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# Psychological Approaches to Credibility Assessment Online

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As networked information and communication technologies have enabled nearly instant access, from virtually anywhere, to almost inconceivably large information repositories, people have come to rely upon web-based information resources in a wide variety of ways. For example, even as early as 2006, nearly half of users in the United States said that the Internet played a crucial or important role in at least one major decision in their lives, such as attaining additional career training, helping themselves or someone else with a major illness or medical condition, or making a major investment or financial decision (Horrigan & Rainie, 2006). Yet, the *credibility* of information obtained online can be problematic, which raises concerns about how people obtain, interpret, and evaluate this information.

## Defining Credibility

The study of credibility is highly interdisciplinary and implicates a number of allied concepts. For example, in information science, the emphasis has been on information evaluation, where perceived quality affects information seekers' judgments about the relevance of information (Rieh & Danielson, 2007). In this context, quality has been conceptualized as a user criterion (made up of accuracy, reliability, currency, comprehensiveness, and reliability) invoked when an individual evaluates a piece of information. Authority can also indicate credibility, even without being sanctioned by official credentials, because people may be recognized as "cognitive authorities in the sphere of their own experience, on matters they have been in a position to observe or undergo" (Wilson, 1983, p. 15).

Trust is also closely related to credibility and is a core concern of work in management information systems (MIS), where the focus has been on interpersonal

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or interorganizational trust in technical contexts, including the domains of e-commerce (Gefen, Karahanna, & Straub, 2003; McKnight, Choudhury, & Kacmar, 2002) and technology acceptance (Wu & Chen, 2005; Wu, Zhao, Zhu, Tan, & Zheng, 2011). In organizational studies, trust has also been a critical concern, for instance, in the study of interorganizational relations (Lane & Bachmann, 1998) or interactions and behaviors in virtual teams (Ridings, Gefen, & Arinze, 2002; Sarker, Valacich, & Sarker, 2003). In these contexts, trust refers to one exchange partner's confidence, belief, and expectation that another will act in their best interest.

In the fields of communication and psychology, credibility is traditionally defined as the believability of information, and it rests largely on the trustworthiness and expertise of the information source or message, as interpreted by the information receiver (Hovland, Janis, & Kelley, 1953; Rieh & Danielson, 2007; Tseng & Fogg, 1999). This differs from trust in that although trustworthiness is one dimension of believability, credibility typically also involves a judgment of source expertise or information accuracy as well. Similarly, a key difference from definitions of credibility that focus on information accuracy is in the subjective nature of credibility—trustworthiness is a receiver judgment, based primarily on subjective factors. Expertise can also be subjectively perceived but includes relatively objective characteristics of the source or message as well (see Metzger, Flanagin, Eyal, Lemus, & McCann, 2003; Tseng & Fogg, 1999 for extended discussions of these points). Thus, the fields of communication and psychology treat credibility as a perceptual variable: credibility is not an objective property of a source or a piece of information. Instead, it is a subjective perception on the part of the information receiver (Fogg & Tseng, 1999). As such, the credibility of the same source or piece of information may be judged differently by different people.

Digital media are complicating notions of credibility today (Metzger et al., 2003). Socio-technical changes in the last few decades have spawned new concerns, and amplified existing ones, for people seeking credible information. For example, a number of challenges have accompanied the web's rise to prominence as an information repository, which have become even more pronounced as the Internet has evolved into a vibrant, interactive information sharing environment. The specific nature of these challenges suggests the importance of understanding the psychological dimensions of people's information evaluation experiences.

## Challenges to Credibility in the Contemporary Media Environment

Perhaps the greatest change in the information environment in the last 15 years or so is that digital media have provided access to an unprecedented amount of information for public consumption. As digital network technologies have lowered the cost and complexity of producing and disseminating information, the nature of information providers has shifted. Rather than a small number of sources, each with a substantial investment in the information production and delivery processes, information is increasingly provided by a wide range of sources, many of whom can readily create

and deliver information to large audiences worldwide. One consequence of this evolution in information production is an almost incomprehensibly vast information repository in the form of the Web and other online resources.

Accompanying this proliferation is the fact that much online information is not subject to filtering through professional gatekeepers and, as a result, it may be more prone to being poorly organized, out of date, incomplete, or inaccurate (Danielson, 2005; Flanagin & Metzger, 2000, 2007; Metzger et al., 2003; Rieh & Danielson, 2007). Through what he calls "disintermediation," Eysenbach (2008) notes that networked digital media remove many traditional information intermediaries such as opinion leaders, experts, and information arbiters, thereby forcing individuals to evaluate the vast amount of information online on their own. Moreover, Callister (2000) argues that traditional strategies for information evaluation, such as trusting a source believed to provide reliable information (e.g., the government) or to possess appropriate credentials (e.g., an expert), works only when there is a limited number of sources and when there are high barriers for public dissemination of information. Thus, while under conditions of information scarcity it is possible for gatekeepers to filter much of the information available (and gatekeepers have incentive to uphold credibility standards), the Internet presents an environment of information abundance that makes traditional models of gatekeeper oversight and quality control untenable due to the sheer volume of information that would have to be vetted.

