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First Comes Love, Then Comes Google: An Investigation of Uncertainty Reduction Strategies and Self-Disclosure in Online Dating

Jennifer L. Gibbs¹, Nicole B. Ellison², and Chih-Hui Lai ¹

Abstract
This study investigates relationships between privacy concerns, uncertainty reduction behaviors, and self-disclosure among online dating participants, drawing on uncertainty reduction theory and the warranting principle. The authors propose a conceptual model integrating privacy concerns, self-efficacy, and Internet experience with uncertainty reduction strategies and amount of self-disclosure and then test this model on a nationwide sample of online dating participants (N = 562). The study findings confirm that the frequency of use of uncertainty reduction strategies is predicted by three sets of online dating concerns—personal security, misrepresentation, and recognition—as well as self-efficacy in online dating. Furthermore, the frequency of uncertainty reduction strategies mediates the relationship between these variables and amount of self-disclosure with potential online dating partners. The authors explore the theoretical implications of these findings for our understanding of uncertainty reduction, warranting, and self-disclosure processes in online contexts.

Keywords
computer-mediated communication, online dating, self-disclosure, privacy, uncertainty reduction theory, warranting

¹Rutgers University
²Michigan State University

Corresponding Author:
Jennifer L. Gibbs, Department of Communication, Rutgers University, 4 Huntington Street, New Brunswick, NJ 08901-1071
E-mail: jgibbs@rutgers.edu
As online technologies, and the communicative affordances they offer, become central in many individuals’ social practices and daily experiences, privacy concerns—what to disclose, to whom, and how to ensure that others are disclosing honestly in return—are increasingly salient. Such concerns are likely to motivate behaviors to reduce uncertainty and verify the credibility of online partners. This is especially true in contexts such as online dating, where individuals often initiate relationships with people they do not know in offline contexts. More than 10 million Americans participate in online dating by maintaining memberships or profiles on at least one dating website (Madden & Lenhart, 2006). Online dating has lost much of its social stigma and is one of the most lucrative forms of paid content on the Internet; it is also one of the few online businesses to continue to profit during the economic recession, with sites like Craigslist, eHarmony, and Match.com reporting a 20%-22% increase in memberships in 2008 (Carpenter, 2008).

Unlike other popular online fora such as social network sites (SNSs; boyd & Ellison, 2007), online dating sites often bring together strangers who have no prior relationship with one another, and the lack of shared physical context and nonverbal cues can create greater uncertainty about others and complicate the process of forming relationships. Since, the introduction of the Internet, public discourse about this venue for relationship formation has included concerns about participants’ privacy and security, specifically the dangers of meeting strangers online and potential threats of identity theft, sexual predators, or cyber stalking (Spitzberg & Hoobler, 2002), as well as concerns about misrepresentation (e.g., della Cava, 2004; Fischler, 2007). Computer-mediated communication (CMC) enables users to engage in “selective self-presentation” (Walther & Burgoon, 1992), but this increased control over self-presentation can result in concerns about misrepresentation and deception (Gibbs, Ellison, & Heino, 2006; Lea & Spears, 1995; Toma, Hancock, & Ellison, 2008). Online misrepresentation has real consequences for online dating participants, who are often searching for a long-term romantic partner. Unlike other CMC contexts such as chat rooms or online role-playing games, in which anonymity or pseudonymity is acceptable or even expected, the anticipation of future face-to-face interaction inherent in online dating provides motivation for reducing uncertainty about the identity of potential relational partners through self-disclosure and other communication strategies (Gibbs et al., 2006).

Online daters’ disclosure choices are shaped by the norms and expectations governing each site, and a desire to “present themselves as unique individuals within the constraints of a technical system that encourage[s] homogeneity, negotiating a desire to stand out with the need to blend in” (Ellison, Heino, & Gibbs, 2006, p. 433). As a result, online dating participants face pressures to reveal personal information, both to conform with social norms and because of their own desire to form romantic relationships. Yet they also must consider the risks of sharing such information with strangers absent confirmation that others are being honest in their disclosures, which could result in emotional or physical distress. Offline, confirmation might be provided by third-party individuals such as mutual friends or by identity information provided by shared social context cues (for instance, the car one drives provides cues about one’s socioeconomic status; attendance at a professional conference signals professional interest). In online contexts, a shared social network such
as those found in SNSs might provide additional identity verification (boyd & Ellison, 2007; Donath & boyd, 2004), but a visible list of third-party “friends” or contacts is not incorporated into most online dating sites. Thus, in constructing a profile and interacting with others online, online dating involves a highly reflexive process in which individuals must contend with a perpetual cycle of self-disclosure opportunities punctuated by assessments of others’ identity claims, with the goal of reducing uncertainty about potential romantic partners.

Previous qualitative research has found that online dating participants engage in a dynamic process of rewriting their profiles to better appeal to desired potential partners as well as developing rules for assessing the credibility of others’ identity claims while recursively applying these rules to their own self-presentation (Ellison et al., 2006; Heino, Ellison, & Gibbs, 2010; Whitty, 2008). Little is known, however, about the uncertainty reduction strategies used by online daters to seek information from and warrant the identity claims of those they meet online and how they compare to those used in other contexts. Other research has demonstrated that CMC users engage in information-seeking strategies to reduce uncertainty and warrant identity claims in other contexts such as email communication (Tidwell & Walther, 2002), e-commerce (Ling, Chuan, Yian, Yani, & Huaping, 2007), and SNSs (Antheunis, Valkenburg, & Peter, 2010; Hancock, Toma, & Fenner, 2008; Walther, Van Der Heide, Hamel, & Shulman, 2009). We wish to explore whether the same types of information-seeking strategies are employed by online dating participants and test a set of factors that may predict the use of such strategies.

This study draws on uncertainty reduction theory (Berger, 1979; Berger & Calabrese, 1975) and the warranting principle (Walther & Parks, 2002) to investigate the uncertainty reduction strategies employed by online dating participants in order to alleviate privacy concerns and warrant the credibility of others. We examine communicator-related factors that lead to greater information-seeking behavior to reduce uncertainty about others, as well as the relationship between such uncertainty reduction strategies and self-disclosure behavior in the online dating context. Finally, we discuss the implications of these findings for scholarship addressing uncertainty reduction, warranting, and self-disclosure in online contexts more broadly.

**Uncertainty Reduction, W warranting, and Self-Disclosure in Online Dating**

**Uncertainty Reduction in Online Dating**

Initial interaction among strangers is theorized to be motivated primarily by the goal of reducing uncertainty, both in relation to making one’s own behavior and the behavior of others more predictable and providing explanations for such behavior (Berger & Calabrese, 1975). Communication plays a key role in this process as it is through communication that uncertainty is reduced. As such, interpersonal relationships develop among strangers as interactants communicate to reduce their uncertainty and get to know each other by gaining greater knowledge and mutual understanding. Uncertainty leads to
information-seeking behavior, as individuals are motivated to monitor other people’s behavior in social situations and engage in a variety of strategies to find out more about others, such as covert observation, asking questions, or communicating to encourage others to reveal more about themselves (Berger, 1979).

Due to the absence of many traditional cues about identity and insufficient immediate feedback, it may be more challenging to engage in uncertainty reduction strategies in online settings. Nonetheless, theories such as social information processing theory (Walther, 1992) and the hyperpersonal model (Walther, 1996) provide important theoretical support for the contention that uncertainty reduction and relational development do occur via CMC (e.g., Byron & Baldrige, 2007; Heisler & Crabill, 2006). Research has shown that interpersonal relationships are indeed developed through CMC as predictability and understanding of a partner’s behavior increases (Parks & Floyd, 1996) as well as demonstrating the use of particular uncertainty reduction strategies in email communication (Tidwell & Walther, 2002), e-commerce (Ling et al., 2007), and SNSs (Antheunis et al., 2010; Hancock et al., 2008).

