, whether it was links to Web sites or advice on pets. Once participants had used this information in a way that generally did not have the potential for serious negative consequence and found it to be credible, then they would begin to trust that particular source regularly. This type of credibility sampling technique was commonly referred to for a wide range of information and credibility needs.

While reading others' opinions online, participants indicated that discerning expertise and intelligence was critical in determining a source's credibility and usefulness. Indicators such as topic mastery, writing style, spelling and grammar, and the extent of details offered were essential to evaluations of an enthusiast's expertise. Enthusiasts are often perceived as credible because they demonstrate topic mastery via their technical knowledge. Moreover, because in many venues online postings are archived over time, and a source's credentials are often based on their past advice,

enthusiasts can be readily identified and discerned over time. As a participant from Cleveland explained about an online forum he participates in for bands:

One of the things they'll show is how many posts a person has and you get a ranking. So somebody will know I've posted 50 messages so I'm a junior member, or somebody who's posted 10,000 messages who is the ultimate senior member kind of thing. But you start to interact with these people, and even though it's just online, you really start to, to a certain extent, develop relationships, form opinions, you know what their personality is, you can know that if a certain topic comes up that one person's going to respond this way and another person's going to respond another way.

#### *Resource sharing via interpersonal exchange*

Participants demonstrated the power of social networks in both online and offline contexts. For example, a participant in Cleveland said, "I trust the recommended Web sites and I save it and I pass it on through other people on my e-mail list." Interpersonal recommendations, especially those from friends and family, were perceived as highly reliable. For example, another participant stated, "If it's a friend that referred them, you know I usually generally trust them." Another participant in Seattle mentioned that she knew a site was credible when she had heard about it from multiple people: "Because it was a good Web site, a major Web site that everyone said 'Oh this is a great site, go to that.' So you know it wasn't just some sketchy thing that popped up."

Social computing tools also allow for low effort, widescale information sharing that helps users discern credibility. A participant in Seattle explained that recommender systems made finding good movies much easier by saying, "If you're a subscriber [of Netflix] you can connect with all of your friends. If you see a really good movie, you can just send out an e-mail to those friends saying 'hey this one was good, check it out.'"

Interestingly, participants across all sites also actively engaged each other during the focus groups by sharing experiences and knowledge with one another. For example, if a participant mentioned a trusted Web site that others had not heard of, they would immediately exchange the site's URL and converse about the site's benefits. Thus, as they discussed seeking others' assistance in finding and vetting credible information online, participants also engaged in interpersonal exchange of information offline, during the focus group sessions themselves. Many even requested pen and paper to jot down notes about site addresses to visit later. In addition, at most sessions participants asked their own vetting questions before accepting others' recommendations.

#### **Cognitive heuristics**

Data analysis revealed five heuristics commonly employed by participants when evaluating credibility: reputation, endorsement, consistency, expectancy violation, and persuasive intent. As Gigerenzer and Todd (1999) explain, it is often difficult to

sort heuristics into mutually exclusive categories. Their research shows that although some heuristic principles are sufficiently specialized so as not to be transferable across situations, many situations elicit multiple heuristics. Furthermore, heuristics can be combined and recombined, one can serve as a building block of another, and they can be nested. Because heuristic principles can be combined in multiple ways, several guises of more basic heuristics can be identified, as with our data.

### *The reputation heuristic*

One of the most prevalent heuristics used for evaluating credibility that was mentioned by focus group participants was relying on site or source *reputation*. The reputation heuristic signals a reliance on the reputation or name recognition of Web sites or sources of Web-based information as a credibility cue, rather than a close inspection of site content or source credentials. For example, a participant in Santa Barbara mentioned that she trusts big companies, such as Amazon.com, because everyone knows of them. Similarly, a participant in Baltimore stated that he feels Amazon is credible because “Amazon’s been in business for a long time, they’ve done a lot of business, and they’re probably fairly reputable.”

