# Predicting User Concerns About Online Privacy

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**With the rapid diffusion of the Internet, researchers, policy makers, and users have raised concerns about online privacy, although few studies have integrated aspects of usage with psychological and attitudinal aspects of privacy. This study develops a model involving gender, generalized self-efficacy, psychological need for privacy, Internet use experience, Internet use fluency, and beliefs in privacy rights as potential influences on online privacy concerns. Survey responses from 413 college students were analyzed by bivariate correlations, hierarchical regression, and structural equation modeling. Regression results showed that beliefs in privacy rights and a psychological need for privacy were the main influences on online privacy concerns. The proposed structural model was not well supported by the data, but a revised model, linking self-efficacy with psychological need for privacy and indicating indirect influences of Internet experience and fluency on online privacy concerns about privacy through beliefs in privacy rights, was supported by the data.**

## Introduction

Privacy and security problems associated with digital communication and network technologies have been a major concern among Internet users during the past decade (Federal Trade Commission, 2000; Metzger & Docter, 2003; UCLA Center for Communication Policy, 2000, 2001, 2003, 2004). Metzger (2004) noted FBI and Federal Trade Commission (FTC) reports on extensive instances of identity theft and online fraud, and FTC findings that nearly all commercial Web sites collect some type of personal information while less than 20% provided a complete privacy policy (FTC, 2000).

Past research has identified a number of demographic and user-experience factors such as gender, Internet use experience, and Web expertise to be related to user concerns about online privacy (Dommeyer & Gross, 2003; Graeff & Harmon, 2002; Milne & Rohm, 2000; O'Neil, 2001; Phelps, Nowak, & Ferrel, 2000; Sheehan, 1999). However, the influence of social-psychological factors, such as people's beliefs and personality, upon concerns about online privacy is unclear. The present study is designed to examine, in addition to the demographic and experience factors identified in previous research, the influence of psychological need for privacy, generalized self-efficacy, and beliefs in privacy rights on user concerns about online privacy.

## Concerns About Privacy

Despite its central position in Western philosophy and an array of social and behavioral sciences (cf. DeCew, 1997; Turkington & Allen, 1999), there is very little agreement on the definition of privacy. A primary source of this disagreement is the fact that the term "privacy" is used loosely by lay persons, scholars, and legal practitioners in different social contexts referring to different things. The concept of privacy has been defined by some as matters that are personal and secretive (Stephen, 1967), the right to be left alone (Cooley, 1880; as cited in Turkington & Allen, 1999; Warren & Brandeis, 1890), the degree of accessibility to an individual (Bok, 1984), dependent on the context of use (Viseu, Clement, & Aspinall, 2004), or one's ability to control information about oneself (Fried, 1970; Westin, 1967).

One seminal definition of privacy deals with the control of personal information. Jourard (1966) viewed privacy as an outcome of people withholding certain knowledge about their present experiences from others. Bennett (1967) defined privacy as the selective control of information. Westin (1967) defined privacy as "the right of the individual to decide what information about himself should be communicated to others and under what condition" (p. 10). Central to this view of privacy are three key elements: the autonomy of decision making, information about one's self, and a process of communicating this information.

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## Concerns About Online Privacy

Public opinion has demonstrated the growing importance of privacy in today's information-saturated society (Udo, 2001). Metzger and Docter (2003) reviewed public opinion polls, industry positions, enacted legislation, and proposed legislation about online privacy protection between 1998 and 2001. They found that, averaging across 16 nationwide opinion polls, over 74% of respondents were either "very" or "somewhat" concerned about privacy when on the Internet. Online privacy concerns focus both on companies that seek to obtain and use personal information for marketing purposes (Smith, Milberg, & Burke, 1996) as well as to more general entities such as spammers, hackers, viruses, and university/government monitoring. Hoffman, Novak, and Peralta (1999) found that more than 90% of Internet users either have declined to provide personal information or have fabricated information due to online privacy concerns.

Based on Westin's (1967) definition of privacy, Smith et al. (1996) identified four factors of online privacy: unauthorized secondary use of personal information, improper access of digitally stored personal information, collection of personal information, and errors in collected personal information. Metzger and Docter (2003) considered online privacy concerns to include anonymity, intrusion (e.g., spam, data mining), surveillance (individual and public—especially since the Uniting and Strengthening America Act—HR 2975, 2001—commonly referred to as the Patriot Act), and autonomy. Regan (2002) argued that personal information flows can be thought of as a common pool of resources and that overuse or misuse, such as through privacy violations, may contribute to a tragedy of the commons on the Internet.

Because the idea of autonomously controlling personal information directly speaks to the informational nature of the Internet, almost all discussions of online privacy seem to adopt the view that online privacy involves the control of personal information in the virtual environment (FTC, 2000; Metzger & Docter, 2003; Milberg, Smith, & Burke, 2000). Indeed, over two thirds of respondents in one survey felt that their ability to control the collection of personal information was extremely important (Harris Interactive, 2003). Those who place a greater value on their personal privacy experience a lower sense of control over their personal information (Stone, Gueutal, Gardner, & McClure, 1983). Metzger's (2004) study concluded that "Participants' general concern for privacy [lower] and the degree to which they believe Web sites protect their privacy [higher] were found to [positively] influence online information disclosure through the trust [higher] these variables engendered" (p. 16).

## Gender and Concerns About Online Privacy

Women generally have more concerns about privacy than do men (Furash, 1997; Kehoe, Pitkow, & Morton, 1997; Milne & Rohm, 2000; O'Neil, 2001; Sheehan, 1999); however, a close examination of these studies would suggest that the effect of gender on privacy concerns is inconclusive at best. Males seem more likely to purchase online products and services, and are less concerned about a site having their online profile, about information collected online being sold, and about a site having a physical location as well (Sheehan, 1999). Sheehan (1999) surveyed 889 Internet users and examined whether women's and men's concerns about privacy differed in 15 online situations. Women were more concerned than were men in about only five of the situations: When the respondent received e-mail (a) from a company they were currently patronizing, (b) about a new product from a known company that they were not currently patronizing, (c) from a company the respondent had never heard of, (d) with no idea how the company had obtained their e-mail address, and (e) when information was being used by other divisions of a company that the respondent had been patronizing. Women seemed more likely to comply with some of the behaviors that online entities would like them to do (e.g., respond to unsolicited e-mail, register for a Web site); paradoxically, they were more likely to do so if they were more concerned about online privacy! Sheehan (1999) also noted that male responses, when concerned about online privacy, were much more proactive whereas women's responses were less confrontational.