Information-seeking strategies play a key role in influencing impression formation processes and relationship development (Ramirez, Walther, Burgoon, & Sunnafrank, 2002). When initiating a relationship, individuals inevitably consider various risks involved, some of which are directly related to self-disclosure. For example, one may fear one’s partner is withholding information or question whether their self-disclosure is honest (Boon & Pasveer, 1999; Derlega, Winstead, & Greene, 2008). Reciprocity norms encourage individuals to disclose in response to others’ disclosures (Gouldner, 1960; Jourard, 1960), but individuals can put themselves at risk if they reveal information in response to deceptive communication from others. In online dating, these risks are especially salient due to the goals shared by many members of meeting face-to-face and forming romantic relationships, which necessitate making themselves vulnerable by revealing intimate personal information.1

The privacy risks inherent in online dating, coupled with the pressures to reveal personal information to form relationships with potential romantic partners, are likely to encourage behaviors aimed at reducing uncertainty and verifying the credibility of these potential partners. Online dating participants, therefore, have an incentive to engage in information-seeking strategies to verify the accuracy of the identity claims made by others on the site, in order to make themselves less vulnerable (Morr & Petronio, 2006). The use of such strategies is a normal part of relationship initiation, as individuals in traditional contexts tend to employ various interactional strategies, specifically information seeking, in assessing whether a new acquaintance should be treated as a potential relationship (Greene, Derlega, & Mathews, 2006); however, the online context provides unique affordances and constraints that are likely to influence how uncertainty reduction processes take place. According to Berger and Calabrese (1975), interactants in initial traditional interpersonal encounters prefer symmetric disclosure, in which parties both seek and provide similar information at the same rate of exchange. Online contexts change this dynamic by enabling asymmetric information exchange and interaction (Hancock et al., 2008).
Although self-disclosure was initially positioned as an interactive uncertainty reduction strategy (Berger, 1979), we posit that the increased privacy risks as well as the affordances of asynchronous interaction in online dating may necessitate an extra step of verification before participants are willing to self-disclose above and beyond what they reveal in the profile. In other words, online daters may be more likely to seek confirmatory information about potential partners early in the process, as a basis for calibrating their own self-disclosure. Verifying others’ claims through other uncertainty reduction strategies is thus likely to influence their own self-disclosures, as knowing whether someone is telling the truth can increase or decrease the risks associated with self-disclosure. In the online dating arena, due to salient concerns about misrepresentation (Gibbs et al., 2006) and frequent acts of deceptive self-presentation (Toma et al., 2008), individuals may use warrants to confirm identity claims made by others, which may precede or work in tandem with their own self-disclosures. This process is likely to be iterative and ongoing, but we predict that uncertainty reduction strategies designed to warrant or verify identity claims of others play an important role in brokering subsequent disclosure decisions as online dating participants reduce uncertainty and form relationships.

**Warranting in Online Dating**

The warranting principle addresses the link between online and offline identity claims and the ways in which individuals verify identity claims in online contexts (Walther & Parks, 2002; see also Stone, 1995). As Walther et al. (2009) write, “W warranting refers to the capacity to draw a reliable connection between a presented persona online and a corporeally-anchored person in the physical world” (p. 232). The principle proposes that when individuals assess others’ online communication, they will privilege messages that cannot be manipulated (such as third-party descriptions) rather than self-reported information (Walther & Parks, 2002) and that “information that has ‘warranting’ value connects the online persona to an offline person in less malleable ways than self-description does” (Ramirez & Walther, 2009, p. 79). Similar to the way in which signals that are more expensive to maintain are more likely to be perceived as credible evidence of a particular trait (Donath, 2007), online identity claims with high warranting value are harder to fake and thus more trustworthy. Empirical research has found support for the warranting principle in online contexts: When assessing personal information in Facebook profiles, individuals gave greater credence to claims of attractiveness when they were provided by others (and thus unlikely to be manipulated or fabricated) than they did to self-proclamations of attractiveness (Walther et al., 2009).

In online dating, true warranting behavior is likely to be rare as participants have little ability to verify information via a shared social network that might provide third-party information (Ellison, Gibbs, & Heino, 2005); users must rely mainly on the self-reported data contained in the profile and any messages exchanged with potential dates. However, given the concerns about deception in online dating and owing to the absence of true warranting opportunities (such as those found in a shared social network), online dating participants are incentivized to develop their own verification strategies in order to warrant the
behavior of others. One strategy available to online daters is to assess the cues unintentionally “given off” in addition to those cues that are purposefully “given” (Goffman, 1959). For instance, online daters often interpret spelling mistakes as indicative of a lack of education or interest; this emphasis on unintended cues is manifest in the “show, don’t tell” rule of thumb in profile creation (Ellison et al., 2006). Similarly, a profile written in a humorous, clever manner will be seen as more credible evidence of a sense of humor than including the words “I am hilarious” in a dull, humorless profile, though both are unwarranted self-reports. The warranting principle suggests that users will privilege information that is not subject to manipulation such as that provided by third parties, and it is supported by research on SNS profiles that finds that third-party information has a significant impact on perceptions of the profile owner (Walther, Van Der Heide, Kim, Westerman, & Tong, 2008). In a related vein, previous research on the role of uncertainty among premarital romantic relationships suggests that communication with partners’ friends and family is associated with more stable relationships (Parks & Adelman, 1983). In the online dating context, users might try to compensate for the lack of a shared social network or true offline verification by engaging in other forms of warranting-type behavior using the information available to them, but no research to date has explicitly explored this issue.

Information-Seeking and Self-Disclosure Online

Self-disclosure in CMC contexts is a growing focus of contemporary scholarship. Compared with face-to-face conditions, participants in certain CMC conditions have been found to engage in more self-disclosure. Evidence of the enhanced nature of self-disclosure online has been obtained in a number of studies (e.g., Joinson, 2001a; Levine, 2000; Parks & Floyd, 1996). A common finding is that anonymity, shared interests, and lack of physical presence may contribute to a greater likelihood to disclose online, which in turn may lead to the development of liking and intimacy among online interactants (e.g., Henderson & Gilding, 2004; McKenna, Green, & Gleason, 2002). For example, McKenna et al. (2002) found that in Usenet newsgroups, participants who were better able to express themselves online were more likely than others to have formed close online relationships which then became integrated into their offline lives. In her study of couples who met online, Baker (2005) found that couples who engaged in honest and free self-disclosure were more likely to form successful relationships.

The online arena presents its own affordances and constraints in terms of uncertainty reduction and self-disclosure strategies. Prior to the first face-to-face meeting, online dating participants may use other means of technology (such as email or telephone calls) to try to verify information about a target person (Whitty, 2008). Participants may also make an effort to disclose information about themselves that can be objectively verified (e.g., current physical appearance) or subjectively confirmed through friends or family (Yurchisin, Watchravesringkan, & McCabe, 2005) in order to reduce the uncertainty of the target and prompt reciprocal self-disclosure. Tidwell and Walther (2002) found that due to its reduced social cues, CMC lends itself to the use of direct uncertainty reduction strategies, that is, direct and intimate questioning and self-disclosure performed by individuals. In addition, unlike the second- or third-hand information about potential romantic partners gleaned
through family or friends in traditional dating, online dating affords users opportunities to
directly examine a range of different types of information about the target available online
(assuming they know his or her full name or online identifier), such as by perusing his or her
interactions in an online discussion group. Of course, these opportunities for confirmation
and discovery are also available to those who meet through more traditional methods, pro-
vided a full name is known and the target’s online presence is identifiable. The online dating
venue differs, though, in that more identity information is available via the profile, but this
information is subject to embellishment and other forms of “selective self-presentation”
(Walther & Burgoon, 1992). Online dating participants, therefore, have a different set of
corresponding concerns driving them to engage in uncertainty reduction tactics as well as a unique set of
tools at their disposal. We focus on uncertainty reduction strategies used to assess online dat-
ing profiles as well as other forms of communication with online dating partners.