Many of the focus group participants also mentioned that they often transferred credibility assessments based on reputation. That is, the perceived credibility judgment of a company’s brand name was used to evaluate the credibility of that organization’s online Web site content. As an example, a participant in San Antonio, TX noted that:

I think it depends on the credibility of the company or the site itself. If it’s a government Web site or if it’s a big company like CNN, they’ve already established their credibility and so their Web site, you’re gonna be more trusting of it.

The reputation heuristic is likely psychologically rooted in part on a simpler heuristic principle of favoring recognized alternatives over less familiar options as a strategy for making judgments with minimal cognitive effort. Gigerenzer and Todd (1999) present compelling data that show people tend to attribute higher values on a criterion to recognized alternatives compared to unrecognized ones. Applied to the context of online credibility judgments, when choosing between sources, people are likely to believe that a source whose name they recognize is more credible compared to unfamiliar sources. People appear to reason that name recognition is earned by positive interactions over time that are spread through social networks. The reputation heuristic may also be a subset of the “authority” heuristic in credibility assessment. As Sundar (2008) explains, one of the most robust findings in the credibility research literature “is that a major criterion for assigning credibility to a Web site is whether the source is an official authority or not” (p. 84).

In sum, the focus groups provided a good deal of evidence that a Web site or source’s reputation serves as a heuristic credibility cue allowing users to avoid more

effortful and systematic processing of content as they evaluate online information. Further evidence for the presence and prevalence of this type of heuristic comes from Hilligoss and Rieh (2008), who found that both the familiarity and degree to which a source was considered a primary or official source served as a heuristic means of judging credibility.

#### *The endorsement heuristic*

The focus group discussions also lend support to *endorsement-based heuristics* (Hilligoss & Rieh, 2008), or what is known as *conferred credibility* (Flanagin & Metzger, 2008). The endorsement heuristic suggests that people are inclined to perceive information and sources as credible if others do so also, without much scrutiny of the site content or source itself. A participant in Tempe, for example, stated that they trust PayPal because eBay owns it. Another participant noted "I found that I usually am really receptive to somebody I know that's offering or advising me on a Web site simply because they probably took the time in . . . researching [the] Web site." A different participant in Tempe stated how he felt the links on CNN.com are credible because he trusts CNN, indicating that "They trust the other people so I could trust them."

Evidence for the endorsement heuristic also showed up in the focus groups when people talked about recommendations they received for Web sites, either online or offline. As discussed earlier, people tend automatically to trust sites and sources that were either recommended by known others or that come from aggregated testimonials, reviews, or ratings. Trust derived from known others is an endorsement heuristic that is perhaps underpinned by a common form of heuristic reasoning known as the "liking/agreement heuristic" (Chaiken, 1987), which is a simple decision rule based on the reasoning that "people I like usually have correct opinions on issues" or, more broadly, that people tend to agree with those they like (Chaiken, 1987, p. 4). Ample empirical evidence for such reasoning has been documented in studies of social cognition and persuasion. Trust derived from aggregated information sources stems from a presumption that a Web site is credible if the site or its source receives a lot of positive feedback. For example, in talking about the use of aggregated "star ratings" provided by past customers on sites like Amazon.com, a Cleveland participant said:

When I buy toys or gifts for the kids, especially the video stuff which I don't know anything about it, I just look and see which ones got five stars and I buy it for them . . . you have one game and if 200,000 people buy that game, it must be a good game.

The endorsement heuristic is also likely based in part on what Chaiken (1987) calls the "consensus heuristic," and Sundar (2008) terms the "bandwagon heuristic," whereby individuals tend to assume that if many others think something is correct or good, they are likely to as well. We believe the most fundamental notion, however, is group *endorsement*. The extent to which people rely on endorsement became obvious in our focus groups in instances when people placed more emphasis on this heuristic



than their own firsthand information or knowledge. Regardless of their previous opinion on a product, some participants noted that they often used comments and testimonials to direct their purchase decisions. One Birmingham participant stated that she decided not to purchase a product because of negative consensus:

I just had a daughter, so I was looking for strollers, and I was on Babies R Us Web site. They use the rating system and I found a stroller that I fell in love with . . . but when I started looking at the ratings, they were all like 1 out of 5 and that prompted me to read the comments, and when I read the comments, the majority of the people had negative feedback. I didn't buy that stroller.