Others have noted that digital media tools sometimes reduce the reliability of standard authority indicators such as author identity or reputation (Danielson, 2005; Fritch & Cromwell, 2002), and yet source information is crucial to credibility because it is the primary basis upon which credibility judgments rest (Sundar, 2008). In some cases, source information is unavailable, masked, or missing online. In other cases, source information is provided, but hard to interpret, such as when information is co-produced, re-purposed from one site, channel, or application to another, or when information or news aggregators display information from multiple sources in a centralized location that may itself be perceived as the source. These issues have prompted concerns about the credibility of online information because they create uncertainty regarding who is responsible for information and, thus, whether it should be believed (Rieh & Danielson, 2007).

Relatedly, understanding credibility online is especially problematic since there are many potential "targets" of credibility evaluation that often are at work simultaneously. Taking the quintessential example of Wikipedia, credibility judgments can be made at the website level (is Wikipedia a credible source of information?), at the content level (is any specific entry within Wikipedia credible?), or regarding specific information author(s) (are specific contributors to Wikipedia credible?). Of course, these various targets can work in concert or at odds with one another, suggesting that in combination the complexity of their credibility judgment is even more pronounced. Research has confirmed this complexity, as past studies have shown that the source and content of information interact in intricate ways, across various user audiences (e.g., Flanagin & Metzger, 2007, 2011).

Finally, the dramatic rise in "user-generated content" in recent years, where individuals are increasingly responsible not just for consuming, but also for producing, many

of the information resources available online, has prompted a number of concerns with regard to information and source credibility. Although user-provided information offers exciting promise, it can also be problematic. The "unfiltered social web" can result in the dissemination of information that is not reliable, and it can be difficult to undo damage from erroneous or biased information distributed via such technologies (see Hesse et al., 2011). In addition, it may be unclear whether the information source is who or what is claimed, and whether the information is original or has been repurposed or altered at some point. Moreover, user-generated mechanisms work best when a diversity of opinions are represented, when individual opinions are independent of others' influence, when community members are able to draw upon specialized local knowledge, and when the convergence of judgments within a community is facilitated (Surowiecki, 2005). Although these conditions are present in some social media venues, they are by no means universal. Group processes are quite often subject to biases through processes of bandwagon effects, groupthink, and other problematic group dynamics (Forsyth, 2010).

In light of the foregoing concerns, we argue that it is critical to understand the psychological dimensions of people's information evaluation experiences. We propose several classes of explanatory mechanisms that help to explain how people navigate the online information environment today, including information processing views, personality-based characteristics, and information assessment perspectives that explicitly take into account the dynamics of social interaction.

## Information Processing and Credibility Evaluation

Studies of credibility evaluation across disciplines such as psychology, communication, education, information science, and others have found that people rely on a wide variety of factors to decide whether to believe the information they obtain online. Early work by Fogg and colleagues (2003), for example, identified over 18 classes of cues that people used to determine the credibility of websites across ten content categories (e.g., news, health, commercial, financial, etc.). These included such cues as author reputation, site design and navigability, writing tone, and users' past experience with the site, for example. Subsequent research added several more cues to this list (Flanagin & Metzger, 2010; Hilligoss & Rieh, 2008; Metzger, 2007), and categorized these in terms of whether each is a feature of the source, message, medium, or receiver (Del Giudice, 2010). For example, author credentials constitute an author cue that information consumers might rely on to assess the relative credibility of information emanating from a source. Information currency, by contrast, is a message cue that has been shown to influence credibility perceptions. The presence or absence of website advertising is an example of a site or source cue affecting perceived credibility, and the degree of an individual's experience with a medium or a source is a receiver characteristic that has been shown to influence people's credibility evaluations. Figure 20.1 presents a list of factors that have been shown to be relevant to the evaluation of the credibility of online information.

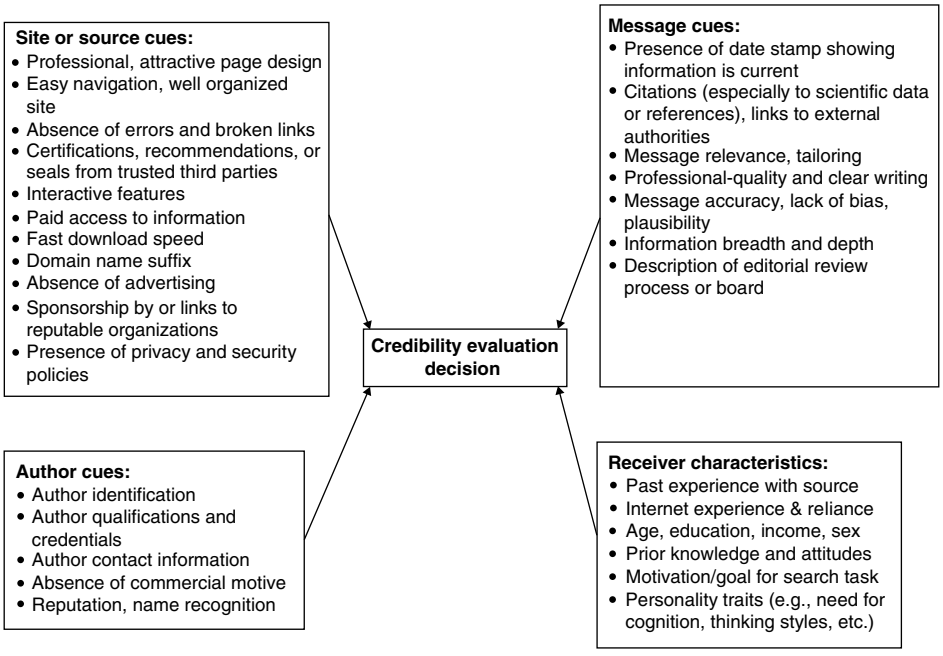


**Figure 20.1** Schematic representation of potential factors relevant to credibility evaluation of online information.

With a dizzying array of credibility cues to choose from, an important question is how information seekers wade through all of the available cues to arrive at a credibility judgment? Information processing theories have been applied to help to understand this process. For example, the Limited Capacity Model of message processing (Lang, 2000) finds that because people do not have unlimited cognitive capacity, they cannot process all aspects of all messages they receive, and so they instead select only some salient features to encode, store, and retrieve.