Conceptual Model and Hypotheses

Drawing on uncertainty reduction theory (Berger, 1979; Berger & Calabrese, 1975) and
theory on information seeking and warranting online (Ramirez et al., 2002; Walther
& Parks, 2002), we propose a conceptual model relating privacy concerns, self-efficacy,
and Internet experience with uncertainty reduction behaviors and self-disclosure (see
Figure 1). Specifically, we propose that three sets of privacy-related concerns, self-
evfficacy, and Internet experience will influence the extent to which uncertainty reduction
strategies are used to seek and confirm information about others, which will in turn predict
the degree to which participants self-disclose to their online dating partners.

Individual Factors and Uncertainty Reduction Strategies

Ramirez et al. (2002) identified several factors that may influence the use of informa-
tion-seeking strategies: communicator related, situation–context related, goal related,
information related, and technology related. Of these factors, communicator-related features (such as personality characteristics, skills, and preferences) are likely to provide the greatest source of variance among online dating participants (who are, for the most part, using the same technology, communicating in the same context, pursuing similar goals of forming romantic relationships, and seeking similar types of information). For this reason, we focus on a set of communicator-related factors that are likely to influence uncertainty reduction strategies in online dating: privacy concerns, self-efficacy, and Internet experience. We hypothesize that these factors are likely to influence online dating participants’ motivation and ability to engage in uncertainty reduction strategies.

**Privacy concerns.** Online dating participants face a variety of vulnerability risks related to several types of concerns, which are likely to create uncertainty about potential dating partners. It follows that the more salient these risks are to participants, the more motivated they will be to try to verify information about others before opening up to them, in order to reduce uncertainty about others’ identity claims (and reduce their own vulnerability). First, disclosing personal information online can pose risks to one’s physical and emotional safety because it can result in threats such as identity theft or stalking (Gross & Acquisti, 2005; Spitzberg & Hoobler, 2002). Second, creating an online profile can result in the exposure of information to unintended audiences (Barnes, 2006) or loss of control of one’s personal information to third parties, such as when an individual’s photograph is recognized by a colleague thus inadvertently revealing her activity on an online dating site (Couch & Liamputtong, 2007). Indeed, Rosen, Cheever, Cummings, and Felt (2008) found that the majority of online daters were reluctant to tell their social networks that they were using online dating (though another recent study found that 70% of online daters had disclosed their involvement to friends and family; Stephure, Boon, MacKinnon, & Deveau, 2009). Third, individuals face disclosure risks due to the possibility of deception or misrepresentation of others in their profiles or online communication. The more one reveals about oneself, the easier it is for others to feign similarity and agreement; a recent study found that the revelation of private information in one’s Facebook profile enabled others to obtain knowledge about the target person and use it to create a sense of homophily in subsequent interaction (Hancock et al., 2008). In this way, self-disclosure may be dangerous because others may use this information as a basis to fabricate their own disclosures.

It stands to reason that people with more privacy concerns are likely to experience greater uncertainty due to suspicion about the veracity of others’ disclosures, which may inhibit their reciprocation of disclosure. Privacy concerns may thus provide greater motivation for users to engage in information-seeking activities to protect themselves from potential risks (Metzger, 2007) because such activities give users more information about their communication partners and may lower their uncertainty about them. More specifically, users with greater privacy concerns are more likely to seek information about potential partners, in order to verify that such individuals do not pose a threat to their personal security, that they are representing themselves honestly and accurately, and that they do not represent a risk to one’s social or professional standing (such as might be the case if one inadvertently pursued a work colleague or social acquaintance). On the basis of this prediction, we expect that participants who are more concerned about their privacy in online
dating—in terms of three sets of privacy-related concerns—will engage in more uncertainty reduction strategies to authenticate identity claims of those they meet online.

Hypothesis 1: Online dating participants with greater concerns about (a) personal security, (b) misrepresentation, and (c) recognition will engage in increased levels of uncertainty reduction strategies.

Self-efficacy. We also predict that self-efficacy may affect the extent to which online dating participants engage in strategies to reduce uncertainty about others. Self-efficacy refers to individuals’ belief in their capabilities to organize and execute the courses of action required to produce given attainments (Bandura, 1977), and perceived self-efficacy plays an important role in influencing individual motivations and behavior (Bandura, 1982; Igbaria & Iivari, 1995). As Eastin and LaRose (2005) write, “Self-efficacy determines what and how often a person engages in a given behavior, the amount of effort and persistence put forth when faced with obstacles, and finally, the mastery of the behavior” (p. 980). Prior research finds that various forms of Internet self-efficacy such as information seeking, entertainment, and social self-efficacy (Eastin, 2005) and online support self-efficacy (Eastin & LaRose, 2005) are important predictors of online behavior. Specific self-efficacy measures have been found to be more predictive in a particular context than generalized self-efficacy measures (Agarwal, Sambamurthy, & Stair, 2000; Marakas, Yi, & Johnson, 1998). On the basis of this finding, we hypothesize that self-efficacy in online dating is likely to influence the degree to which online dating participants develop and engage in uncertainty reduction strategies. Specifically, those with high self-efficacy about their ability to be successful in online dating may be expected to be more motivated and able to develop uncertainty reduction strategies to verify the private information of others; these individuals will feel more confident about their ability to uncover deception and thus will be more likely to try to do so.

Hypothesis 2: Online dating participants with greater self-efficacy will engage in increased levels of uncertainty reduction strategies.

Internet experience. Internet experience has been predicted to increase disclosure and information-seeking behavior in the e-commerce context (Metzger, 2007). Similarly, we predict that prior Internet experience may serve as an important source for the information-seeking strategies that online dating participants use to reduce uncertainty and warrant the identity claims made by others. This is not due to their acquisition of technical expertise (as the technologies used in online dating are not sophisticated and generally limited to email, instant messaging (IM), telephone, and the use of Internet search engines) so much as to an increased familiarity with online social norms and rules for behavior. That is, individuals are likely to develop a generalized set of strategies related to information-seeking and uncertainty reduction on the basis of their experience engaging in other types of online activities, such as doing online research, shopping, or e-banking. For example, users who encounter inaccurate information from the websites they visit may be more aware of the need to verify
the credibility of online information and thus be prompted to construct a strategy of double-checking information using multiple websites. Likewise, those with a wider scope of Internet experience may also be more familiar with search engines such as Google and thus more likely to use strategies that include Googling—a common information-seeking strategy in other Internet contexts (Griffiths, 2003; Griffiths & Brophy, 2005)—to verify others’ profile information or disclosures. Internet literacy, defined as “the ability to access, understand, critique, and create information and communication content online” (Livingstone, 2008, p. 110), is predicted by Internet users’ actual online skills (Hargittai, 2005). This suggests that those who participate in a greater variety of online activities will have a greater ability to assess information and content across different online contexts. We predict that such users will be more likely to engage in information-seeking and uncertainty reduction strategies.

Hypothesis 3: Online dating participants with greater Internet experience will engage in increased levels of uncertainty reduction strategies.