O'Neil (2001) analyzed data from the Georgia Institute of Technology's Graphic, Visualization, and Usability (GVU) survey and reported a gender difference in online privacy concerns; however, only descriptive statistics were reported, and no formal inferential test was conducted to examine whether this difference was statistically significant. Finally, findings from other studies have not supported a gender difference in online privacy concerns. Nowak and Phelps (1992) did not find gender differences in concerns about personal privacy threats or requests to be removed from a mailing list, and Phelps et al. (2000), in a national mail survey about disclosing consumer information, found no statistically significant differences by gender.

The mixed findings from these studies are not surprising due to a number of issues. First, many online privacy studies rely on opinion polls and secondary data from general surveys not specially designed for the research topic of interest (Harper & Singleton, 2001). Second, large-sample national surveys covering a wide variety of topics (e.g., the Census and even the Pew surveys of Internet use) tend to use single-item measures rather than scales with multiple items. Third, many studies rely heavily on descriptive statistics and seldom consider the effects of mediating and moderating factors by using more sophisticated statistical analyses. Finally, there may be a gender–time interaction; because women generally have adopted the Internet later than have men but are now at equal levels (Katz & Rice, 2002), they may have only recently become more comfortable with some of these potential online privacy issues, so differences may be declining over time.

Based on the mixed findings from previous research, the present study first asks a general research question


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exploring the influence of gender on user concerns about online privacy:

> Research Question 1: Do User Concerns About Online Privacy Differ for Men and Women?

## Internet Use Experience, Fluency, and Online Privacy Concern

In a multiyear longitudinal investigation, the UCLA Center for Communication Policy (2000, 2001, 2003, 2004) found that the level of privacy concern, as measured by a single item, has decreased over time, especially among experienced Internet users. Phelps et al. (2000) found that consumers who had made a mail-order (not online) catalog purchase within the past 6 months were less concerned about privacy than those who had not. Although the direction of influence cannot be conclusively determined, these two studies suggest that users' increased experience in conducting Internet-related activities and distant purchases may be negatively correlated with their concerns about privacy. Metzger (2004) found, through an analysis of responses to a simulated commercial Web site, that the more prior Internet experience the users had, the less they were concerned with privacy and the more willing they were to disclose personal information to the Web site.

Diversity of Internet use seems more informative than simply the number of years using the Internet because it represents greater possibilities for exposure to and familiarity with various features, functions, resources, and challenges of the Internet and the Web (e.g., using Web addresses, setting cookie options, or creating Web sites). Further, the number of online activities has been shown to be a stronger predictor of some kinds of Internet attitudes and outcomes than has years using the Internet (Rice, 2006). This increased familiarity should, in turn, reduce the anxiety associated with using a new medium and increase their use of features and options that affect privacy. The more people engage in diverse online activities and the greater fluency they have in Internet and Web features and activities, the better understanding they will have about advantages and potential threats associated with these activities. Thus:

> **H1a:** The greater one's Internet use diversity, the more fluent he or she will be using the Internet.
>
> **H1b:** The greater one's Internet use diversity, the less concerned he or she will be about online privacy.
>
> **H1c:** The more fluent people are with the Internet, the less concerned they will be about online privacy.

## Self-Efficacy and Online Privacy Concern

Perceived self-efficacy is a person's belief in their capabilities and cognitive resources needed to cope with the given events (Bandura, 1989a, 1994). Perceived self-efficacy reflects an optimistic self-belief (Schwarzer, 1992)—that one can perform novel or difficult tasks in various domains of human functioning. Perceived self-efficacy facilitates goal setting, effort investment, persistence in the face of barriers, and recovery from setbacks. It can be regarded as a positive resistance resource factor. Although self-efficacy is commonly understood as being domain specific, some researchers also have conceptualized a generalized sense of self-efficacy—a global confidence in one's coping ability across a wide range of demanding or novel situations (Schwarzer, 1992; Schwarzer & Jerusalem, 1995; Schwarzer, Mueller, & Greenglass, 1999). Several cross-cultural studies have suggested that generalized self-efficacy seems to be a consistent indicator of a stable within-individual characteristic (cf. Schwarzer & Born, 1997; Schwarzer et al., 1997; Scholz, Gutiérrez-Doña, Sud, & Schwarzer, 2002; Zhang & Schwarzer, 1995).

In the context of Internet use and online privacy concern, it can be argued that a high level of self-efficacy will allow an Internet user to be less fearful about using the medium and the potential risks associated with it. Consistent with this view, Salanova, Grau, Cifre, and Llorens (2000) found that computer-related self-efficacy was positively correlated with frequency of using computers. Frequent users and users who received computer training tended to have much higher computer efficacy and lower computer-using anxiety. Thus:

> **H2a:** People's generalized self-efficacy will be positively related to Internet use diversity.
>
> **H2b:** People's generalized self-efficacy will be positively related to Internet use fluency.

In addition, social cognitive theory (Bandura, 1989b) postulates that a person's self-efficacy to exercise control over potentially threatening events plays a significant role in anxiety arousal. The social cognitive approach views threat as a rational evaluation concerning the match between perceived coping capabilities and a potentially difficult environment or task. People who perceive that they can exercise control over potential threats experience a much lower level of anxiety than those who believe they cannot cope with the environment (Bandura, 1982, 1988). LaRose, Mastro, and Eastin (2001) argued that social-cognitive influences such as self-efficacy should be included in studies of Internet usage as a way to extend familiar models such as uses and gratifications. Their survey analysis of Internet usage concluded that Internet self-efficacy was a far greater influence on usage than traditional uses and gratifications factors, and demographics. In the context of online privacy, it can be argued that the level of generalized self-efficacy may directly influence the level of anxiety associated with online privacy concerns, aside from its indirect effect mediated by computer-use experience and fluency. Thus:

> **H3:** People's generalized self-efficacy will be negatively related to online privacy concern.