Fogg's (2003) Prominence-Interpretation Theory of web credibility similarly suggests that not all elements of a website can be attended to by users, and so not all elements will enter into users' credibility evaluations. This theory states that credibility evaluations are a function of users (a) noticing a cue (prominence) and (b) making a judgment about that cue (interpretation) in an ongoing and iterative fashion until the user reaches an overall credibility decision or encounters a constraint, such as lack of time that bars examination of more cues. Prominence is affected by user characteristics (e.g., involvement, experience, ability to process), contextual factors (e.g., time pressures or task type, such as seeking information vs. amusement), and the artifact being evaluated (e.g., the type or content of a website or its navigability). Interpretation refers to the value or meaning that users assign to a credibility cue, typically whether a cue is a positive or negative credibility indicator. Several factors affect interpretation, including users' assumptions, cultural background, prior experience or knowledge, skill, goals, and information seeking context, including norms and expectations. Any

particular credibility cue will only impact an information seeker's credibility assessment if it is perceptually prominent and is both interpretable and interpreted (Fogg, 2003).

Dual processing models of information processing and evaluation, such as the Elaboration Likelihood Model (Petty & Cacioppo, 1981) and the Heuristic-Systematic Model (Chaiken, 1980) (see Chaiken & Trope, 1999 for an overview of dual processing models), have also been invoked to answer the question of how and when people use available credibility cues to evaluate information online (e.g., Metzger, 2007; Sundar, 2008; Wathen & Burkell, 2002). Dual processing models emphasize the role of motivation and cognitive ability in guiding information assessment and decision making, and theorize that people will process messages in more or less depth depending upon the message receiver's motivation and ability to do so.

Metzger's (2007) dual processing model of credibility assessment posits that information seekers' motivation and ability are key to whether and to what degree users will evaluate Web information for its credibility. According to this model, the degree to which online messages will be scrutinized for their credibility depends on individual users' *ability* to evaluate the message, which may be a function of their knowledge or training in how to evaluate information, critical thinking skills, time constraints, or other factors, and their *motivation* or purpose for seeking the information, which involves their awareness and salience of the consequentiality of receiving low-quality or inaccurate information. The dual processing model of credibility assessment posits two general strategies that reflect greater and lesser degrees of cognitive rigor: The "analytic" strategy involves a more systematic attempt to discern credibility by considering more deeply a wider range of author, message, or medium cues. By contrast, the "heuristic" strategy relies on a faster and more cursory examination of credibility cues and often focuses primarily or exclusively on surface characteristics of the information (e.g., the visual design elements of a website) or on a user's gut feelings about the credibility of a piece of information.

Chen and Chaiken (1999) found that individuals' "accuracy goals" vary depending on the situation, such that people are more or less motivated to reach accurate judgments across different contexts. Internet users' accuracy goals likely vary from search to search, and their information seeking may be more or less casual or purposive depending on their goals. While some Web browsing is certainly highly motivated by a person's need to find accurate information (e.g., information sought for an important medical decision), other information seeking situations may not require such a high level of credibility checking (e.g., looking up information on a music group). The dual processing model of credibility evaluation argues that users look to different aspects of Web-based information to assess its credibility such that under conditions of high accuracy motivation, online information seekers will likely pay more attention to a broader array of credibility cues and perform more rigorous information evaluation compared with when motivation is lower (for similar logic, see Fogg et al., 2003; Sundar, 2008; Wathen & Burkell, 2002). Consistent with this model, credibility assessment has been shown to vary by information type, such that people exert significantly more effort to verify the credibility of factual or reference information than they do for entertainment information (Flanagin & Metzger, 2000).

Others have confirmed that user ability also plays a role in predicting online information seekers' credibility assessment strategies. For example, studies have found that Internet experience and Internet self-efficacy are positively related to the amount of effort users exert to verify the credibility of information they find online (Flanagin & Metzger, 2000; Hong, 2006), and other research has shown that topic experts employ more cues to evaluate the quality of a website's information and an information source's credentials, and are less likely to rely exclusively on simple visual appeal of the site to assess its credibility, compared to less knowledgeable users (Flanagin & Metzger, 2007; Fogg et al., 2003). Parallel results were found in these studies when the information obtained online was higher in personal salience and consequentiality (see also Byerly & Brodie, 2005; Sillence, Briggs, Harris, & Fishwick, 2007), which lends further support to the contention that that people with different levels of ability and motivation pay attention to different criteria when judging the credibility of websites.

Although dual processing theories tend to imply that only one strategy may be used in any information evaluation situation, recent studies have shown that both analytic and heuristic strategies for credibility evaluation can operate simultaneously. In a survey of 3,991 adults in the United States, respondents reported using both analytic and heuristic strategies when evaluating credibility across a variety of online information seeking contexts (Metzger et al., 2011). Some of the most common analytic means of evaluation included double-checking facts, checking other websites for supporting information, and considering all views on a topic. Frequent heuristic strategies included relying on gut feelings and making quick credibility decisions. Similar results were found in a nationally representative survey of US children between the ages of 11 and 18 (Flanagin & Metzger, 2010).