Uncertainty Reduction Strategies and Self-Disclosure

Self-disclosure has been defined as any message about the self that an individual communicates to another (Wheeless, 1978; Wheeless & Grotz, 1976). The disclosure of highly personal information plays an important part in romantic relationship development (Greene et al., 2006), as it helps individuals collect information about prospective partners and make forecasts about the viability of potential relationships (Derlega et al., 2008). It follows from this that online dating participants who engage in greater uncertainty reduction behavior will have less uncertainty about potential dating partners and will thus open up more in their interactions with them, assuming they are confident in the veracity of the information they have received. Reciprocity norms lead to increased mutual self-disclosure in interpersonal relationships (Derlega, Winstead, Wong, & Greenspan, 1987), but in the online context concerns about the veracity of the disclosed information may hinder this process and inhibit reciprocal self-disclosure. Uncertainty reduction is likely to provide an important middle step that helps alleviate such concerns and provokes more self-disclosure, as individuals gain confidence in the information provided by the other person through verification activities that do not reveal misrepresentation by the target. It is unlikely that online daters will discover “extreme lies” that would stifle further self-disclosure when they engage in uncertainty reduction behaviors because the majority of these profile–reality discrepancies are small in magnitude (Toma et al., 2008). Thus, we propose that online dating participants who engage in more uncertainty reduction strategies will report greater amounts of self-disclosure with those they meet online.

Hypothesis 4: Online dating participants who engage in increased levels of uncertainty reduction strategies will report greater amounts of self-disclosure in their interactions.
In addition to the above hypotheses, we also propose that uncertainty reduction strategies mediate the effects of the three sets of concerns, self-efficacy, and Internet experience on amount of self-disclosure. First, we predict that online dating participants with greater concerns about their personal safety, misrepresentation, and recognition will engage in less online self-disclosure out of a motivation to protect their privacy by withholding information (Metzger, 2007; Petronio, 2002). However, those who have developed uncertainty reduction strategies for assessing the credibility of potential dating partners may feel more comfortable disclosing personal information such that the negative effects of such concerns are mitigated when uncertainty reduction strategies are in place. This is supported by research finding that the effect of dispositional aspects of privacy (general privacy attitudes) on self-disclosure was mediated by general cautionary privacy behaviors such as reading privacy policies (Paine, Joinson, Buchanan, & Reips, 2006); uncertainty reduction strategies may function similarly to such cautionary privacy behaviors in online dating.

Next, we predict that uncertainty reduction strategies will mediate the effects of self-efficacy on amount of self-disclosure. Research on consumer privacy behavior in e-commerce has found that self-efficacy is associated with greater privacy protection and lower self-disclosure, though the presence of privacy seals encouraged personal information disclosures among those with high self-efficacy (Rifon, LaRose, & Choi, 2005). Although this study tested for moderating rather than mediating effects, we postulate that uncertainty reduction strategies may function similarly to privacy seals by giving online daters more confidence and encouraging them to open up and self-disclose more with potential partners. Finally, we predict that uncertainty reduction strategies mediate the effects of Internet experience on self-disclosure, as engaging in a variety of Internet activities makes it more likely that online daters will develop such strategies in other contexts and apply them to online dating, and the application of such strategies in turn encourages greater self-disclosure due to confidence derived both from greater digital literacy in general and the use of specific information-seeking strategies. Given the exploratory nature of this model and the lack of prior theoretical support for such relationships, we do not propose a formal hypothesis but rather a research question to address these mediating relationships:

**Research Question 1:** Do uncertainty reduction strategies mediate the effects of (a) personal security concerns, (b) misrepresentation concerns, (c) recognition concerns, (d) self-efficacy, and (e) Internet experience on amount of self-disclosure?

In addition to testing the relationships specified earlier, we also explore more qualitatively the specific types of uncertainty reduction strategies that are used by online dating participants. In the initial formulation of uncertainty reduction theory, Berger (1979) identified three types of strategies that individuals use to find out information about others in order to reduce uncertainty about them: passive, active, and interactive. Parks and Adelman (1983) extended this classification with the addition of another active strategy: interacting with a romantic partner’s social network. More recently, Internet scholars adapted this framework to apply to reduction of uncertainty in CMC contexts, adding an alternative category of “extractive” information-seeking strategies that are likely to be
particularly prevalent. Ramirez et al. (2002) outlined a four-part typology of information-seeking strategies that vary in directness, including interactive, active, extractive and passive. As two ends of the continuum, interactive strategies refer to acquisition of information through direct interaction between communicator and target, whereas passive strategies involve acquiring information about a target through unobtrusive observations such as reading messages posted on a central forum and reviewing buddy profiles commonly available in IM services. Active strategies involve acquiring information from other individuals without direct interaction with the target, such as relying on the target’s social networks as information sources, whereas extractive strategies encompass a variety of noninteractive strategies such as conducting online background checks using a search engine such as Google. The last category is unique to CMC as it relies on archived data that are preserved over time; this affordance allows for covert collection of information without the target’s knowledge (Ramirez et al., 2002).

These types of strategies have been observed in online contexts such as e-commerce (Ling et al., 2007) and SNSs (Antheunis et al., 2010) and are likely to occur in online dating as well (Ellison et al., 2006), though they have not been explicitly examined. For instance, individuals might use search engines to locate newsgroup postings by the person under scrutiny, knowing that this searching is covert and that the postings most likely were authored without the realization that they would be archived (Ramirez et al., 2002). Westerman, Van Der Heide, Klein, and Walther (2008) explored information-seeking behaviors, focusing on the relationship between channel choice and target (less or more known). Although they did not include search engine queries as a possible channel, they did find that SNSs were perceived to be useful regardless of the relational status of the target, noting that these sites allow for third-party assessments (e.g., comments by targets’ “Friends”) that are likely to be particularly valuable. A recent Pew report found that 9% of online adults reported searching online for information about a romantic partner or someone they were dating. More women engaged in this practice than men—11% of online women versus 7% of online men (Madden, Fox, Smith, & Vitak, 2007).

Although the warranting principle has not been explicitly examined in the online dating context, it has found support in research examining SNSs (Walther et al., 2009) and research suggests that online dating participants engage in strategies geared at assessing and verifying the identity claims made by others (Couch & Liamputtong, 2007; Ellison et al., 2006). We pose the following research question to describe the specific types of uncertainty reduction strategies used in online dating.

**Research Question 2:** What types of uncertainty reduction strategies are used by online dating participants?

**Method**

**Procedure**

This study draws on web-based survey data from a sample of online dating participants. Participants were prescreened from a commercial research panel of approximately 1.4 million Internet users (who had agreed to take part in surveys on a regular basis). The
initial screening questions asked whether they were currently involved in online dating as a paid subscriber to any online dating site, how long they had been participating in online dating, and whether or not they were currently married. The incidence rate of online dating participants was 15%. The research agency then contacted a random sample of those who qualified with the survey link and invited them to participate in the survey, informing them that they had been selected to participate in a research study on online dating with the goal of exploring “online dating participants’ perceptions and how they communicate with others.” Those who completed the survey received a US$6 incentive. Participation was further encouraged by sending a reminder email. Data collection spanned a period of one week in May 2006. The web survey was hosted by Zoomerang.com, which is a survey-hosting website. Respondents were identified only through a unique password provided to them by the research agency, which protected their confidentiality as well as ensuring that (a) only those sampled were able to complete the survey, and (b) each respondent only completed the survey once.

**Sample**

All respondents were Internet users who were actively involved in online dating. Participants were recruited on the basis of the following sample criteria: All were current paid subscribers to at least one online dating site (eHarmony, Match.com, Yahoo! Personals, etc.), all had at least one month of experience with online dating, none was currently married (this included single, divorced, and widowed individuals), and all were at least 18 years of age. A total of 562 respondents completed the survey, representing a 59% response rate; 54.4% of the sample were men. Participants ranged in age from 18 to more than 60, with 59.8% being in their 30s and 40s; 78.3% were White, 58.9% were single; another 29.4% were divorced or separated and 79.9% were heterosexual; 78.5% had a bachelor’s degree or higher; and the median income was US$50,000-US$75,000.