In general, an underlying assumption in much of the past research on Internet privacy is that people have the same


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level of desire for privacy; the only variation among different individuals is their ability (i.e., Internet-related knowledge or experience) to fulfill this desire. Thus, as a person gains more knowledge and experience in using the medium, or as the medium itself provides more privacy-protection options, concerns about online privacy will naturally decrease. Yet, this assumption does not consider the influence of individual differences in the desire to have more or less privacy in the real world. The relationship between a person's dispositional preference to have more or less privacy in the physical world and preference to have more or less privacy in the virtual world has not been closely examined. In the present study, we propose that a thorough understanding of people's specific concerns about online privacy should consider individual differences in at least two factors: (a) an individual's beliefs in privacy rights in general and (b) an individual's dispositional need for privacy.

## Beliefs in Privacy Rights and Online Privacy Concerns

The notion of privacy is deeply rooted in the Western culture. Early philosophers such as Aristotle, John Locke, and John Stuart Mill have commented in their writings on the importance of a "right to privacy" as a fundamental value to democracy (DeCew, 1997; Turkington & Allen, 1999). However, because of its elusive ontological nature and its broad scope, the extent to which a person is protected by a "right" to privacy has not been clearly defined in the American legal system.

For example, although a number of Supreme Court decisions reflect a general consensus that a human right to privacy exists (cf. *Griswold v. Connecticut*, 1965; *Roe v. Wade*, 1973), the Supreme Court has not yet clearly explicated the scope and nature of this right. Moreover, while legal precedents in the United States have clearly identified a class of activities as violations of privacy (e.g., trespassing, appropriation of one's image, etc.), qualifications and exceptions often make litigation concerning the invasion of privacy extremely difficult (Cate, 1997).

Given its complexity, very few people, with the exception of a handful legal scholars and privacy researchers, have explicit or comprehensive knowledge about the nature and scope of one's actual legal rights to privacy. Yet, the idea of having a right to privacy is so pervasive in Western societies that almost everyone would be able to give their own opinions about how much privacy one should have.

Thus, it may be far more fruitful when examining privacy concerns to treat the right to privacy as a set of beliefs and values held by individuals than to view it as a set of objective legal codes. People's beliefs in privacy rights will be subjective and will vary from individual to individual. Some people may firmly believe in the right to privacy across all human domains, including on the Internet, and they will be very concerned about online privacy violations. Others may not hold such a strong view. Thus:

**H4:** People's beliefs in a general right to privacy will be positively related to their concerns about online privacy.

## Need for Privacy and Online Privacy Concern

Several theories argue for an enduring human need for privacy. The evolutionary perspective, for example, postulates that the human species has an innate drive to be gregarious, but territorial. Halmos (1953) explicitly stated that the desire for solitude is natural to both primitive and postprimitive societies and functions to regenerate social life for more harmonious living. Klopfer and Rubenstein (1977) argued that having some level of privacy is essential to many animals' survival. Most animals exhibit some pattern of social withdrawal, often manifest in the form of territoriality. Privacy may aid survival by reducing competition for food and reproductive resources.

The developmental perspective, on the other hand, emphasizes individual differences in the desire for privacy. Specifically, this perspective pays close attention to changes in the understanding and preference of privacy through different stages of the human development cycle. It sees individual conceptions of privacy as developed primarily by learning through observations of adults. The family environment may directly influence the development of an individual's independence and autonomy (Ittelson, Proshansky, Rivlin, & Winkel, 1974; Laufer & Wolfe, 1977). In support of the developmental perspective, Lawton and Bader (1970) found that preference for a private room increases with age from Years 10 through 40. Marshall (1974) also noted that age was a significant predictor of privacy preference. Wolfe and Laufer (1974) found that with maturation, one's concept of privacy becomes more cognitively complex. Parke and Sawin (1979) discovered that the use of both physical privacy markers and privacy rules at home (e.g., putting signs on the door, knocking before entering the room, etc.) increased with age among children. In summary, there are both enduring and individual differences in a psychological desire for privacy (Buss, 2001).

It can be argued that the need for privacy, defined as an individual's disposition to desire more or less privacy in various social situations, may influence people's beliefs in privacy rights. A person who has a greater dispositional desire for privacy will be more likely to express support for a right to privacy than is someone who has less need for individual privacy. Thus:

**H5:** People's psychological need for privacy offline will be positively related to their support for the general right to privacy.

This psychological need for privacy also may directly influence a person's tolerance or threshold for privacy threats, in both physical and virtual environments. For example, people who are highly protective of their private properties in the physical world also may be highly protective of their


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virtual space, such as their e-mail accounts. People who like to close curtains or doors while in their house may be particularly sensitive to online surveillance and tracking. Thus:

**H6:** People's psychological need for privacy offline is positively related to people's concern about online privacy.

## A Model of Online Privacy Concerns

Although the hypotheses can be tested separately, a path model that simultaneously considers these factors should be tested to gain a complete understanding of how these factors may influence user concerns about online privacy. There are several advantages of testing a path model. First, a simultaneous analysis provides a better understanding of the possible role of mediating effects. For example, a person's need for privacy may be correlated with online privacy concerns; however, this relationship may be mediated by this person's beliefs in privacy rights in general. Alternatively, a need for privacy may have a direct impact on privacy concerns independent of one's beliefs in the right to privacy. A path model will provide a more complete picture of these relationships than what simple correlational findings may provide. Second, a simultaneous analysis of all hypothesized relationships will allow us to compare the relative importance of each predictor to the dependent variable—user concerns about online privacy.