Although analytic means of credibility evaluation are traditionally thought to be superior and result in better decisions, heuristic strategies appear to be quite common (Metzger, 2007; Metzger, Flanagin, & Medders, 2010). Fogg and colleagues (2003), for example, found that online information consumers' main consideration in credibility assessment was the visual design elements of websites, rather than any content or source information. They argue that because web users typically spend little time at any given website, they likely develop quick strategies for assessing credibility. They say, "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). Other research similarly shows that people rarely engage in effortful information evaluation tasks, opting instead to base decisions on factors like website design and navigability, while Internet users report verifying the information they found online for its credibility only "rarely" to "occasionally" and tend to verify using strategies that require the least time and effort (see Metzger, 2007, for a review). While in some views cognitive heuristics are thought to lead to biased or faulty information processing (Tversky & Kahneman, 1974), growing evidence suggests that heuristics can be equally effective as more cognitively demanding information processing strategies in inference and decision-making contexts (Gigerenzer & Todd, 1999; Gladwell, 2005).

The use of heuristic strategies may be explained by the fact that online information seekers often perform credibility evaluations within the limits of bounded rationality (Del Giudice, 2010, Metzger et al., 2010). Bounded rationality operates on the

principle of least effort and acknowledges that decision makers "must arrive at their inferences using realistic amounts of time, information, and computational resources" (Gigerenzer & Todd, 1999, p. 24). Consequently, people are not always able to act perfectly rationally due to limitations imposed by the human mind (e.g., noninfinite cognitive resources) and external conditions (e.g., noninfinite time) (Simon, 1955). One form of bounded rationality in information processing is *satisficing*, whereby people use not all but rather just enough of their cognitive resources to obtain optimal outcomes for the situation or context. Gigerenzer and Todd (1999) argue that information processing employing highly rational, true optimizing strategies is actually quite rare, and research on information foraging theory finds evidence that satisficing is a frequent strategy of Internet information seekers (Pirolli, 2005).

These perspectives suggest that Internet information seekers are likely to cope with the perceived costs of information overload and credibility evaluation by using strategies that minimize their cognitive effort and time. A number of recent studies have identified several cognitive heuristics, or mental short cuts or rules-of-thumb used as a judgment rule that help people make quick evaluations (Sundar, Oledorf-Hirsh, & Xu, 2008), that online information seekers invoke to assist in the process of credibility evaluation (e.g., Hilligoss & Rieh, 2008; Metzger at al., 2010; Sundar, 2008). For example, Metzger et al. (2010) found six cognitive heuristics used to evaluate credibility: *reputation*, *endorsement*, *consistency*, *self-confirmation*, *expectancy violation*, and *persuasive intent*.

The *reputation* heuristic says that when choosing between sources, people should favor a source whose name they recognize as more credible compared to an unfamiliar source. The rationale underlying the reputation heuristic is that reputation or name recognition is earned via an accumulated record of transactions over time, the results of which are spread through people's social networks. The reputation heuristic may also be a subset of the authority heuristic, or whether a source is recognized as an official authority or not, which has been found to impact Internet users' credibility assessments (Sundar, 2008).

The *endorsement* heuristic suggests that people are inclined to believe information and sources if others do so also. People tend to trust sites and sources that are trusted and recommended by *known* others, or that come from *unknown* persons in aggregated form (Metzger et al., 2010). Trust derived from known others may be underpinned by another form of heuristic reasoning known as the "liking/agreement heuristic" (Chaiken, 1987), which says that people often agree with those they like. Trust derived from aggregated information from unknown others (e.g., testimonials or ratings) likely stems from bandwagon heuristics, whereby people assume that something is correct if many others think it is correct (see Sundar, 2008). The *consistency* heuristic is a close relative of the endorsement heuristic because it also operates on the principle that people tend to believe things if others believe them. The consistency heuristic comprises a credibility evaluation stopping rule that says a piece information should be judged as credible when it is found to agree with information from another independent source. The implication of a heuristic "stopping rule" illustrates the potential ambiguity between heuristic strategies relying on mental shortcuts and more cognitively laborious processing efforts.

The *self-confirmation* heuristic reflects the human tendency to notice and place greater value on information that supports one's beliefs, while discounting information that refutes those beliefs. In terms of credibility, it is the tendency for people to view information as credible if it confirms their preexisting beliefs and not credible if it counters their existing beliefs, regardless of how well argued, exhaustively researched, comprehensive, or appropriately sourced it is. The self-confirmation heuristic likely stems from the false consensus effect: research in cognitive psychology finds that people tend not only to believe that their own opinions are right but that they are widely shared by others (Ross, Greene, & House, 1977). Such cognitive biases serve as ego defense mechanisms, resulting in a tendency for people to evaluate ambiguous information in a way that is beneficial to their own needs or interests.