**Instrument and Measures**

The survey instrument was constructed using a combination of established scales and original items informed by the literature on privacy, information seeking, and self-disclosure in interpersonal and online relationships. The survey was pilot tested (n = 52) to validate original scales and clarify question wording. All scales were validated through factor analysis using Varimax rotation and retaining Eigenvalues of 1 or greater (all identified a 1-factor solution), followed by reliability analysis. Responses to all online dating-related questions referred to subjects’ main online dating site (as many of them used more than one) and ranged from 1 = strongly disagree to 5 = strongly agree, unless specified otherwise.

**Amount of self-disclosure.** The amount of self-disclosure was measured using four items from the General Disclosiveness Scale (GSD; Wheeless, 1978; Wheeless & Grotz, 1976), which measures individuals’ self-disclosure patterns with others in general, rather than asking about self-disclosure to a particular individual or individuals. Items were modified to refer to online interactions and were used in previous online dating research (Gibbs et al.,
Items that did not hang together reliably with the rest of the scale were dropped from the survey based on analysis of pilot data. The final survey consisted of four self-disclosure items. When the scale was validated, two items that were reverse-coded did not hang together reliably with the other two, so they were dropped. The final measure (Cronbach’s $\alpha = .75$, $M = 2.90$, $SD = .90$) consisted of the following two items: (1) “I usually communicate about myself for fairly long periods at a time with those I meet online”, and (2) “I often discuss my feelings about myself with those I meet online.”

Due to the low number of items in the final scale, we conducted a test of convergent validity to further validate this measure. A small number of our respondents provided their profile screen names and allowed us to conduct further analysis of their actual profiles. We restricted this analysis to Match.com users, who constituted the majority of respondents, in order to avoid inconsistencies in site design and ensure comparability. Although this sample ($n = 31$) did not have enough power to allow for hypothesis testing, we did observe a significant correlation between self-disclosure and word count (the number of words in the open-ended profile self-description) using a one-tailed test in light of our directional prediction ($r = .35$, $p = .028$). This association with a more objective behavioral indicator helps confirm the validity of our measure of self-disclosure.

**Uncertainty reduction strategies.** To measure uncertainty reduction strategies, we constructed an index of five information-seeking or information-appraisal strategies that online dating participants might use to verify the credibility of others they meet online. These strategies mapped onto the categories described by Ramirez et al. (2002), as follows: (a) “‘Googling’ prospective dates (e.g., searching for their name online to verify personal information or find out more about someone’s background)—extractive; (b) “saving emails/IM chats to check for consistency”—active (similar to deception detection); (c) “comparing photos to written/demographic description in profile”—passive; (d) “asking follow-up questions in email or IM to see if they are who they say they are”—interactive; and (e) “asking questions on the phone about what they said in a profile, email or IM”—also interactive. Note that these strategies range in the degree of warranting value they provide (with Googling being the closest to actual warranting, though we were unable to assess the specific webpages that our participants found while Googling and thus cannot assume that this activity definitively resulted in “other-provided” information). Respondents were asked to rate how often they engaged in each of these strategies on a 5-point scale ranging from 1 = never to 5 = often. The five items were aggregated into an index measuring the frequency of using various uncertainty reduction strategies ($\alpha = .85$, $M = 3.09$, $SD = 0.97$). We also included an open-ended question following these five closed questions, “Are there any other strategies you use to verify what people say in their profiles?” These data were analyzed using descriptive statistics and content analysis.

**Personal security concerns.** We used a modified version of Spitzberg and Hoobler’s (2002) cyberstalking scale to assess a range of online dating concerns related to personal safety. An index named personal security concerns was constructed ($\alpha = .93$, $M = 2.56$, $SD = 0.90$), consisting of nine items (sample item: “Someone I meet through online dating will send me threatening written messages or images,” in response to the question prompt:
“How concerned are you about the following?” rated on a 5-point scale with the response options ranging from 1 = not at all concerned to 5 = very concerned.

**Misrepresentation concerns.** We included two additional items related to misrepresentation, which prior online dating research has identified as a salient concern (Ellison et al., 2006; Gibbs et al., 2006). These items (“Someone I meet through online dating will be very different from their profile”; “Someone I meet through online dating will have exaggerated some of their qualities”) were aggregated to form an index called misrepresentation concerns (α = .89, M = 3.73, SD = 0.87).

**Recognition concerns.** A third set of concerns was also included, given that prior online dating research has found that participants are often concerned about having their profiles recognized by friends, family, or work colleagues (Couch & Liamputtong, 2007). To address this concern, we included three items (sample item: “I am concerned that people I know professionally will see my online dating profile and recognize me”) on a 5-point scale where response options ranged from 1 = strongly disagree and 5 = strongly agree. The items were aggregated into an index called recognition concerns (α = .82, M = 2.98, SD = 1.07).

**Self-efficacy.** We examined established scales measuring general self-efficacy, but on the basis of the suggestion by several studies that specific self-efficacy measures are more predictive in a particular context (Agarwal et al., 2000; Marakas et al., 1998), we created our own original items to measure online dating self-efficacy specifically. The six items were assessed on a 5-point scale, with response options ranging from 1 = strongly disagree to 5 = strongly agree (sample item: “I can accurately choose people who are a good match for me”). Reliability analysis indicated that the scale was more reliable if one of the items (which was reverse coded) was dropped, so the final scale was comprised of an average of the other five items (α = .80, M = 3.46, SD = 0.69).

**Internet experience.** To address critiques that have been leveled against simple Internet access measures (Hargittai, 2005; Jung, Qiu, & Kim, 2001), we created an index of Internet experience by aggregating the total number of online activities performed at least once a week. We characterize individuals who perform a broader range of Internet activities regularly as more experienced Internet users. Index values range from 0 to 10 and are based on ten activities, including reading an online news site, looking for health/medical information, updating a personal website or blog, and shopping online (M = 4.40, SD = 2.16).

**Control variables.** Two additional variables that are likely to influence self-disclosure were included as controls: gender and individuals’ likelihood to trust online. Gender was included given the wealth of research on the impact of sex differences on self-disclosure (e.g., Dindia, 2000) and was assessed through one of the demographic questions. Likelihood to trust online was included given that prior research has observed a positive relationship between interpersonal trust and self-disclosure (Altman & Taylor, 1973; Corcoran, 1988; Steel, 1991). It was measured using four original items comparing respondents’ likelihood to trust those they meet via online dating compared to various face-to-face settings. The four items were statements evaluated on a 5-point scale with response items ranging from 1 = much less likely to 5 = much more likely. Statements read: “I am _______ to trust people I meet through online dating compared to (1) strangers I meet at a bar, (2) people I
meet through work, (3) people I meet through mutual friends, and (4) people I meet through family members.” Reliability analysis revealed that the scale was more reliable if the first item (strangers I meet at a bar) was dropped, so the final scale consists of an average of the other three items ($\alpha = .82$, $M = 2.02$, $SD = 0.77$).

Interitem correlations among each of our major constructs were also examined to check for evidence of multicollinearity. All correlations were under .4, well below the recommended threshold of .7 (Tabachnick & Fidell, 2001); thus, we concluded that the variables were nonredundant. Correlations among all variables are reported in Table 1.

## Results

### Hypothesis Testing

All hypotheses in the model were tested through hierarchical multiple regression analysis. In the first model predicting uncertainty reduction strategies, the independent variables were added through forced entry. In the second model predicting self-disclosure, gender and likelihood to trust were entered as control variables in a first step. In a second step, the independent variable was added through forced entry. Standardized $z$ scores were used for each variable in the regression analysis, to ensure that coefficients were comparable.

