

# Individual Differences in Online Privacy Concern

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## ABSTRACT

We examined the effects of socio-demographics and personality traits on online privacy concern. We investigated this relationship in general and across different Internet functions. Using a large, diverse, population-representative sample ( $N = 5,242$ ), we found that females, educated, and wealthier individuals tend to be concerned with online privacy to a greater extent. Among personality traits, agreeableness and conscientiousness were generally associated with an increased probability of being concerned with online privacy. These results imply that socio-demographics and personality traits provide explanatory insights into online privacy concern.

*Keywords:* Socio-demographics, Personality, Online Privacy Concern, Internet Functions

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## I . Introduction

Privacy is an elastic concept and embraces a wide variety of definitions. Its traditional meaning is the right for individuals to be left alone (Berendt et al., 2005). As information technology (IT) is highly embedded in everyday life, it has become easy to manipulate digitalized personal information. As a result, the concept of information privacy, which indicates the right to control digital information, has received considerable attention from researchers and practitioners (Dinev and Hart, 2006). Within the information privacy domain, *privacy concern* has received extensive

attention as a key concept and research topic. Privacy concern refers to the individuals' subjective view on fairness within the context of information privacy (Liu et al., 2005; Malhorta et al., 2004). Prior research has demonstrated that IT users put significant value on their privacy (Lwin et al., 2016; Xu et al., 2009) and privacy concern is a major inhibitor of adopting online services such as e-commerce (Dinev and Hart, 2006; Elovici et al., 2005), mobile banking (Kim et al., 2009), and social network services (Tan et al., 2012).

Online privacy concern is typically positioned as an antecedent to attitudinal and behavioral variables

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within research models in prior research (Bansal and Gefen, 2010). Only a few studies have dealt with individual differences as an antecedent to online privacy concern (Junglas et al., 2008). Among potential individual difference antecedents, this study focuses on *socio-demographics* and *personality traits* which are two of the most fundamental factors (or individual differences) that is shaped by nature (e.g., biology, genetics) and nurture (e.g., culture, upbringing) that influence an individuals' perception about privacy (Bansal and Gefen, 2010; Junglas et al., 2008; Park, 2015). The fluctuating or stable perceptions and behavior that are learned and acquired from privacy-related instances are shaped by individual characteristics. For that matter, this study aims to examine the influence of socio-demographics and personality traits on privacy concern across a range of online contexts.

Granted that individual characteristics, including socio-demographics and personality, are influential factors that explain an individuals' attitudes and decision-making (Mount et al., 2005), their effects on information privacy are relatively unexamined. Even for studies that are published, they rely on student-based samples to provide generalized conclusions, which is problematic (Peterson, 2001). Moreover, the impact of socio-demographics and personality traits on privacy concern may be different across Internet functions (e.g., Internet banking, shopping, and blogs) and there is a need to investigate this phenomenon to provide a better understanding of individuals' online privacy behaviors. The amount of personal information that needs to be submitted is different across the Internet functions. For instance, e-commerce use requires a submission of personal information as well as financial information. A typical website might ask permission to access cookies stored in the hard drive. As such, privacy settings are differ-

ent across Internet functions. Overall, the way a user interacts with an Internet function and their privacy settings is personal choice that is fundamentally dictated by socio-demographics and personality traits.

Until this study, a population-representative study ( $N = 5,242$ ) of online privacy concern, demographics, and personality has not been conducted. The current study intends to fill this gap in the literature. Research on online privacy concern, socio-demographics, and personality forms the theoretical basis for our examination. Across two analyses, we examine (1) the effects of socio-demographics and personality on online privacy concern and (2) the effects of socio-demographics and personality on online privacy concern across different Internet functions. We conclude with a discussion of the theoretical and practical implications.

## II. Research Background

### 2.1. Online Privacy and Individual Differences

There are a number of demographic or socio-economic factors that could possibly influence online privacy concern. So far, results examining the effects of socio-demographics on online privacy concern are mixed. For example, while some studies show that males are less concerned than females about their online privacy (Youn, 2009), other empirical research reveals no significant differences (Jensen et al., 2005; Yao et al., 2007). Age tends to display differential effects on online privacy concern depending on the Internet function (Bergström, 2015). Education tends to show a consistent effect whereby highly-educated Internet users show more concern towards online privacy (Raine et al., 2013; Sheehan, 2002). Income did not have significant association

with online privacy concern (Sheehan, 2002). Hence, disparate findings have been produced with regards to the impact of socio-demographics; thus, there is a need to replicate and expand how it influences online privacy concern.