#### *The consistency heuristic*

A common strategy for judging credibility mentioned by individuals across the focus groups was validating information by checking different Web sites to make sure that the information was consistent. For example, one person from Boston, MA, indicated that "You go to so many different Web sites for the same thing, that if you find they're all basically saying the same thing then you tend to believe that they're credible and what they're saying is the truth." This consistency heuristic can be accomplished by cross-validation, which, although requiring more cognitive effort than the other heuristic strategies, still functions as a relatively quick means of arriving at a credibility judgment in comparison to the more laborious methods of determining each source's identity and credentials, considering matters of the source's potential bias or agenda, and looking to see when the information was last updated. Indeed, our focus group participants indicated that the consistency or similarity of information on its face is enough to establish credibility in most information-seeking situations.

Cross-validating for consistency as a way of establishing the credibility of information was mentioned in almost all focus groups, typically before participants were asked about strategies for information evaluation. The validation process, however, can be relatively superficial, with participants indicating that they consult at most a handful of sites when verifying information. A participant from Cleveland said that "sometimes I read the first one, that's far as I'm gonna go. Other times I read six or seven of them just to double check and make sure. It depends on how much time I have." Also, if information appeared consistent across the sites they checked, then the information was deemed credible without further study. As one Santa Barbara participant explained:

I try to compare, I'll pull up a couple different Web sites on the same topic and try to read most of everything but not read everything, just find out what similar verbiage and similar things that are pertinent to what I'm looking for, to see if they're valid.

Participants further reported that information found online can be validated both with additional online sources as well as offline ones. In situations where information

was highly consequential (e.g., a large financial transaction or health situation), individuals stated they cross-validate for consistency offline to a greater extent. For example, one person from Boston indicated that “if it’s a fairly large expenditure I won’t use the Web as my only source of information. I’ll back it up with some other fairly credible sources.” The sources of those offline verifications typically were reported as being trusted others, such as family and friends. However, it is important to note that many individuals seemed to regard the information found online as being equally or even more credible than information found from traditional sources.

Cross-validating information to verify consistency across different sources online as a heuristic for credibility evaluation could be viewed as a variant of the endorsement, bandwagon, and consensus heuristics, inasmuch as it operates under the same principle that “people tend to believe things if others believe them.” However, based on our data, we think there is another dimension to the consistency heuristic in credibility evaluations, which plays more on the true meaning of consensus in the sense of agreement: People tend to trust online sources or messages if others *agree* with those sources or messages. Using this principle, the consistency heuristic can be summed up as: “If others agree it’s correct, then it’s probably credible.”

#### *The expectancy violation heuristic*

A major finding from the focus group discussions was that participants often employed an expectancy violation heuristic when evaluating the credibility of information online. Many participants said that if a Web site failed to meet their expectations for a particular type of site (in terms of its appearance, layout, features, functionality, comprehensiveness, etc.), or if the informational content on a site did not conform to their expectations, then they would judge it as *not* credible. Expectancy violations cause arousal and distraction, which compel attention to the violation and cause people to appraise the violation and its meaning (Burgoon, Stern, & Dillman, 1995). According to Fogg’s (2003b) prominence-interpretation theory of credibility, these violations will be noticed and used to (negatively or positively) appraise information and source credibility. As such, the types of expectancy violations observed in our data operate as heuristics in that they enable fast judgments of credibility without a great deal of cognitive effort and scrutiny of message arguments, source qualifications, and other more involved methods of information evaluation.

We observed several types of expectancy violations that have implications for credibility. One form occurred when Web sites asked for more information than necessary or provided more information than was requested by users. An example is reflected in this quote from a Birmingham participant, who was solicited for more information than expected while trying to sign up for e-mail weather updates:

... and then it would also ask you for your e-mail address. I’ve got three e-mail addresses, one for school, one for home, one for crap like that, so I just gave them that one. And then it was asking for my home address and I’m like, time-out, I just want a page. I just want you to send me a note whenever

there's a thunderstorm warning over Shelby County or whatever. You don't need [my home address]. At that point I just backed out.