The first regression model was run to test the effects of the individual predictors on uncertainty reduction strategies (Hypotheses 1-3). Hypothesis 1(a) was confirmed, as those with greater personal security concerns engaged in greater uncertainty reduction strategies ($\beta = .24$, $p < .001$). Hypothesis 1(b) was also confirmed, as those who were more concerned about misrepresentation also engaged in uncertainty reduction strategies more frequently ($\beta = .09$, $p < .05$). Hypothesis 1(c) was confirmed as well, as those who were more concerned about being recognized by friends, family, or work colleagues engaged in uncertainty reduction strategies more often ($\beta = .09$, $p < .05$). Self-efficacy also proved to be a significant predictor of uncertainty reduction strategies ($\beta = .15$, $p < .001$), confirming Hypothesis 2. Finally, Internet experience was a nonsignificant predictor of uncertainty reduction strategies, providing no support for Hypothesis 3. The adjusted $R^2$ for this model was .14 and the model was significant, $F(5, 521) = 17.901$, $p < .001$ (see Table 2 for regression results).

Next, a regression model was run to test the effects of uncertainty reduction strategies on the amount of self-disclosure (Hypothesis 4). The frequency of performing uncertainty reduction strategies was found to have a significant positive effect on self-disclosure ($\beta = .13$, $p < .01$), providing support for Hypothesis 4. The control variables both had significant effects as well: Women were less likely to disclose than men ($\beta = -.17$, $p < .001$) and those with greater online trust reported greater self-disclosure ($\beta = .12$, $p < .01$). The adjusted $R^2$ for this model was .06, and the model was significant, $F(3, 528) = 12.475$, $p < .001$. Regression results are reported in Table 3.
<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
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</thead>
<tbody>
<tr>
<td>Personal security concerns</td>
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<td></td>
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<td></td>
<td></td>
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<td></td>
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<tr>
<td>Misrepresentation concerns</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recognition concerns</td>
<td>.329**</td>
<td>.199**</td>
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<td>Online dating self-efficacy</td>
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<td>.016</td>
<td>-.125**</td>
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<td>Internet experience</td>
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<td>.183**</td>
<td>.087*</td>
<td>.079†</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>Uncertainty reduction strategies</td>
<td>.315**</td>
<td>.221**</td>
<td>.182**</td>
<td>.155**</td>
<td>.141**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likelihood to trust online</td>
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<td>-.195**</td>
<td>-.186**</td>
<td>.182**</td>
<td>-.039</td>
<td>-.097*</td>
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<td>Gender (male = 0, female = 1)</td>
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<td>.037</td>
<td>-.021</td>
<td>.011</td>
<td>-.141**</td>
<td>.100*</td>
<td>-.222**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amount of self-disclosure</td>
<td>.099*</td>
<td>.038</td>
<td>-.033</td>
<td>.196**</td>
<td>.167**</td>
<td>.110*</td>
<td>.162**</td>
<td>-.192**</td>
<td></td>
</tr>
</tbody>
</table>

Note: Total number of participants studied, N = 562.

†p < .10. *p < .05. **p < .01.
Next, we conducted mediation tests to explore whether uncertainty reduction strategies mediated the effects of the independent variables on amount of self-disclosure, to address Research Question 1. We tested for simple mediation using Preacher and Hayes’ (2004, 2008) bootstrapping procedures for indirect effects. This nonparametric method makes no assumptions about the distribution of indirect effects and is recommended over both the Baron and Kenny (1986) approach and the Sobel test (1982) or product-of-coefficients approach for its higher power and reasonably controlled Type 1 error rate (MacKinnon, 2008; Preacher & Hayes, 2008). As recommended by Preacher and Hayes, we calculated indirect effects on the basis of 5,000 bootstrap resamples. The significance of such effects is determined by examining bias-corrected and accelerated 95% confidence intervals (CIs) that include corrections for both median bias and skew (Efron & Tibshirani, 1993) and ascertaining whether they contain zero; if they do not, the effect is considered significant.

Bootstrapping results—with the two control variables (likelihood to trust online and gender) entered as covariates—showed that uncertainty reduction strategies mediated the effects of all five independent variables on amount of self-disclosure. None of the CIs contained zero, so all indirect effects were considered to be significant (see Table 4 for point estimates and CIs obtained).

### Table 2. Regression Coefficientsa for Uncertainty Reduction Strategies

<table>
<thead>
<tr>
<th>Variables</th>
<th>Uncertainty Reduction Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal security concerns</td>
<td>.24***</td>
</tr>
<tr>
<td>Misrepresentation concerns</td>
<td>.09*</td>
</tr>
<tr>
<td>Recognition concerns</td>
<td>.09*</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>.15***</td>
</tr>
<tr>
<td>Internet experience</td>
<td>.07†</td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>17.901***</td>
</tr>
<tr>
<td><strong>Df</strong></td>
<td>5,521</td>
</tr>
<tr>
<td><strong>SE</strong></td>
<td>0.93</td>
</tr>
<tr>
<td>Adjusted <strong>R</strong>²</td>
<td>.14</td>
</tr>
</tbody>
</table>

*a.Standardized regression coefficients are shown.  
†p < .10. *p < .05. ***p < .001.

### Mediation Analyses

Next, we conducted mediation tests to explore whether uncertainty reduction strategies mediated the effects of the independent variables on amount of self-disclosure, to address Research Question 1. We tested for simple mediation using Preacher and Hayes’ (2004, 2008) bootstrapping procedures for indirect effects. This nonparametric method makes no assumptions about the distribution of indirect effects and is recommended over both the Baron and Kenny (1986) approach and the Sobel test (1982) or product-of-coefficients approach for its higher power and reasonably controlled Type 1 error rate (MacKinnon, 2008; Preacher & Hayes, 2008). As recommended by Preacher and Hayes, we calculated indirect effects on the basis of 5,000 bootstrap resamples. The significance of such effects is determined by examining bias-corrected and accelerated 95% confidence intervals (CIs) that include corrections for both median bias and skew (Efron & Tibshirani, 1993) and ascertaining whether they contain zero; if they do not, the effect is considered significant.

Bootstrapping results—with the two control variables (likelihood to trust online and gender) entered as covariates—showed that uncertainty reduction strategies mediated the effects of all five independent variables on amount of self-disclosure. None of the CIs contained zero, so all indirect effects were considered to be significant (see Table 4 for point estimates and CIs obtained).

### Frequency and Types of Uncertainty Reduction Strategies Used

The second research question was answered through both closed and open-ended questions. First, analysis of the means for each of the five uncertainty reduction strategies specified in the survey revealed that the most common strategies were interactive and involved asking questions, either on the phone ($M = 3.33$, $SD = 1.12$) or in email/IM.
This was followed by uncertainty reduction through more passive strategies such as comparing photos and profile descriptions (M = 3.11, SD = 1.27) and saving copies of online conversations to check for consistency (M = 3.07, SD = 1.26). The least common strategy was using Google or another search engine to verify personal information (M = 2.77, SD = 1.30). The means for each strategy hovered around 3, or “sometimes,” indicating that all five of them were performed occasionally.