In addition to demographical factors, individual differences in personality may play a critical role in online privacy concern. Personality is a set of individual differences that is formed by genetic components and experiential learning of skills, habits, and preferences (McAdams and Olson, 2010). Personality can be influenced by cultural norms (Diener et al., 2003). Personality is also shaped in early development and tends to be stable across most of lifespan (Briley and Tucker-Drob, 2014). Personality can be predictive of a number of life choices and outcomes, such as career choices (Ackerman and Beier, 2003), food preferences (Goldberg and Strycker, 2002), academic achievement (Poropat, 2009), and relationship outcomes (Shaver and Brennan, 1992). Personality also plays a major impact on online behavior (e.g., Kim et al., 2015; Kim and Jeong, 2015). As such, personality is an enduring personal characteristic that wields a large influence on an individual's life.

The Big Five dimensions of extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience provide a comprehensive depiction of individual differences in personality (Digman, 1990; Goldberg, 1990). Extraverted individuals are generally associated with being sociable and outgoing. Agreeableness refers to the tendency to be trusting and tolerant to others. Conscientiousness is composed of traits reflecting discipline and goal-pursuit. Emotional stability relates to having lower levels of anxiety, depression, and rage. Finally, openness to experience refers to the tendency to be imaginative or intellectually curious.

Online privacy concern is a "hot button issue"

that poses a threat to information and communication technology use for users. The collection of demographic information (e.g., gender) and identifying information (e.g., search history) raises user's concern about their information privacy (Weber, 2010). Yet, users might be sensitive (or nonsensitive) to online privacy concern. These divergent reactions to online privacy concern are associated with psychological characteristics. For that matter, personality is able to predict individual differences robustly across various technological phenomena. Research has shown that personality predicts Internet use (Swickert et al., 2002), social media use (Hughes et al., 2012), blog use (Guadagno et al., 2008), and smartphone use (Kim et al., 2015).

Only a few studies have examined the direct link between personality traits and online privacy concern (Junglas et al., 2008; Korzaan and Boswell, 2008). In general, the results are inconsistent. Some studies found that agreeableness, conscientiousness, and openness to experience are significantly related to online privacy concern (e.g., Junglas et al., 2008), whereas others found that agreeableness is the only substantial factor (e.g., Korzaan and Boswell, 2008). In their study examining undergraduate students' privacy concern, Bansal et al. (2010) found a positive relationship of agreeableness and neuroticism with concern for own health information. Because agreeable individuals pursue harmony and tend to be trustworthy, when faced with uncertainty, they tend to avoid potential risks (McCrae and Costa, 1991). Along these lines, privacy issues in an online context pose a risk that agreeable individuals would hopefully like to avoid (Junglas et al., 2008). Despite the findings from past research, they still rely on small convenience or college students. This research uses a population-representative sample to achieve generalizability.

## 2.2. Online Privacy Across Internet Functions

Privacy concern has been extensively studied to explain users' privacy-related behaviors across divergent online contexts. While some studies examine the role of privacy concern in the general online (or Internet) context (e.g., Weber, 2010), others have focused on specific IT functions (e.g., 'e-commerce' in Dinev and Hart, 2006; 'social networking sites' in Feng and Xie, 2014; 'location-based services' in Junglas et al., 2008). The former body of research typically demonstrates the importance of online privacy concern and that it plays a major role for users to use the Internet. The latter typically examines the extent to which online privacy concern has an influence on accepting (or rejecting) a specific IT function. It must be noted from the latter body of research that conflicting results in terms of significance and magnitude emerge in the relationship between online privacy concern and consequential variables (e.g., trust, attitude, and behavioral intentions). It is difficult to synthesize online privacy-related results because studies are evaluating different IT functions and using disparate research designs. Moreover, there are few studies that compare how online privacy concern influences consequential variables across different Internet contexts (Bergström, 2015). At this juncture, explication of online privacy concern across different Internet contexts is needed.

There is a need to examine privacy concern across different Internet functions chiefly because each Internet function involves different privacy settings and the risk imposed on users due to privacy threats is not the same across Internet functions. For instance, online banking requires the user to enter personal information and financial information to even get started. Despite the fact that banks set up elaborate security settings, there is always the possibility that

this information may be leaked and this comes with a "significant" loss at the expense of the user. For instant messaging, the conversation itself contains value to users and this information might be disclosed to a third-party. For blog users, personal information contained in a blog post might possibly be leaked. For cloud service users, files might be hacked. As such, depending on the Internet function, a variety of privacy issues exist. Accordingly, this study explores how socio-demographics and personality traits affect online privacy concern across different Internet contexts.