The *expectancy violation* heuristic in credibility evaluation says that if a website fails to meet users' expectations in some way, for example, if a site asks for more personal information than is necessary or contains typos or grammatical errors, they will immediately judge it as *not* credible without further inspection of its content. The reverse could also be true: positive surprises that contradict negative expectations might bolster perceived credibility. The expectancy-violation heuristic may be underpinned in part by the "effort heuristic," which is the human tendency to value objects based on how much effort went into producing them (Kruger, Wirtz, van Boven, & Altermatt, 2004). Finally, the *persuasive intent* heuristic is the tendency to feel that information that may be biased—typically for commercial purposes—is not credible. For example, the presence of advertising on websites where it is unexpected seems to elicit an immediate defense mechanism that leads people to mistrust information without further scrutiny (Metzger et al., 2010; for similar results, see also Fogg et al., 2003; Walther, Wang, & Loh, 2004).

## Individual Differences in Credibility Assessment

Because credibility judgments are a subjective perception on the part of the information receiver, individual differences naturally impact users' credibility evaluations (Del Giudice, 2010; Hong, 2006; Flanagin & Metzger, 2010, 2013; Metzger et al., 2011), in part by making certain cues more salient to certain users (Fogg, 2003). Many types of individual-level differences have been discussed in the literature, including, for example, demographic differences, patterns of Internet use and past experience, information literacy skills, personality traits, familiarity with the topic, cultural norms and values, and levels of cognitive development. Beyond mentioning these as possible factors, however, little empirical data exist showing how each of these individual factors affects credibility decision making.

To fill this void, Flanagin and Metzger conducted two large-scale surveys using representative samples of Internet users in the United States in which several individual-level differences were measured and analyzed for their impact on Internet users' credibility evaluations and verification behaviors (Flanagin & Metzger, 2010; Metzger et al., 2011). They specifically studied how user demographics, types of Internet use, past experience, information literacy skills, and personality traits affect information

seekers' concern about credibility and the degree to which they believe information obtained online.

Although digital divide perspectives and past research suggest that information evaluation strategies and opportunities may vary across demographic characteristics (see Hargittai, 2002; van Dijk, 2006), the studies by Metzger and Flanagin found little evidence that sex, income, education, or race greatly affected users' levels of concern about credibility or the amount and types of online information that people believe to be credible, although some small differences did emerge. Among adult Internet users, older Internet users were slightly more concerned about credibility, as were females and users with greater education. At the same time, older adults and females also felt that slightly more of the information on the Internet was believable (Metzger et al., 2011). Among children, race played a very minor role, such that nonwhite youth expressed somewhat higher concern about credibility, and children from families of higher income said they believed more information on the Internet. Both younger kids and girls were more likely to believe the information they find online compared to older kids and boys, respectively, although all of these differences explained only a small portion of the variance in credibility perceptions (Flanagin & Metzger, 2010).

Individuals' patterns of Internet usage, access, and past negative experiences were found to influence credibility judgments, presumably by leading different types of users to different types of information and by influencing their level of skepticism. For adults, greater use of the Internet for certain activities, such as social networking and electronic commerce, resulted in less concern about credibility and more trust of online information, whereas people who used the Internet to post content reported less trust in online information credibility (Metzger et al., 2011). Adults who reported spending more time online and possessing greater Internet skill expressed less concern about credibility and trusted more of the information available online, although children with higher skill and who spent more time online reported greater concern (Flanagin & Metzger, 2010). Users' online experiences and training in digital literacy also influenced their credibility beliefs: having had a bad experience with misinformation personally or even vicariously in the past, as well as having had formal instruction in credibility evaluation, contributed to greater concern about and less trust in the credibility of information on the Internet. With one exception as noted earlier, findings for children were similar to those for adults.

Several *personality traits* were also explored in these studies for their contribution to people's credibility beliefs and evaluation practices, including cognitive dispositions or "thinking styles" that have been shown to influence how people approach information. *Need for cognition*, for example, reflects the degree to which people engage in and enjoy thinking deeply about problems or information and, thus, may be willing to exert effort to critically evaluate information. *Flexible thinking* refers to people's willingness to consider opinions different from their own, which might impact how users process contradictory or contrasting information when judging credibility online. *Faith in intuition* reflects a tendency to trust based on first impressions, instincts, and feelings. And, *social trust*, or the propensity to trust strangers, is likely to affect the degree to which people judge information provided by those they do not know online to be trustworthy.

The studies by Flanagin and Metzger found that trait-based individual differences do affect credibility perceptions. Adults who were higher in need for cognition, and lower in social trust of others online expressed greater concern about credibility online (Metzger et al., 2011). Among children, flexible thinking style and social trust were related to children's level of credibility concern: Children who reported being more flexible in attending to information that runs counter to their own beliefs and who were less trusting of others online expressed greater concern about credibility (Flanagin & Metzger, 2010). Users of all ages with higher faith in intuition and lower need for cognition believed that more of the information available on the Internet is credible. In addition, higher need for cognition predicted greater analytic and lower heuristic credibility evaluation strategies in both younger and older Internet users.

Differences in findings between the adult and child samples noted earlier suggest that cognitive development may be another important individual-level variable that affects credibility beliefs and evaluations. Although children may be talented and comfortable users of technology, they may lack tools and cognitive abilities critical to effectively evaluate information. Youth also have less life experience than adults to help them compare information they find online or to discern relative reputational cues across sources. In addition, they may not have the same level of experience with or knowledge about media institutions, which can make it difficult for them to understand differences in editorial standards across various media channels and outlets compared to adults (Metzger & Flanagin, 2008).