The second form of this type of expectancy violation is illustrated by participants stating that they did not trust sites that gave them something they did not ask for or expect to receive, for example, when a Web site redirected them to another site. A Tempe focus group discussant said when this happens, "Chances are I wouldn't trust the Web site," because "I feel like, you know, it's not what I asked for." Others agreed that getting redirected is a credibility "red flag." Participants also indicated that they were able to decide quickly that some information was not credible if it sounded unreasonable, such as when online offers were deemed "too good to be true."

Another type of expectancy violation we observed was when information did not conform to users' personal beliefs or opinions. As discussed earlier, many participants expressed a tendency to view information as credible if it confirmed their pre-existing beliefs and not credible if it did not. For example, when asked about news blogs in particular, a participant in Baltimore responded:

It depends on what you believe to begin with. If you believe the Iraq war is wrong and the blog says its right, you're going to say, that blog's all wrong. I'm going to go to one that says [the war is] wrong because I agree with them. So it depends on your opinion.

This illustrates a type of *self-confirming bias* that may affect credibility judgments, whereby the extent to which people feel that information confirms their own opinions or biases determines their perceived credibility of that information. This form of the expectancy violation heuristic may also underlie the "hostile media phenomenon" (Vallone, Ross, & Lepper, 1985), where news consumers tend to believe the media are biased when they hear or see reports that run counter to their own personal point of view.

Of course, the expectancy violation heuristic is highly context dependent. For example, the personal opinions of news reporters may decrease the credibility ratings of a mainstream news Web site but may increase credibility among readers of news blogs. The focus group data also revealed that expectancy violations can override other credibility cues, as when information on a site is well argued, duly researched, comprehensive, appropriately sourced, and so on, and yet is deemed not credible because it runs counter to a user's own opinion. Disconfirming content is likely experienced as an expectancy violation because of the "false consensus effect" whereby individuals tend to overestimate the extent to which others share their own opinions (Ross, Greene, & House, 1977).

A final and especially prevalent form of expectancy violation was linked to a Web site's appearance and functionality. There was a general consensus among the focus group participants that certain Web site features or characteristics were associated with a lack of credibility because they violate expectations of a credible source or site.

For example, bad grammar and typographical errors were mentioned across all the focus group sites as a quick and easy way to determine a site's credibility. A common strategy for assessing credibility was to ask: "Is it poorly designed? Is it misspelled?" One participant went on to add "If somebody's taken the time to invest the money into designing a good Web site, that at least gives some air of credibility to it."

Indeed, a common finding in credibility research is that people often rely on the surface characteristics of Web sites and sources when evaluating credibility. Flanagin and Metzger (2007), for example, found experimental evidence that site design features play an important role in credibility assessment, corroborating Fogg *et al.*'s (2003) survey findings that site presentation features were the primary factor influencing people's credibility judgments. Our focus groups add further evidence that site appearance is a key factor in credibility evaluations and that they serve as a heuristic by reducing cognitive load during information processing (see also Hilligoss & Rieh, 2008).

Across all focus groups, participants identified issues related to bad spelling, grammar, layout, and overall design as the types of things that were likely to decrease evaluations of credibility. For example, one person in Baltimore said that "Occasionally you'll find spelling mistakes, and I think the spelling mistakes make the whole thing not credible." Germane to these decisions is whether a Web site meets the test of professionalism. Participants frequently noted that professional-looking content and site navigation had a significant impact on their site evaluations. One discussant from Minneapolis summarized this trend, speaking about the factors affecting perceived credibility:

If it looks like a third grader did it versus someone that's professional—like they paid somebody to make this Web site. The way it flows, the way things are organized on the site. And you know if it's just one big long [block of text], you have to scroll down forever to get to wherever you want . . . Just the professionalism of the Web site.