Figure 1 presents the structural model to be tested in the present study. Individuals' psychological need for privacy directly affects both beliefs in privacy rights and concerns about online privacy. One's belief in privacy rights mediates between need for privacy and concerns about online privacy. Individuals' generalized self-efficacy increased Internet use experience and Internet fluency. Self-efficacy also reduces concerns about online privacy. Increased Internet use experience increases Internet use fluency. Internet fluency mediates the influence of both self-efficacy and Internet experience on concerns about online privacy. People's Internet experience mediates between self-efficacy and concerns about online privacy. Overall, then, two very general traits—need for privacy and self-efficacy—have both direct and indirect influences on concerns about online privacy. The indirect effects are mediated by specific beliefs and Internet experience and fluency, which themselves directly affect concerns about privacy. Technology familiarity is affected by one's self-efficacy while privacy rights beliefs are affected by an underlying need for privacy.

The causal directions among these variables are fairly clear. Need for privacy is an indicator of a person's stable characteristic, beliefs in privacy rights may be viewed as a specific domain in which this stable trait may be influential, and finally, concerns about online privacy may be a specific context in which these beliefs are manifested. More complex models would, of course, involve many more factors shown by previous research to influence all of these concepts.

## Method

### *Participants*

The participants in this investigation were 413 undergraduate students (94 male, 23%; 317 female, 77%; 2 unknown; the gender distribution mirrors the distribution in the communication major) enrolled in lower division communication courses at a Southwestern U.S. university. Participants volunteered to complete this study's survey to partially satisfy the research requirement of their course and received 1 hr of credit. The mean age of the sample was 19.5 years ($SD = 1.38$).

### *Measures*

Table 1 provides the descriptive statistics for both the constituent items and the resulting scales (with alpha reliabilities) used in this study.

*Need for privacy.* The 19-item Need for Privacy Scale (Buss, 2001) was used to measure individual differences in need for privacy. Participants were asked to indicate the degree to

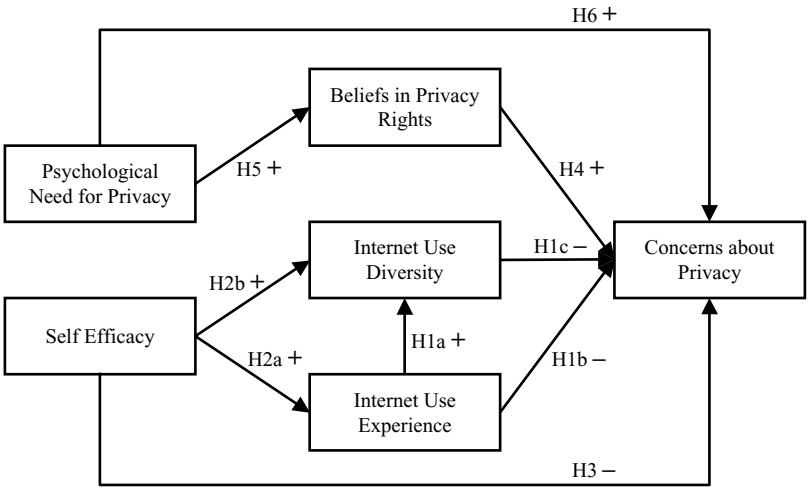


FIG. 1. Proposed path model predicting user concerns about online privacy.


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TABLE 1. Descriptive statistics for items and scales, with alpha reliabilities.

| Item, scale, and $\alpha$ | *M* | *SD* |
|---|---|---|
| hard talk about myself | 3.28 | 1.77 |
| prefer others know little about me | 3.42 | 1.55 |
| never show diary to others | 5.09 | 1.79 |
| not tell acquaintance things about me (reversed) | 3.60 | 1.56 |
| many things not talk about w/others | 4.22 | 1.66 |
| not talk personal unless others first | 3.79 | 1.46 |
| at home keep window shades closed | 2.82 | 1.80 |
| uncomfortable public restrooms | 3.14 | 1.77 |
| prefer car tinted windows | 2.94 | 1.67 |
| hate when people next door can hear | 4.02 | 1.73 |
| object bystander listening when telephone | 4.24 | 1.68 |
| don't like getting undressed locker room | 3.60 | 1.69 |
| rather study alone | 4.44 | 1.76 |
| difficult concentrate when others around | 4.44 | 1.54 |
| need lots room/space around me | 4.29 | 1.53 |
| easier do many things if tune others out | 4.60 | 1.42 |
| unwind—get away from everybody | 3.80 | 1.74 |
| need time away from others | 4.68 | 1.66 |
| working studying need elbow room | 5.08 | 1.51 |
| Need for Privacy $\alpha = .81$ | 3.97 | .78 |
| solve problems | 3.31 | .51 |
| get what want | 2.93 | .55 |
| stick to aims goals | 3.14 | .62 |
| confident unexpected events | 3.20 | .56 |
| resourceful unforeseen situations | 3.11 | .62 |
| solve problems necessary effort | 3.43 | .58 |
| calm problem coping abilities | 3.01 | .69 |
| find several solutions | 3.02 | .63 |
| in trouble think of solution | 3.19 | .56 |
| usually handle whatever | 3.24 | .55 |
| Efficacy $\alpha = .86$ | 3.16 | .39 |
| people right to be left alone | 6.28 | 1.00 |
| people able use Internet anonymously | 5.55 | 1.44 |
| no gather disclose personal info w/out consent | 6.45 | 1.00 |
| people right control their personal info | 6.48 | .90 |
| govt never tap private lives w/out courts | 5.86 | 1.39 |
| Beliefs in Privacy Rights $\alpha = .67$ | 6.12 | .76 |
| using browser navigate | 6.75 | .67 |
| typing Web address directly | 6.84 | .54 |
| identify host server from IP address | 5.36 | 1.56 |
| use hypertext links | 5.92 | 1.54 |
| using back & forward in browser | 6.89 | .42 |
| add bookmarks in browser | 6.42 | 1.24 |
| editing bookmarks | 5.88 | 1.60 |
| using search engines | 6.86 | .50 |
| using advanced search techniques | 6.04 | 1.27 |
| save text of Web pages to disk | 5.44 | 1.76 |
| save images Web pages to disk | 5.56 | 1.73 |
| turn on/off auto load images | 4.87 | 1.84 |
| use dial-in account to log on | 5.48 | 1.70 |
| create Web site visual editor | 3.34 | 1.90 |
| use Internet email | 6.75 | .82 |
| set browser accept/reject cookies | 4.54 | 2.02 |
| Web site using html | 2.97 | 1.79 |
| Internet Fluency $\alpha = .88$ | 5.71 | .82 |
| online order | .87 | .34 |
| order >$100 | .59 | .49 |
| create page | .31 | .46 |
| custom page | .66 | .48 |
| change browser homepage | .75 | .43 |
| change cookie pref | .44 | .50 |
| online chat/discussion | .86 | .35 |
| listen online radio | .57 | .50 |