Research in this area finds that as children mature, they show increased sophistication in interaction with information (Gross, 1999; Kafai & Bates, 1997; Solomon, 1993). That said, children often accept information presented online at face value and fail to apply critical criteria in their evaluation of the source or quality of online materials (Wallace & Kupperman, 1997). Many children report trusting the accuracy of information on the Internet simply because it exists online (Kafai & Bates, 1997), and many attribute altruistic intent to authors based on surface qualifications without considering possible bias or motives (Brem, Russell, & Weems, 2001). Eastin, Yang, and Nathanson (2006) found that children judged websites to be similarly credible regardless of whether the sites contained useful source information, were dominated by advertising, or simply offered dynamic features. In fact, children rated sites with advertising and no source as highest in credibility—even though they often believed the author of the page was the advertiser—indicating a potential misunderstanding of the relationship between content provider and advertiser. These findings reflect a level of confusion on the part of younger information consumers about the production processes, and possible ignorance regarding the ease with which any Internet user can publish online.

Additional individual traits are likely to be important in credibility assessment as well. For example, users with high topical knowledge have been found to be more critical of the information they find, as well as to assess qualifying characteristics of the source or the message more quickly than people with less knowledge on the topic about which they seek information ( Fink-Shamit & Bar-Ilan, 2008; Fogg & Tseng, 1999; Gugerty, Billman, Pirolli, & Elliott, 2007). Similarly, early studies showed that users with greater Internet experience were better able to determine which features of

websites indicated higher information quality and were more likely to lead to an accurate assessment of credibility (Flanagin & Metzger, 2007; Freeman & Spyridakis, 2004; Johnson & Kaye, 2000, 2002). Del Giudice (2010) argues that traits such as field dependence, locus of control, evaluation apprehension, and task orientation affect the likelihood of a person relying on available cues as guides for attitudes, perceptions, and behavior, and thus may influence credibility evaluation strategies and decisions. She further points out that cultural values such as power distance, subjective norms, individualism or collectivism, and uncertainty avoidance may affect how users determine the credibility of information they find online because these factors influence adoption of information technologies and affect the information contained within those technologies.

## Social Interaction and Information Assessment

A transformative development in recent years has been the shift toward the increasingly *social* nature of information available online. The Internet environment is notable for its capacity to promote, maintain, and sustain collective endeavors among disaggregated individuals. A large class of tools and applications, including blogs, social bookmarking, wikis, social networking sites, and a range of ratings, recommendation, reputation, and credentialing systems, enables diverse opinions, experiences, and knowledge to be combined across individuals online. These tools have resulted in historically unparalleled information resources for people, who are now able to locate others with shared interests across a tremendous range of domains, and to efficiently share relevant information with one another in a timely manner.

In such an environment, people routinely 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 is heavy reliance on more social means of online information processing and assessment through electronic networks, which are used to harness collective intelligence for evaluating information and sources online (Flanagin & Metzger, 2008, 2011, 2013; Metzger et al., 2010). In this manner, social media tools and applications have the potential to "replace the authoritative heft of traditional institutions with the surging wisdom of crowds" (Madden & Fox, 2006, p. 2).

The core advantage underlying user-generated information online is the capacity to share the experiential aspects of people's information, making aggregated individual experiences available to many. In spite of their relative lack of official authority, individuals may possess relevant expertise due to their firsthand knowledge or experience with a topic or situation, and thus may be accurately perceived by others as having a great deal of *experiential credibility* (Flanagin & Metzger, 2008, 2013; Pure et al., 2013). Indeed, shifts in information dissemination challenge longstanding models of information provision by suggesting circumstances under which sources that are not understood as "experts" in the traditional sense are in fact in the best position to provide the most credible information. Under conditions where knowledge is esoteric, diffused among many individuals, and depends on specific, situational understanding,

it is often the case that the most reliable information is gleaned not from a traditional source imbued with authority by virtue of position or status, but rather from a diversity of individuals lacking official credentials or a widely recognized reputation.

A number of theoretical perspectives suggest why aggregated user-generated information rooted in experiential credibility, such as that contained in consumer ratings or reviews online, might be viewed as a credible source of information. The warranting principle, for example, suggests that people's judgments online, where key personal and relational information is often missing, are more aptly based on information that cannot be easily manipulated by an information source (Walther & Parks, 2002). Relatedly, signaling theory (Donath, 2007) argues that certain signals available about information sources—particularly those signals that are difficult to fake, are supported by the rule of law or social convention, or are costly to obtain or to mimic—are most reliable for assessing credibility. Signaling theory suggests that, when aggregated, user-provided information, can signal information credibility because it is difficult to for any one person to manipulate an average when there are many inputs. The warranting principle also implies that user-generated information may be perceived to be credible because the aggregation process makes it unlikely that any particular contributor has control over the collective opinion ultimately represented. Aggregated instances of users' experiential credibility thus serve as a warrant that information is valid and reliable.

Tests of the warranting principle and signaling theory show that cues that are difficult to fake online are indeed seen as more credible. For example, friends' comments on Facebook profiles were more influential in assessments of physical attractiveness than self-comments were (Walther, Van Der Heide, Hamel, & Shulman, 2009) and information generated by others had a higher impact than self-generated information on communal orientation (Utz, 2010). Also, consumer reviews have been found to be a stronger predictor of the trustworthiness of an online store than either store reputation or assurance seals, both of which are more readily controlled by the store itself (Utz, Kerkhof, & van den Bos, 2012). A variety of signals (i.e., seller reputation, product condition, and argument quality) have also been shown to predict important outcomes in online auctions (e.g., number of bids, auction success, and willingness to pay; Shen, Chiou, & Kuo, 2011), and people also put greater emphasis on signals that are costly to fake when locating experts online (Shami, Ehrlich, Gay, & Hancock, 2009).