To further explore the range of uncertainty reduction strategies used, content analysis was conducted on the responses to an open-ended question on uncertainty reduction strategies that asked people whether they used any additional strategies (beyond those included in the closed items) to verify what other people said in their profiles. Analysis consisted of three steps: first, preliminary analysis of all the responses served to establish a 9-item coding scheme, which was then used in the formal analysis. Second, two of the authors independently coded the data using the coding scheme by assigning each response a code ranging from 1 to 9. Third, these nine items were collapsed into five main types of strategies (of the initial nine codes, categories of “other,” “no/NA,” and “left blank” were excluded, and two other codes were combined). A high degree of interrater reliability was attained, with an overall Cohen’s Kappa of 0.94 and Kappas for each strategy ranging from 0.85 to 1.00. The five main strategies identified were as follows (it should be noted that percentages were calculated based on the number of participants who answered the question; 76% of the sample reported no additional strategies or left the question blank): **direct questioning**: 37% (e.g., asking direct questions, engaging in lengthy dialogue, and asking for numerous photos), **information-based triangulation**: 23% (e.g., cross-referencing and comparing profiles on multiple websites, checking public records such as the white pages, Mapquest, Zabasearch, or performing a home property value search), **comparisons**: 20% (e.g., comparing photos to one’s profile description, saving emails to check for consistency),

### Table 3. Regression Coefficients for Amount of Self-Disclosure

<table>
<thead>
<tr>
<th>Variables</th>
<th>Amount of Self-Disclosure&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Step 1</td>
</tr>
<tr>
<td>Gender</td>
<td>-.17&lt;sup&gt;***&lt;/sup&gt;</td>
</tr>
<tr>
<td>Likelihood to trust online</td>
<td>.12&lt;sup&gt;**&lt;/sup&gt;</td>
</tr>
<tr>
<td>Uncertainty reduction strategies</td>
<td>—</td>
</tr>
<tr>
<td>F</td>
<td>—</td>
</tr>
<tr>
<td>df</td>
<td>—</td>
</tr>
<tr>
<td>SE</td>
<td>—</td>
</tr>
<tr>
<td>Adj. R²</td>
<td>—</td>
</tr>
<tr>
<td>ΔR²</td>
<td>—</td>
</tr>
</tbody>
</table>

<sup>a</sup>Standardized regression coefficients are shown.

**p < .01. ***p < .001.
gut instinct: 9% (e.g., relying on one’s hunches or common sense), social triangulation: 8% (e.g., asking other people who may know them, trying to meet their friends quickly), and other strategies: 3%. Of these strategies, information-based triangulation and social triangulation have the highest warranting value, as they rely on information from third parties or other sources that are not easily subject to manipulation.

Discussion

This study explored the ways in which online dating participants verify and share personal information with those they meet online through the use of uncertainty reduction strategies. Our hypotheses proposed that uncertainty reduction behavior was predicted by three sets of online dating concerns—personal security, misrepresentation, and recognition—as well as self-efficacy and Internet experience. We believe focusing on uncertainty reduction strategies is important because these activities enable individuals to confirm the identity claims made by others in a context that lacks many traditional avenues of information seeking, thus setting the stage for self-disclosure and relationship development to occur. Investigating the link between uncertainty reduction, warranting, and self-disclosure also has potential to further our understanding of how relationships move from online contexts to offline meetings (though we focused primarily on online interactions; Walther & Parks, 2002). All of our hypotheses were supported except for Hypothesis 3, as Internet experience had no effect on uncertainty reduction strategies. Our findings have several implications for scholarship examining uncertainty reduction, warranting, and self-disclosure in online dating and online contexts more broadly.

First, we found that several communicator-related factors (Ramirez et al., 2002) predicted uncertainty reduction activity among online dating participants, including individual privacy concerns and self-efficacy. Of these factors, security concerns and self-efficacy played the greatest role in influencing uncertainty reduction behavior. It makes sense that concerns about risks to one’s personal safety would be more likely to induce protective information-seeking behavior than less potentially threatening risks of misrepresentation.
or recognition (which are likely to result in embarrassment rather than physical harm). Our hypothesis that Internet experience would be associated with uncertainty reduction strategies received no support in our model, however. This unexpected finding suggests that strategies from other CMC contexts may not generalize so easily to online dating and that having Internet literacy may not mean that one will develop and engage in uncertainty reduction strategies specific to online dating. The Internet activity with the strongest association \((r = .15, p < .001)\) with use of uncertainty reduction strategies in online dating was use of a social or professional network site (such as Facebook or LinkedIn), presumably because both online contexts represent social uses of online tools, as opposed to more practical uses such as banking or reading news. This highlights the need to distinguish among various kinds of Internet use in future research.

In addition, participants who used uncertainty reduction strategies tended to disclose more personal information in terms of revealing private thoughts and feelings, suggesting a process whereby online dating participants proactively engage in uncertainty reduction activities to confirm the private information of others, which then prompts their own disclosure. The finding that uncertainty reduction strategies mediate the effects of privacy concerns, self-efficacy, and Internet experience on self-disclosure suggests that uncertainty reduction plays a pivotal role in encouraging self-disclosure by reducing privacy concerns and that self-efficacy and digital literacy better equip individuals to formulate and engage in uncertainty reduction strategies and thus feel more confident revealing intimate information to strangers they meet online. Relationships between these variables may vary in other contexts and should be further explored.

Our data further revealed that online dating participants engaged in a variety of uncertainty reduction strategies, including some with high warranting value, such as checking public records and using Google to search for self-presentational discrepancies. Identifying these strategies offers insight into the process by which online daters manage privacy risks through various types of information-seeking behavior. In responses to both the close- and open-ended questions, examples that spanned the full range of uncertainty reduction strategies (i.e., interactive, active, extractive, passive) were reported by participants. Our finding that interactive strategies such as direct questioning were most commonly used supports scholarship arguing that such direct strategies are most amenable to CMC due to its lack of traditional identity cues (Tidwell & Walther, 2002) and extends this finding to the online dating context. Our data also support McKenna’s (2008) argument that online dating affords individuals opportunities to directly examine information about the target person from various online sources, as participants mentioned taking advantage of other online information by comparing profiles on multiple websites, checking public records such as the white pages, and performing home property value searches. These extractive strategies were the least frequently mentioned by our participants, possibly because these strategies demanded higher levels of Internet literacy or personalized knowledge and thus were available to fewer of our participants.

Our data suggest that online dating participants gather information from both online and offline domains to reduce uncertainty about potential romantic partners. Although the most common strategies used were interactive and involved directly engaging with others to
verify their statements, rather than relying on other-generated information, we did find evidence that almost one third (31%) of those who mentioned any additional uncertainty reduction strategies reported engaging in strategies with high warranting value such as information-based triangulation (relying on websites or public records) and social triangulation (relying on other individuals); of these, the former were more prevalent, perhaps because they can be done in the absence of a shared social network (though the fact that any social triangulation occurs at all is interesting and suggests that a shared social network is not completely absent). The relative frequency of interactive strategies, such as asking questions, may be explained in that they can be done very early in a correspondence, whereas activities like search queries or consulting third parties can only be done after the target’s real name is known. At this point, the real name serves as an important warrant and most likely indicates a relationship that has moved beyond the initial stages.

Note that Googling was reported as the least popular uncertainty reduction strategy among our participants, though it provides the highest potential to provide true warranting value. We suspect that, as mentioned earlier, this may be due to the fact that Googling is only possible when one has access to information not provided by the profile—one’s real first and last name or email address. Because not all online dating interactions will develop into relationships in which true names and contact information are exchanged, participants will have fewer opportunities to conduct meaningful online queries. Further research should examine the timing and sequencing of when various strategies are used by online dating participants at different stages of relationship development and whether it differs on the basis of the level of trust or intimacy established. It should also more explicitly assess whether they value some kinds of information (e.g. reported by others) over others (self-reported) as well as assessing the effectiveness of each strategy in reducing uncertainty.

Our research extends theory on uncertainty reduction, warranting, and self-disclosure in CMC contexts more broadly. First, our findings about the types of uncertainty reduction strategies used online provide additional support for research in other CMC contexts that finds that interactive strategies such as asking direct questions and self-disclosure are more common in CMC than active or passive strategies, which are more difficult to perform due to the lack of common acquaintances and lack of opportunity for advanced planning of interaction space (Tidwell & Walther, 2002). Research on SNSs has found, on the other hand, that passive strategies were most commonly used in SNSs, due presumably to the fact that it is easy to gather information from SNS profiles unobtrusively and because connections to the target’s friends are visible, allowing for easier access to this social network (Antheunis et al., 2010). Whereas online dating participants also reveal substantial personal information in their profiles, it is still limited compared to what may be available on SNSs (which often support a constant stream of updates, a historical record of how the profile has changed over time, and the articulated “Friends” network). Furthermore, the predominant goal of forming intimate interpersonal relationships (as opposed to maintaining existing relationships; see boyd & Ellison, 2007) may necessitate interactive strategies to seek more personalized information in order to determine whether the other person is compatible. Further comparison of various CMC contexts is warranted to determine relative strengths and weaknesses of each type of strategy. Our study makes an important first
step, though, in empirically examining the relative use of extractive, interactive, active, and passive strategies in the same study.