Focus group members consistently mentioned issues of spelling and page navigability, both of which contribute in part to perceived professionalism. Furthermore, discussants noted with some frequency that visually unpleasant font type and size, poor layout, and bad use of graphics all indicated "amateurish" sites, signaling low credibility. A person from Boston indicated that "if you read something, and [the Webmaster] spelled all five words wrong, then you're probably not gonna put as much credence in it as if it were eloquently and correctly written." Comments like this illustrate the importance of professionalism to credibility assessments and indicate the role of heuristic evaluations of credibility. If a site exhibits surface credibility by being visually appealing and easy to read, it will instantly establish a base level of credibility, according to the comments of our focus group participants. Moreover, evaluations of appearance and content were highly interrelated. For instance, one person from Seattle noted that:

If there's misspellings, if the sentence structure is run-on, how can I feel confident in the information if the form that I'm getting it in is so poor? You know it's kind of cheesy, but presentation is important, so if there's a misspelling and all that it makes it worse. If a Web site looks pretty put together well, then, that's usually a good validation of its credibility.

The overarching logic is that people expect credible sources to present information clearly and professionally as a reflection of their expertise and attention to detail. When some Web-based information conforms to those expectations, users tend to grant it credibility, or at least are willing to give it the benefit of the doubt until further inspection. This could also stem in part from the liking/agreement heuristic described earlier (Chaiken, 1987), although in this case agreement is a reflection of site liking rather than feelings toward a person. When a Web site does not conform to appearance or functionality expectations, however, users tend to judge it harshly and discount it as noncredible almost automatically.

#### *Persuasive intent heuristic*

Many Internet users from our focus groups identified advertising specifically and perceived commercial or persuasive intent more generally, as major (negative) heuristic cues for making credibility judgments. Previous research has shown that commercial information is viewed as less credible overall (Flanagin & Metzger, 2000) and that individuals become negative about a Web site's credibility almost instantly when presented with unexpected commercial content (Fogg et al., 2003). The implication is that there is some sort of manipulation or ulterior motive on the part of the information provider, which negatively impacts credibility. This type of content seems to elicit an immediate defense mechanism that leads people to mistrust information without further scrutiny. Indeed, strong commercial motivations nearly uniformly produced negative responses from the Web users in our focus groups.

Additionally, Fogg and his colleagues have identified that certain types of Web advertising, especially interstitial or pop-up ads, have additional negative impact on users' perceptions of Web credibility. Sundar (2008) discusses this phenomenon in terms of an *intrusiveness heuristic*, whereby unsolicited and unwelcome information negatively affects users' perceptions of Web site content because the annoyance generated by the information transfers to the site or source itself. Certain types of intrusive advertising such as pop-ups or page-redirects were mentioned explicitly by some focus group participants as being directly related to a Web site's credibility. As a participant in Seattle put it:

Anything that is pushed to me I am much more skeptical about . . . If something comes in my e-mail or I get a pop-up when I'm on a site, that's kind of a red flag that, you know, just watch this information because someone's feeding it to you.

Some focus group participants responded to commercial interests and advertising in surprising ways. Although the perception among most participants was that aggressive persuasive intent leads to negative credibility evaluations, for a smaller subset of participants the negative reactions went further. In extreme examples, suspicion of commercial intent led some users to stop using the entire top-level domain of .com Web sites as a source of credible information. This reaction is supported empirically by research on the evaluation of page content based on top-level domains, although that research also suggests more complex relations between domains and advertising, based on expectancy violations (Walther, Wang, & Loh, 2004).

As with visually displeasing information operating through the expectancy violation heuristic, evidence or even suspicion of persuasive intent seems to act as a negative heuristic credibility cue by drawing users' immediate attention and ire. This heuristic seems to be affectively based, stemming from fears of unknown others' nefarious manipulation. Consequently, users often try to detect ulterior motives that might underlie the information they find online. In many cases, our discussants mentioned this as the first cue that they would use to determine credibility, and often it was mentioned as a heuristic stopping rule for credibility judgments, as illustrated in the following quote:

If I go to a site to look up something or do something, [and] all of a sudden I just get stuck in a pop-up ad here or an advertisement there, usually then I just [think] 'I don't need this' and I'll get right off it.