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TABLE 1. *Continued*

| Item, scale, and $\alpha$ | *M* | *SD* |
|---|---|---|
| online phone call | .16 | .37 |
| online directory add/phone | .56 | .50 |
| class about Internet/Web | .15 | .35 |
| bought book about Internet/Web | .08 | .28 |
| Internet Use Diversity | 5.99 | 2.26 |
| bother me companies ask for personal info | 4.81 | 1.46 |
| personal info database should be double-checked | 4.27 | 1.32 |
| companies not use personal info w/out authorization by ind | 6.02 | 1.20 |
| companies devote more time prevent unauthorized access | 5.73 | 1.17 |
| companies ask personal info think twice before providing | 5.79 | 1.28 |
| companies never use info for other reason | 6.19 | 1.12 |
| companies better procedures correct errors personal info | 5.25 | 1.26 |
| company databases protected from unauthorized access | 5.84 | 1.18 |
| companies never sell personal info in databases to other companies | 6.37 | 1.08 |
| companies devote mote time verify accuracy personal info | 5.20 | 1.32 |
| concerned companies collect too much personal info me | 4.73 | 1.49 |
| Organizational Privacy $\alpha = .85$ | 5.47 | .79 |
| hackers credit card number online | 5.30 | 1.53 |
| computer virus attack | 5.80 | 1.40 |
| e-mail read by someone other than recipient | 4.09 | 1.78 |
| other learning your personal info from online activities | 4.58 | 1.73 |
| ISPs selling your personal info | 4.70 | 1.79 |
| spam/junk e-mails | 4.78 | 1.72 |
| ISPs monitoring e-mails other online activities | 4.52 | 1.71 |
| employer/university monitoring e-mails other online act | 4.56 | 1.86 |
| govt monitoring e-mails other online activities | 4.42 | 1.95 |
| Concerns About General Online Privacy $\alpha = .88$ | 4.75 | 1.23 |
| Overall Concerns About Online Privacy $\alpha = .89$ | 5.17 | .83 |

which they agree or disagree on a scale of 1 (*very strongly disagree*) to 7 (*very strongly agree*), with 19 statements describing one's privacy-related preferences (e.g., "it is hard for me to talk about myself"). The Need for Privacy Scale displayed good internal consistency (Cronbach's $\alpha = .81$).

*Generalized self-efficacy.* Participants' self-efficacy was measured by the 10-item Generalized Self-Efficacy Scale (Jerusalem & Schwarzer, 1992). While other studies have specifically used a measure of Internet self-efficacy, we wished to broaden the explanatory scope of the model to take into account more general dispositional factors, to correspond with the more general need for privacy and beliefs in privacy rights. Each of the 10 items is a statement that refers to successful coping in difficult situations, and implies an internal-stable attribution of success (e.g., "I can always manage to solve difficult problems if I try hard enough") (1 = *not at all true*, 2 = *hardly true*, 3 = *moderately true*, 4 = *exactly true*). The GSE has been used in hundreds of studies across samples from various cultures (cf. Jerusalem & Schwarzer, 1992; Rimm & Jerusalem, 1999; Schwarzer, 1992; Zhang & Schwarzer, 1995). It consistently has been found to be a highly reliable scale. In the present study, a good alpha coefficient also was obtained (Cronbach's $\alpha = .86$).

*Beliefs in privacy rights.* Five items were included in the present study to measure respondents' beliefs in privacy rights. The items were developed based on frequently cited definitions of privacy, including those by Warren and Brandeis (1890)—people should have the right to be left alone—and Westin (1967)—people should have the right to control their personal information—and were scored on a scale of 1 (*very strongly disagree*) to 7 (*very strongly agree*). Although preliminary analyses suggested that the internal consistency of this scale is relatively low ($\alpha = .67$), this alpha coefficient is acceptable given a high face validity and the exploratory nature of the present study (Murphy & Davidshofer, 1994).

*Internet use fluency.* Seventeen items were taken from the Computer–E-mail–Web Fluency Scale developed by Bunz (2004) to measure Internet use fluency. Participants were asked, on a scale from 1 (*very difficult*) to 7 (*very easy*), to indicate how difficult it is for them to perform various online activities such as "using Netscape or Explorer to navigate the World Wide Web," "typing a Web address into a browser to go there directly," and "identifying the host server from the Web address" (Cronbach's $\alpha = .88$).

*Internet use diversity.* A dozen questions were taken from the Georgia Tech (1998) Web survey that asked whether or not the respondent had performed each of the listed activities (e.g., created a Web page). This scale has a possible range from 0 to 12. A high score on this scale indicates a person has more experience in using the Internet.