Explicitly *social* influence processes also affect people's credibility assessments online. Social influence can take several forms. *Informational social influence*, for instance, is the tendency to "accept information obtained from another as *evidence* about reality" (Deutsch & Gerard, 1955, p. 629; emphasis in original). Particularly in the absence of firsthand experience, people tend to believe that others' interpretations are more correct than their own, and rely on others to help them choose the appropriate course of action. In this manner, informational social influence is a means of gaining information under circumstances when people are uncertain about their own perceptions and may be the underlying theoretical driver of bandwagon effects. Information provided by others becomes influential in this view as a means of removing ambiguity and establishing subjective validity.

A related but complementary form of social influence is *referent informational influence* (Turner, Wetherell, & Hogg, 1989). Stemming from theories of social identity and self-categorization, referent informational influence explains opinion and behavior conformity by processes of group identification and the subsequent adherence to standards of group behavior. The most reliable and cognitively available sources of information about group norms are the attitudes or behaviors of fellow group members themselves, which serve to reduce the uncertainty of a social situation. Referent informational influence, therefore, operates by priming a social identity or category within the available social context. Individuals then rely on a cognitive representation of the group norm as a guide for their attitudes and behaviors.

Many studies have demonstrated the effects of social influence online. For example, people viewing movie ratings online tend to rate movies consistent with the ratings they have been shown and people's choices online are swayed by others' views in recommender systems (Cosley, Lam, Albert, Konstan, & Riedl, 2003; Zhu, Huberman, & Luon, 2011). In addition, people tend to find information contributed by similar others to be more credible (Flanagin, Hocevar, & Samahito, 2014) and online adoption of user-created content has been shown to be particularly prone to the social influences of friends (Bakshy, Karrer, & Adamic, 2009), suggesting that referent informational influence is a particularly important influence on Internet users' attitudes and behaviors. Both informational social influence and referent informational influence emphasize the role that socially available others play in prompting opinion and behavioral conformity, either through the information resources they provide or via the perceived norms of the identifiable group, both of which can serve to disambiguate complex information environments.

These perspectives suggest that others' opinions may be an important source of information when users evaluate the credibility of user-generated information, especially if information evaluators identify with the people who post their opinions. Supporting this view, research by Sundar and colleagues (2008) found that online consumers' opinions of product quality were highly influenced by others' opinions and found stronger attitude conformity as social information (i.e., the number of customer reviews) increased. Flanagin and Metzger (2013) similarly found that users' personal evaluations of movies tended to agree with online user-generated movie reviews as both the quantity of reviews and the degree to which participants generally identified with others' taste in movies increased.

Through these mechanisms, social media tools and applications can assist users in locating credible information online, and yet they pose difficulties for credibility assessment as well. 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 resources. The proliferation of sources also amplifies concerns about the lack of gatekeepers, disintermediation, and source ambiguity. Also, while there is evidence that information aggregated across users can produce enhanced collective intelligence via the "wisdom of crowds," it is also true that crowds are not always wise, particularly when bandwagons can develop easily such that popularity can trump quality, when talent is assumed to be equally distributed across all contributors,

and when the specific training and expertise of contributors are undervalued (Keen, 2007).

Research on the dynamics of user-provided online information is just beginning to address these realities by examining the tensions information consumers are now faced with when evaluating these newer forms of online information and sources. With Wikipedia, for instance, where information consumers must assess the credibility of information that originates primarily from largely unknown, fellow users, there is evidence that many people are skeptical of Wikipedia content (Flanagin & Metzger, 2011; Menchen-Trevino & Hargittai, 2011), and that people tend to find traditional venues (e.g., Encyclopaedia Britannica) to be more credible (Flanagin & Metzger, 2011). Interestingly, however, adults also find information (i.e., the content of the encyclopedia entries themselves, independent from the source) originating from Encyclopaedia Britannica and Wikipedia to be equally credible, and moreso than parallel encyclopedia entries on the hybrid user- and expert-produced content on Citizendium, demonstrating that they attend to credibility cues in the entries themselves. Moreover, children (ages 11–18) find encyclopedia entries from Wikipedia to be significantly more believable than those from other encyclopedias, but only when they think they are actually from more reputable sources (e.g., Encyclopaedia Britannica), suggesting an intriguing sort of social desirability effect, where internalized knowledge about what is and is not an acceptable information source exists in tension with credibility cues gleaned from the content of the message (Flanagin & Metzger, 2011).

Additionally, both children and adults report that other people should believe information on Wikipedia less than they themselves report believing it (Flanagin & Metzger, 2011), indicating a form of the "optimistic bias" effect (Weinstein, 1980) based on social comparison, whereby people tend to see themselves as less likely than others to experience negative life events. Research on optimistic bias has demonstrated its stability across a wide range of demographic variables, including age, sex, and education (Weinstein, 1987), but little research has focused on the occurrence of the optimistic bias in a digital media environment. The surveys described earlier by Metzger and Flanagin, however, found that children and adults believed that their ability to figure out which information is good and bad online was superior to that of "typical" Internet users, and reported being more likely to question information they find on the Internet, and slightly less likely to believe false information online compared to others (Flanagin & Metzger 2010; Metzger et al., 2011). These data provide support that for an optimistic bias in users' perceptions of their information literacy and credibility evaluation skills.