## Discussion

Our focus group discussions suggest the growing importance of social- and group-based means of credibility assessment, as well as the key role played by cognitive heuristics in evaluating the credibility of information online. The focus group method enabled us to draw on participants' specific experiences with online information and to learn from both spontaneous and prompted discussions of credibility assessment. The richness of these data, derived across multiple regional samples and a wide range of demographics, is unique to the credibility literature and this study provides the first empirical work to offer insight into Internet users' social- and group-based credibility assessment processes.

The data from the focus groups show that social arbitration is a widespread technique for dealing with the abundance of information available in complex information sharing networks like the Web. Internet users in our focus groups frequently turned to Web-based applications like social networking sites or online ratings and reputation systems to help them assess information or its source. In this migration to distal yet relevant information sources, social information pooling, personal opinion confirmation, enthusiast endorsements, and interpersonal resource sharing were increasingly privileged mechanisms invoked by individuals to evaluate the credibility of information found online.

In this manner, the capacity for digital media to connect individuals together directly offers new potential for determining information credibility. In essence, digital media in general, and social computing in particular, enable the uncoupling of credibility and authority on a scale never before possible, and in new ways, by calling into question traditional conceptions of authority as hierarchical, impenetrable, and singularly accurate.<sup>3</sup> Under a model of information scarcity, credibility assessment was typically top-down—people often deferred to experts (e.g., librarians, doctors, etc.) to vet information. Today, however, bottom-up assessments of information quality can be constructed rather easily through collective or community efforts enabled by technology, which in some cases allow information consumers to bypass traditional authorities altogether (Flanagin & Metzger, 2008). In this way, social processes enabled by Web-based tools may be emerging as new arbiters of information credibility, authority, and trust. This more collective approach to credibility assessment also reveals concerns about source identity and authenticity, as well as the importance of information domains and context. Among our participants, these concerns triggered various approaches to the evaluation of socially produced information, ranging from assessing the presence and number of negative ratings for a product, to developing trust by sampling enthusiasts' advice. Although traditional gatekeepers still remain a part of the digital credibility landscape, they are increasingly playing a parallel or even a subordinate role to these group-based methods, depending on information type and motivation.

This study also contributes to a growing body of knowledge about the heuristic processes used in credibility assessment. Together with recent work (Hillgoss & Rieh, 2008; Sundar, 2008; Taraborelli, 2008), our data suggest that under specific circumstances people tend to rely on strategies that maximize their information gain to information-assessment cost ratio, through the use of cognitive heuristics. Our findings clearly show that a common strategy employed by Internet information seekers is to minimize cognitive effort and mitigate time pressures through the use of heuristics. Indeed, findings from this study might help to develop an inventory of heuristics that people use during credibility assessment in the online environment. Identifying these heuristics is an important first step in developing parsimonious explanations of information evaluation behavior online. Moreover, understanding the heuristic processes used in information evaluation can help to design curricula or intervention strategies aimed to increase users' information literacy. Future work can leverage our findings to identify how, when, and which heuristics can lead to prejudiced or problematic credibility assessments and to educate users to recognize potential cognitive biases resulting from overreliance on heuristics.

Although there were additional ways in which our participants indicated they reached decisions about credibility relatively quickly, the five overarching heuristics we identified emerged consistently across almost all the discussion groups. As noted earlier, several of the heuristics we identified may derive from lower-order principles of reasoning and intuition. Indeed, it is possible to further categorize these



five heuristics into two general classes of credibility heuristics: one based in *social confirmation*, and the other rooted in *expectancies within context*.

The idea of social confirmation (or “social proof” as Cialdini, 1984 calls it) seems to underpin the reputation, endorsement, and consistency heuristics identified in our data, which are all premised on the notion that credibility can be established from others’ actions and beliefs. If a number of people use some Web site or information, recommend it, and agree with it, then users assume it is credible. Although this heuristic works well for the most part in helping users find valid information, it is not perfect because it is subject to problems of crowd behavior and may erroneously equate credibility with popularity.