We also extend uncertainty reduction theory by providing empirical support for the relationship between communicator-related factors (privacy concerns and self-efficacy) and uncertainty reduction strategies. We further extend the theory by parsing out relationships between uncertainty reduction strategies and self-disclosure, which has traditionally been studied as a particular interactive strategy (Berger, 1979). Although we cannot make claims about causality or temporal sequencing from our cross-sectional data, our findings suggest that other information-seeking strategies may provide an important middle step in reducing privacy concerns and providing verification of identity claims that then provokes self-disclosure in online contexts. Further research should test more directly the degree to which various strategies reduce privacy concerns and influence self-disclosure.

Second, ours is the first study to empirically examine the use of warranting information in a context in which third-party information is not available. Previous research on warranting has focused on third-party information (Walther et al., 2009), which is largely (though not completely) absent in online dating. Our findings show that the act of seeking out archival information using search engines such as Google plays a small but significant role as a source of warranting for online dating participants and that online daters engaged in other creative workarounds in the absence of “true” warranted data. Although the mean frequency was lower than that of the other strategies, the vast majority of respondents (78%) reported using this strategy “rarely” or more often. Our findings help broaden the notion of warranting to include extractive information not provided by third parties.

Third, our findings suggest further theoretical implications for self-disclosure theory more broadly. The self-disclosure we examine refers mainly to expression of personal thoughts and feelings, which may not be as risky as revealing personal financial data or contact information linking one to one’s offline identity, which are privacy concerns prevalent in e-commerce settings (Metzger, 2007). Although online dating participants often reveal a great deal of intimate information in their profiles and subsequent online communication, their identity is masked by a screen name and thus—except for the occasional case in which one’s photo is recognized by an offline acquaintance—this communication poses little risk of identity theft or physical harm. These unique features suggest the importance of distinguishing between identifiable versus nonidentifiable or expressive dimensions of self-disclosure in further research on online dating and in online contexts more broadly.

**Limitations**

This study has several limitations. First, though all of our hypotheses were supported (with the exception of Internet experience), the models did not explain a high degree of variance. The low $R^2$ in each model (self-disclosure, in particular) suggests that there may be additional important predictors that should be considered in future research. Second, we did not assess specific types of information revealed by participants or the intimacy of their self-disclosure, but simply the amount of self-disclosure in general (and by two items). We
studied amount rather than intimacy or depth of self-disclosure because it is the focus of much of the online self-disclosure literature (e.g., Brunet & Schmidt, 2008; Dietz-Uhler, Bishop-Clark, & Howard, 2005; Joinson, 2001a, 2001b; Yee & Bailenson, 2007), but future research should also examine the depth or intimacy of self-disclosure. Third, several measures were compromised by reverse-coded items, possibly due to the fact that the negatively worded items were not measuring the same underlying trait as the positively worded items, and this produced systematically different responses (Weems & Onwuegbuzie, 2001). The web survey format may also have played a role, as survey respondents may be less able to accurately identify reverse-coded items on web-based surveys than on paper-based surveys (Bradley & Sankar, 2003). Finally, we rely on self-reports, which may be subject to bias.

Despite these limitations, our findings make an important contribution to the literature on online uncertainty reduction and self-disclosure by extending it to the mixed-mode interpersonal context of online dating. Online dating constitutes an important CMC context that brings together strangers for face-to-face interaction (unlike other modes in which individuals interact online only, or articulate face-to-face relationships in online settings), resulting in increased pressure for users to seek information that can warrant identity claims and reduce uncertainty. As such, it highlights salient issues related to privacy and technology and the key role played by communication in navigating boundaries between privacy and self-disclosure. Overall, our findings contribute to the literature on online relationships by suggesting that uncertainty reduction plays an important role in online relationship formation. As online and mobile communication tools directed toward social interaction continue to evolve—reshaping communication patterns between strangers, friends, families, and romantic partners—understanding the relationship among uncertainty management, self-disclosure, and relationship development in these broader contexts will become increasingly important.

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**Notes**

1. The design of online dating sites and the emergent social norms that evolve on many of them encourage early disclosure of a great deal of intimate information that is typically not explicitly shared in most initial face-to-face encounters. For example, in addition to standard demographic and appearance descriptions, profiles on Yahoo! Personals provide information about when users last logged into the site and self-reported descriptions of their interests, personality type, and sense of humor in addition to more sensitive information such as income, smoking and drinking habits, desire for children, and religious beliefs. Yahoo! and other sites incorporate an “I’ll tell you later” option when users do not wish to complete a particular field; thus, the structure of the profile subtly pressures users to reveal personal information while enabling them to withhold some data or to disclose intimate personal information but still maintain anonymity (by not including a photograph, for instance).

2. As email and web surveys typically have lower response rates than in-person and phone surveys (Watt, 1999), we took several measures to increase our response rate: limiting the survey to 15 min and keeping format simple, offering incentives, sending prenotification and reminder emails, emphasizing the academic (rather than commercial) nature of the research, and ensuring confidentiality of responses (Tuten, Urban, & Bosnjak, 2002). Respondents’ prior agreement to participate in a research panel (though participation in any survey was completely voluntary) also helped ensure commitment.

3. We selected this measure of general tendency to disclose rather than a composite score of average disclosure between dyads, which could be misleading due to the great variability in disclosure behavior among online dating participants (e.g., an individual may disclose far more to an established communication partner than to a new acquaintance). Also, as online dating participants tend to communicate with a large number of others (indeed, 9% of our sample reported interacting with more than 100 online dating participants over email or IM), isolating their disclosure to a specific individual would be difficult for respondents to assess.

4. Final items: (a) “I am able to effectively assess another person’s profile”; (b) “I make good decisions about whom to meet in person”; (c) “I can accurately choose people who are a good match for me”; (d) “When looking at profiles, I can choose the trustworthy people from those who are not trustworthy”; and (e) “I feel I understand how to be successful in online dating.”

5. Note that Internet experience was included in the mediation test because it was significantly correlated with uncertainty reduction strategies ($r = .14, p < .001$), though its effect was nonsignificant when the other independent variables were controlled in the regression model.

**References**


Bios

Jennifer L. Gibbs is an associate professor of communication at Rutgers University. She earned her PhD from the Annenberg School for Communication at the University of Southern California in 2002. Her research interests include online self-presentation and relationship formation as well as collaboration and identification in virtual, multicultural work contexts such as global teams. Her work has been published in Administrative Science Quarterly, Communication Research, Communication Yearbook, Human Relations, and Journal of Computer-Mediated Communication, among others.

Nicole B. Ellison received her PhD from the Annenberg School for Communication in 1999 and is currently an associate professor in the Department of Telecommunication, Information Studies, and Media at Michigan State University. Her research explores issues of self-presentation, relationship development, and identity in online environments. Her most recent research explores the social capital implications of Facebook use, deceptive self-presentation among online dating participants, and the use of social network sites in educational contexts. Her book, Telework and Social Change, was published in 2004.

Chih-Hui Lai is a doctoral student in the Department of Communication at Rutgers University. Her research interest is focused on mediated communication and evolution of social relationships and explores a social network lens to observe social changes. She has conducted a case study regarding the use of a mobile social networking service in Taiwan, placing the use of mobile applications into specific cultural and social contexts. Findings from this study were published in M/C Journal. Another study focused on American young people’s use of mobile phones and online social networking was published in the book Communications in the 21st century.