Compounding the problem of assessing the credibility of user-generated content online is that it may be difficult for people to interpret users' "experiential-based information" correctly, absent knowledge about basic statistical principles like sampling (Eysenbach, 2008). For example, research on user-generated commercial ratings shows that Internet users attend to the average "star" ratings for a product without also attending to the number of such ratings provided, potentially at the expense of critical information about the influence of a small number of opinions on the aggregate rating (Flanagin, Metzger, Pure, Markov, & Hartsell, 2014). Under such circumstances, people's ability to take appropriate advantage of user-generated information to make accurate credibility decisions is clearly suboptimal.

## Research Directions and Conclusions

Features of the contemporary information and communication environment highlight the complex reality that information consumers confront when evaluating online information today. The opportunities and challenges presented by this environment suggest the importance of the psychological dimensions of people's information evaluation experiences, including their information processing activities, the personality-based characteristics that influence information evaluation, and the dynamics of information assessment that unfold in the context of social interaction online. A number of research directions naturally arise from these perspectives.

For example, the use of credibility cues and cognitive heuristics in decision making about credibility raises a number of questions that can serve to guide future research. As mentioned earlier, some evidence suggests that heuristic means of credibility assessment may be *equally* effective as analytic strategies in terms of the quality of credibility judgments that are rendered. This is because cognitive heuristics are based on rational principles and are honed through both evolutionary and individual learning processes (Gigerenzer & Todd, 1999). An avenue for research, therefore, is to address the questions of whether and under what circumstances the use of heuristic evaluation strategies leads to good or bad credibility decisions. Taraborelli (2007) provides a useful model for conducting this type of research in an experimental setting that may be helpful for researchers pursuing work in this area.

It is also likely that many instances of online information involve multiple cues that bear on a user's credibility evaluation, so another important question for future research concerns how people cope with conflicting credibility cues. An example of this is when bandwagon effects appear to validate information that violates users' expectations for professionalism because, for example, it is presented in a sloppy manner (see also Sundar, 2008; Sundar, Xu, & Oeldorf-Hirsch, 2009 for other examples). Wikipedia may also evoke heuristics based on authority cues that compete with bandwagon heuristics and notions about the wisdom of crowds. In these circumstances, which cue is privileged and how do people reconcile the dissonance they might experience when interpreting conflicting credibility cues or heuristics? Credibility cues may be ordered hierarchically in cognition, may interact with specific individual-level traits or attitudes to be more or less perceptually salient, or may be based on the relative prominence of cues in the particular interface, but future research is needed to determine the validity of these as well as other potential explanations.

Social influence processes may also help to explain how users deal with the tension between believing those with credentialed authority, such as acknowledged experts or traditionally recognized gatekeepers, and those with high experiential credibility, such as laypeople with esoteric or firsthand knowledge, when information provided by each is in conflict. These views suggest that this cognitively demanding task is guided by a host of factors, including individual information processing differences and experiences, social cues, and relevant group identities.

Informational social influence processes, for example, suggest that both types of information might be relied upon to guide information consumers' opinions,

particularly if they lack their own firsthand knowledge. Referent social influence further suggests that these influences might be particularly pronounced under conditions where group identification is high. To unravel the specific influences on people's credibility assessments, research will need to locate the conditions under which social influence processes are most likely online (e.g., those where individuals lack their own concrete knowledge, such as evaluative situations where subjective opinions are prevalent), relevant individual-level differences (e.g., social trust), and the group identifications that might be germane to each situation (e.g., specific group-based alliances such as political party identification or identification with particular groups' information sharing practices). Research in this domain might illuminate the social influences and cognitive processes individuals undergo when faced with complex, and occasionally competing, information influences online. Related to this, signaling theory and the warranting principle suggest that lay users may be viewed as equally or even more credible than experts, at least in situations where sufficient evidence shows that user-generated information is unlikely to have been manipulated by a small number of biased sources (e.g., see Flanagin & Metzger, 2013).

Because the tension between expert- and user-generated information is situation-specific, future research should also account for particular information contexts, and their psychological impacts. For instance, during times of crisis where accurate and timely information is critical (e.g., a rapidly unfolding natural disaster, such as a hurricane or wildfire), users may face added pressure to locate specific and credible information, which might not be available in sufficient degree from traditional sources, such as the mainstream news media. Whereas mainstream media tend to rely on a small number of credentialed sources (e.g., the fire or police chief), information that originates from individuals reporting on their own firsthand observations has the potential to be superior since, using social media tools, people can provide specific experiential information in real time to large forums. Research to date, though, has not addressed the basic issues implied in these scenarios, such as the tradeoff between urgency and accuracy (perhaps as understood through the theoretical lens of motivation), differences in comfort levels with or acceptance of fellow citizens as external information sources, whether some users (e.g., those with particular facility in using social media tools) are more comfortable in trusting this information than others, and generational or developmental differences along these lines.

Finally, a good deal of work is also needed to identify and inventory the various cues, heuristics, and strategies that people use during credibility assessment within and across various online environments and information-seeking contexts because it is an important first step in developing theoretical explanations of information evaluation behavior online. Moreover, a thorough understanding of the processes used in online information assessment can help educators and others to design intervention strategies to improve Internet users' information evaluation skills. In the end, the application of research findings in this manner can help people avoid deception, manipulation, and persuasion by misinformation in the Internet environment, which is critical as people increasingly turn to online sources for information that matters in their lives.

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