The notion of expectancies within context is a central principle underlying the expectancy violation and persuasive intent heuristics, to the extent that any violation of what is expected for a particular Web site or source (e.g., appearance, format, level of professionalism, disconfirming content, or unexpected forms of advertising) causes an immediate suspicion regarding credibility. Again, this heuristic principle can serve users well in many cases, but it may be overgeneralized and lead to biases in credibility judgments at times. For example, discounting information as not credible because it disconfirms one’s own opinion may lead to myopic evaluations of information quality.

Our study suggests a number of avenues for further credibility theorizing, research, and practice. First, our data make clear the importance of incorporating heuristic processes into models of credibility assessment because people cannot always expend the time and energy required for systematic information evaluation. Although a few existing models of information evaluation address the notion of heuristic processing, they do so nominally. Our results provide a basis for fully articulating the nature of heuristic processes. Future research should thus include further explorations of heuristics, the cognitive biases they may create, and how multiple and competing heuristics operate in tandem to affect credibility judgments. As Sundar (2008) argues, such examinations may help to explain conflicting findings in the credibility research literature.

Future research must also include further examinations of social and group means of credibility assessment, given the increased prevalence and use of such tools and strategies. For example, studies should investigate which cues people attend to within wikis, blogs, reputation and ratings systems, and other peer-to-peer information sources to decide whom and what to trust. This will increasingly require theorizing about how *interpersonal trust* translates to the online environment, where traditional social and physical cues may be lacking. In turn, understanding which cues people rely on will inform the development of tools to help information consumers to determine credibility within these kinds of social and group information contexts (e.g., tools like Wikiscanner and Wikidashboard help users evaluate information quality in Wikipedia).

Finally, findings from this study can also be used to help educators develop more effective and realistic strategies for teaching information consumers how to evaluate

the credibility of information they find online. For example, the results of our study suggest that “contextual” approaches (Meola, 2004) to credibility assessment, rather than “checklist” approaches, may be more successful (see also Metzger, 2007). A large part of contextual credibility assessment strategies involves training users to compare information across more than one source to confirm consistency. A major finding in our data is that people do cross-validate and seek social confirmation as means of evaluating credibility efficiently, which also allows them to conserve time and cognitive resources. Thus, consistent with our findings, heuristic and social processes should be considered together, in order to provide the most holistic, and accurate, view of credibility evaluation today.

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## Notes

- 1 In the cognitive science literature, as well as in the present article, “cognitive heuristics” is often simplified to “heuristics” and these terms are used interchangeably to denote the same concept.
- 2 Although the goal of our participant selection method was not to solicit a representative sample among the U.S. population, demographics of our sample can be compared to national data for reference. The sex ratio of the sample was identical to national data (U.S. Census Bureau, 2006a) and to a recent random national survey of Internet users (Pew Internet & American Life Project, 2008). Educational data are consistent with national surveys showing that Internet users tend to come from more highly educated groups (Pew Internet & American Life Project, 2008). And, our data reflect remarkable similarity to census data on race, which show the U.S. population racial breakdown to be 74% White, 13.4% African American, 14.8% Latino, 4.4% Asian, and 0.14% Native Hawaiian or Pacific Islander (U.S. Census Bureau, 2006b).
- 3 This view corresponds to notions of authority held primarily by virtue of administrative position, normative agreement, or legitimacy based on some established social system (e.g., the legal system, the educational system, etc.). This type of what has been termed “deontic” or “administrative” authority (De George, 1976; Wilson, 1983) is more readily challenged or undermined through the use of technological tools that can be used to aggregate individuals’ experiences and opinions, pool their information, and identify the expertise of “nonexperts” based on specific or situated knowledge. This type of authority stands in contrast to “epistemic” or “cognitive authority,” for example, which arise from specific training, expertise, or knowledge. In essence, technological tools make the identification of epistemic/cognitive authority easier, by reducing the need to rely exclusively on deontic/administrative authority.

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