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*Concerns about online privacy.* Two sets of items were used to evaluate concerns about online privacy. Participants' concerns about *organizational privacy* were measured by 11 items taken from Smith et al.'s (1996) 15-item scale. These items emphasize people's concerns about the ways in which companies gather and exchange personal information via the Internet. Participants were asked to indicate, on a 7-point scale (1 *very strongly disagree* to 7 *very strongly agree*), the degree to which they agree or disagree with 11 statements describing how they feel about various online-company practices involving one's information (e.g., "It usually bothers me when companies ask me for personal information"). To cover a broader range of online privacy concerns, nine additional items concerning *general online privacy* (concerning a range of entities, not just companies) were included. Participants were asked to indicate the degree to which they were concerned about various general potential threats to online privacy, such as online surveillance and spam, on a scale of 1 (*not at all concerned*) to 7 (*extremely concerned*). Although the 11-item scale measuring concerns about organizational privacy ($\alpha = .85$) and the nine-item scale measuring concerns about general online privacy (Cronbach's $\alpha = .88$) can each be used as an indicator of the level of privacy concern, the 20 items collectively formed not only a more complete measure of people's overall concerns about online privacy but also a slightly more reliable scale (Cronbach's $\alpha = .89$).

## Analyses

First, correlations between each pair of measures for the entire sample were examined. Next, the effect of gender was explored to address Research Question 1. To examine unique predictive effects among the hypothesized predictors and concerns about online privacy, a hierarchical multiple regression analysis was conducted. Finally, structural equation path analyses, including testing for possible mediating effects, were conducted.

## Results

### *Zero-Order Correlations*

Table 2 provides the zero-order correlations between each scale. Internet use diversity and Internet use fluency were positively correlated; this is consistent with H1a. However, overall online privacy concerns were not negatively related to Internet use diversity and fluency, as was predicted in H1b and H1c. In fact, online privacy concerns were positively related to Internet use fluency. Generalized self-efficacy was positively related to Internet use diversity and fluency, as predicted in H2a and H2b. In addition, consistent with H3, self-efficacy was negatively related to overall privacy concerns.

Beliefs in privacy rights and need for privacy are overall better predictors of online privacy concerns than are the Internet diversity and fluency factors. Need for privacy also was positively related to beliefs in privacy rights. These results support H4, H5, and H6. Finally, individuals with high self-efficacy reported lower levels of need for privacy.

### *Gender Effects*

A two-sample $t$ test comparing the means of overall concerns about online privacy of male and female participants was conducted first. There was essentially no difference between females ($M = 5.12$, $SD = .82$) and males ($M = 5.08$, $SD = .96$), $t(408) = .333$, $p = .73$.

Additional $t$ tests were conducted to examine gender effects on Internet use diversity, Internet use fluency, self-efficacy, beliefs in privacy rights, and need for privacy. There was no significant difference found for need for privacy, $t(409) = 1.09$, $p = .28$, or beliefs in privacy rights, $t(405) = -.84$, $p = .40$. However, female respondents reported significantly lower levels of Internet use diversity ($M = 5.66$, $SD = 2.10$) than did male respondents ($M = 7.05$, $SD = 2.40$), $t(409) = -5.45$, $p < .001$. Females also reported significantly lower Internet use fluency ($M = 5.63$, $SD = .79$) than did males ($M = 5.97$, $SD = .87$), $t(405) = -3.59$, $p < .001$, and lower generalized self-efficacy ($M = 3.12$, $SD = .37$) than did males ($M = 3.28$, $SD = .43$), $t(405) = -3.59$, $p < .001$.

An analysis of covariance (ANCOVA) for concerns about online privacy was conducted using gender as the independent variable and Internet use diversity, Internet use fluency, self-efficacy, beliefs in privacy rights, and need for privacy as covariates. This analysis was intended to examine the unique influence of gender on online privacy concerns by removing any influence associated with the covariates. Again, no significant gender effect was found, $F(1, 394) = .72$, $p = .40$. Since gender did not seem to have any significant

TABLE 2. Correlations among scales.

| Measure | Need for privacy | Self-efficacy | Privacy rights | Internet use diversity | Internet fluency |
|---|---|---|---|---|---|
| Need for privacy | – | | | | |
| Self-efficacy | $-.20^{**}$ | – | | | |
| Beliefs in privacy rights | $.14^{**}$ | .02 | – | | |
| Internet use diversity | .02 | $.17^{**}$ | $.12^{*}$ | – | |
| Internet use fluency | .05 | $.15^{**}$ | $.17^{**}$ | $.35^{**}$ | – |
| Online privacy concerns | $.25^{**}$ | $-.10^{*}$ | $.40^{**}$ | .08 | $.11^{*}$ |

$^{*}p < .05$. $^{**}p < .01$.


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TABLE 3. Hierarchical regression on online privacy concerns.

| Step | $\beta$ | $R^2$ | $\Delta R^2$ | $\Delta F$ | $df$ |
|---|---|---|---|---|---|
| Step 1 | | .01 | .01 | 2.92[a] | 2,405 |
| Internet use diversity | .03 | | | | |
| Internet use fluency | .10* | | | | |
| Step 2 | | .22 | .20 | 22.24*** | 5,407 |
| Generalized self-efficacy | −.07 | | | | |
| Need for privacy | .20*** | | | | |
| Beliefs in privacy rights | .37*** | | | | |

In final regression model, $\beta$ for Internet use diversity is .02 n.s., and $\beta$ for Internet use fluency is .04 n.s.
[a]$p = .055$. *$p < .05$. ***$p < .001$.

impact on concerns about online privacy, it was eliminated from further analyses.

### *Hierarchical Regression Analyses*

To examine unique direct effects of each hypothesized factor upon online privacy concerns, a hierarchical regression analysis was performed. Participants' Internet use diversity and Internet use fluency were entered in the first step. Generalized self-efficacy, beliefs in privacy rights, and need for privacy were entered in the second step. An increment in $R^2$ determined whether these three variables, as a whole, enhanced the explanatory ability of the overall model.

As Table 3 shows, in the first step, Internet use diversity was not a significant influence on online privacy concerns while Internet use fluency was a significant influence, though the overall regression equation was marginally significant, $F = 2.92$, $p = .055$. However, the three psychological and belief variables entered in the second step collectively accounted for over 20% of the variability in concerns about online privacy ($p < .001$). The stronger a person's beliefs in privacy rights and need for privacy, the more likely this person will be concerned about online privacy. Generalized self-efficacy, on the other hand, had a nonsignificant negative influence on concerns about online privacy.

### *Structural Equation Analyses of a Path Model Predicting Online Privacy Concerns*

Structural models reflecting the hypothesized mediating effects were analyzed using AMOS Graphics 5.0. Figure 2 depicts the results of the proposed model and of a final, adjusted model. In the proposed model, Internet use diversity and fluency serve as mediators between generalized self-efficacy and concerns about online privacy; people's beliefs in privacy rights serve as mediators for the influence of need for privacy upon concerns about online privacy. Need for privacy and generalized self-efficacy also would directly influence concerns about online privacy.

In accord with the prior regression analysis, this proposed model failed to provide an adequate overall fit of the observed data, as indicated by the highly significant difference between the observed and reconstructed correlation matrices, $\chi^2(6) = 32.5$, $N = 413$, $p < .001$. The overall Comparative Fit Index (*CFI*) was low, and the root mean square error of approximation (*RSMEA*) was relative high, $CFI = .86$, $RSMEA = .10$. The path coefficient for the direct effect of Internet use diversity on concerns about online privacy was not significantly different from zero, $\beta = .02$, n.s. In addition, the path coefficient for the direct effect of Internet use fluency also was not significant, $\beta = .04$, n.s. While self-efficacy had a marginally significant negative impact on concerns about online privacy, the coefficient for this path was relatively small, $\beta = -.08$, $p = .07$.

To improve the overall fit of the path model, several alternative models were tested according to the guidelines set by Byrne (2001) and Klein (2005). In earlier analyses, though not predicted, it was found that there was a significant negative relationship between need for privacy and self-efficacy. A new path linking these two variables was thus added to the model. In addition, Internet use fluency was found to be positively correlated with beliefs in privacy rights. Although the direction of influence may not be clearly determined in the present study because it is a cross-sectional survey, a new path was added to reflect this empirical relationship. Finally, there was no empirical evidence to suggest that Internet use diversity and fluency are significant predictors of online privacy concerns. Thus, these two paths were removed from the original model.

In the final model, concerns about online privacy was positively influenced by individuals' need for privacy and their beliefs in privacy rights. Online privacy concern may be directly negatively (though only slightly) influenced by generalized self-efficacy. Self-efficacy fosters greater Internet use diversity, and both directly and indirectly influences Internet fluency, which affects beliefs in privacy rights. Furthermore, need for privacy also indirectly affects concerns about online privacy, mediated through individuals' beliefs in privacy rights. Note that the fundamental distinction of this model is that self-efficacy and Internet use diversity and fluency do not directly affect concerns about online privacy. Rather, they do so only through beliefs in privacy rights. The final model provided an adequate fit of the data; the difference between the observed and reconstructed correlation matrices was not statistically significant, $\chi^2(6) = 6.7$, $N = 413$, $p = .35$. The fit indices also were significantly improved from the original model, $CFI = .99$, $RSMEA = .03$.


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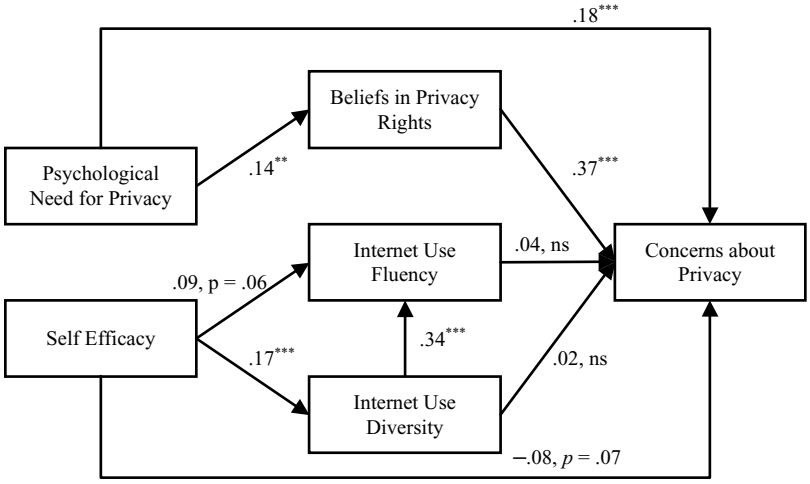
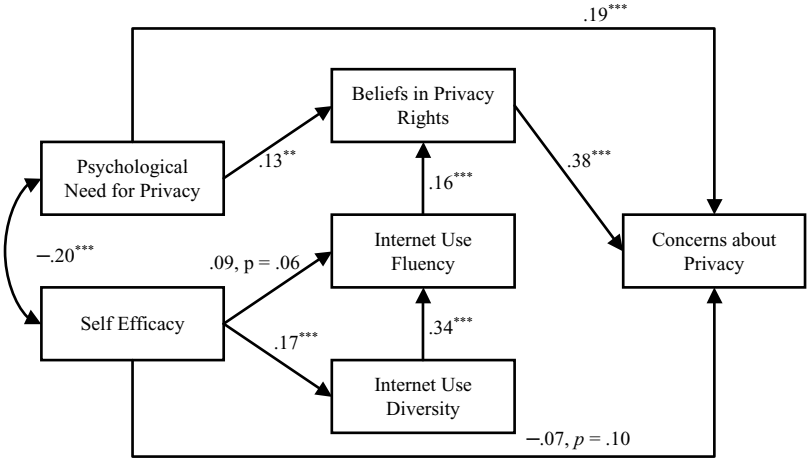
Proposed Model




$\chi^2(6) = 32.5, N = 413, p < .001, CFI = .86, RSMEA = .10$

Final Model




$\chi^2(4) = 6.7, N = 413, p = .35, CFI = .99, RSMEA = .01$

FIG. 2. Structural equation analyses for a path model predicting online privacy concerns.

## Discussion

The present study was conducted to examine the influence of gender, Internet use diversity and fluency, and individual differences in need for privacy, beliefs in privacy rights, and generalized self-efficacy upon user concerns about online privacy. The results suggest that individuals' beliefs in privacy rights and the dispositional desire for privacy in general are the main factors determining concerns about privacy issues in the specific context of the Internet. Specifically, the more that people believe in the right to privacy and the more they desire privacy in the physical world, the more they are likely to have online privacy concerns (about both companies and other entities). However, their beliefs are influenced directly and indirectly by psychological dispositions (e.g., need for privacy, and self efficacy) and Internet use and fluency.

Results from the hierarchical regression analysis showed that beliefs in privacy rights and need for privacy explained a decent amount of the variability in concerns about online privacy. The structural equation analyses also suggested that the link between beliefs in privacy rights and concerns about online privacy is noticeably stronger than are other direct and indirect effects. Beliefs in privacy rights also mediate the relationship between need for privacy and online privacy concerns. Gender has no direct or indirect impact on concerns about online privacy.

Unlike the theoretical reasoning behind the relationships among need for privacy, beliefs in privacy rights, and concerns about online privacy, the empirical link between Internet use fluency and beliefs in privacy rights is not as clear. Structural models that fit observed data should not be interpreted as the only models that will fit the data, especially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when a specific path is based on empirical findings as opposed to theoretical reasoning. Unknown third variables (e.g., political liberalism and social economic status) may influence these two variables. Future research should further explore this interesting relationship.

The results from this study failed to support the hypotheses that Internet use diversity and fluency directly affect online privacy concerns. Although Internet use fluency had a positive zero-order correlation with concerns about online privacy, this relationship disappeared in the subsequent multivariate analyses. In addition, while Internet use diversity is positively related to Internet use fluency and generalized self-efficacy, it has no direct impact upon online privacy concerns.

Several possible explanations can be offered. First, Internet use diversity and fluency may indeed have no direct influence upon user concerns about online privacy. However, a second and a more likely explanation is that the influence of Internet use experience may be more complex than was originally proposed. For example, although an increase in Internet use diversity and fluency may lead to a general sense of control over potential threats to online privacy, it also may lead to exposure to more threats. Thus, the overall concern about online privacy may not decrease for those experienced users. In addition, as users gain more knowledge about Internet-privacy-related issues, they may become aware of online privacy threats that are not widely known to the general public. A novice user may be worried about using credit card to make online purchases generally, but an expert user may be very worried about the integrity of data transmission specifically. Although both users may express concerns about online privacy, the fear of the novice user might be overcome by knowledge and experience whereas the concerns of the expert user might not. Future research should examine the qualitative differences in online privacy concerns between novice and expert Internet users.

From a methodological standpoint, it also is possible that because measures of both Internet use diversity and fluency involved a number of items (i.e., 12 for use diversity and 17 for fluency), some Internet experiences most likely to be related to concerns about online privacy were submerged within the overall scale. For example, experience with placing online orders, changing cookie settings, or identifying the host server from a Web or an e-mail address might either lessen or heighten one's concern about online privacy. To address this issue, we correlated each of the separate items with concerns about online privacy. Significant diversity items were online chat/discussion, listen to online radio, and bought a book about Internet/Web. Significant fluency items were typing the Web address directly, saving the text of Web pages to disk, saving images from Web pages to disk, turning off/on autoload images, creating a Web site with a visual editor, and creating a Web site using html. None of these seem particularly related to online commerce or company privacy intrusions. All of these significant bivariate influences were entered into a multiple regression predicting concern for online privacy, which had an adjusted $R^2$ of 4%, $F(10, 292) = 2.3$, $p < .05$. This is slightly greater than the variance explained in the first regression step in Table 3, but when these separate items were entered in the first hierarchical step, as in Table 3, they also disappeared as significant influences when self-efficacy, need for privacy, and beliefs in privacy rights were entered in the second hierarchical step. So the lack of direct influence is not due to submerging specific subdimensions into overall Internet diversity and fluency scales.

## Limitations

Of course, the reliance of self-report data and the use of a college-student sample are important limitations of this study. Self-report measures are subject to social desirability and accuracy of self-evaluation. For example, participants may believe that they are fluent in using Internet-related technologies; they also may feel that they should be more knowledgeable about the Internet than they actually are. In both of these cases, self-report measures of Internet use fluency may be inflated. Future research may use knowledge-based items (e.g., a quiz on various technical features) to assess participants' actual Internet-related expertise rather than self-evaluation items. On the other hand, the current measures have good reliability and ask about explicit types of usage.

The use of a college-student sample is another limitation of the research. For example, different age groups may have very different concerns about privacy. Young people may be more concerned about anonymity when downloading music whereas adults may be a lot more concerned about financial information. Level of education may be another important factor; people with higher levels of education may be more fluent in using Internet-related tools and have greater generalized self-efficacy. As a result, any influence of efficacy may be less pronounced in the current college-student population.

Finally, college students use computers with greater frequency than do average members of the general population (Jones, 2002). College students' university networks provide greater levels of privacy and security than do at-home Internet connections and most commercial Internet Service Providers. As a result, college students may be less cognizant about online privacy issues than are users who primarily access the Internet from home. On the other hand, as college students are frequent users of the Internet, the college sample is a relatively good representation of frequent Internet users of this age group and what should be more common levels of usage by the general population in the near future (also see LaRose et al., 2001). Nonetheless, more generalizable findings also are needed to fully understand the factors and underlying processes that determine users' concerns about online privacy.

## Conclusion

The results from this study, taken as a whole, suggest that future research on Internet privacy issues should consider the influence of individual differences. Researchers of new media technology in general and online privacy


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specifically have historically put less emphasis on psychological factors and processes than on technological and contextual factors. Findings from the present study support the idea that concerns about online privacy should not be simply viewed as a unique problem associated with new technologies. Instead, online privacy should be considered as an enduring concern manifesting itself in a new technological context. The concept of privacy has generated thousands of scholarly discussions and scientific inquiries in multiple disciplines throughout history. Online privacy research will be greatly benefited by adopting a broader approach to the concept and by utilizing theoretical models developed in other areas of research.

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