## 2.3. Goal of Present Study

In the present study, we investigate the predictive utility of socio-demographics and personality on online privacy concern. Moreover, we evaluate this relationship across different Internet functions (i.e., online banking, online shopping, instant messaging, blog, social network service, and cloud service). Compared to prior studies which primarily use a convenient sample (e.g., college students), we rely on a large and demographically diverse sample ( $N = 5,242$ ). By means of a population-representative sample, we can estimate highly precise effect sizes. This study uses a sample from South Korea, a country noted for its high Internet connection speed and high quality of Internet service.<sup>1)</sup> This setting provides the appropriate opportunity to evaluate the online privacy concern context, particularly because we are able to link it to individual psychological and socio-demographical characteristics. The primary objective of this research is to characterize the psychological and socio-demographic characteristics that

1) Korean's Internet quality and speed is documented in <https://www.fastmetrics.com/internet-connection-speed-by-country.php>.

predict online privacy concern in general and across different Internet functions. Thus, the following research questions are posed:

*RQ1: To what extent are socio-demographics and personality traits related to online privacy concern?*

*RQ2: To what extent are socio-demographics and personality traits related to online privacy concern across different Internet functions (i.e., online banking, online shopping, instant messaging, social network service, blog, and cloud service)?*

From the mentioned demographic literature, we hypothesized that more educated individuals would be concerned with online privacy to a greater extent. From the mentioned personality literature, we hypothesized that individuals with higher levels of agreeableness would be concerned with online privacy to a greater extent. A specific *a priori* hypotheses is not offered for gender, age, income, openness to experience, extraversion, conscientiousness, and emotional stability.

### III. Methods

#### 3.1. Participants

We used secondary data provided by the Korean Information Society Development Institute (KISDI). KISDI conducted a survey in 2014 to examine media behavior among Koreans. This survey is an ongoing panel study of Korean households since 2010 using a multistage probability design with systematic sampling, resulting in a sample frame that is representative of the South Korean population. The data for this study is cross-sectional. The original sample size

was 10,319 users, but was reduced to 5,242 users after eliminating those who did not answer the questions related to personality items. <Table 1> describes the user profile.

#### 3.2. Measures

The dependent variable for this study was online privacy concern. The scale's coefficient alpha was .95. The scale used six items adopted from Buchanan et al. (2007).<sup>2</sup> A five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was used.

Socio-demographics encompassed *gender* (1 = male, 0 = female), *age* (in years, centered at the mean of 39.42 years), *completed education level* (-3 = elementary school; -2 = middle school; -1 = high school; 0 = undergraduate or above), and *income* (0 ≤ \$6,000; 1 = \$6,000-11,999; 2 = \$12,000-23,999; 3 = \$24,000-35,999; 4 = \$36,000-47,999; 5 = \$48,000-59,999; 6 ≥ \$60,000). We coded the variables such that the constant in the regression analyses represents the largest subsection of the data.

Personality was measured by adopting the Ten-Item Personality Inventory (Gosling et al., 2003).<sup>3</sup> Each personality dimension is composed of two items. For each item, participants reported their level of agreement with brief adjectives on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) that best describe them. The scale was subsequently converted into standardized variables based on sum scores for each personality dimension.

2) Refer to [http://stat.kisdi.re.kr/MediaPanel/MediaPanel\\_Questionnaire.aspx](http://stat.kisdi.re.kr/MediaPanel/MediaPanel_Questionnaire.aspx) to obtain items on online privacy concern. The questionnaires are in Korean.

3) Refer to <https://gosling.psy.utexas.edu/wp-content/uploads/2014/09/TIPI-Korean.pdf> for the Korean version of the Ten-Item Personality Inventory.

&lt;Table 1&gt; User Profile

Characteristics	Frequency	Percent (%)
<i>Gender</i>		
Male	2,496	47.6
Female	2,746	52.4
<i>Age</i>		
10-19	596	11.4
20-29	680	13.0
30-39	1,090	20.8
40-49	1,669	31.8
50-59	932	17.8
60-69	222	4.2
>69	53	1.0
<i>Education (Completed)</i>		
Elementary school	46	.9
Middle school	298	5.7
High school	2,409	46.0
Undergraduate or above	2,489	47.5
<i>Income (\$)</i>		
No income	2,084	39.8
≤ 6,000	91	1.7
6,000-11,999	233	4.4
12,000-23,999	989	18.9
24,000-35,999	953	18.2
36,000-47,999	543	10.4
48,000-59,999	216	4.1
≥ 60,000	133	2.5
<i>Internet function use (out of total Internet users)</i>		
Online banking	3,960	75.5
Online shopping	4,087	78.0
Instant messaging	4,264	81.3
Social network service	2,684	51.2
Blog	1,059	20.2
Cloud service	587	11.2

Note:  $N = 5,242$ . Income was converted from Korean Won to US Dollars.

### 3.3. Analytic Approach

We used ordinary least squares regression for all analyses.<sup>4)</sup> For our first analysis, online privacy concern was regressed by socio-demographics and

personality. For our second analysis, we evaluated the same model, but the sample was restricted to

4) All assumptions (linearity,  $E(\epsilon) = 0$ , random sampling of observations, multicollinearity, no homoscedasticity, and normality) for OLS were met.

particular Internet function users (online banking, online shopping, instant messaging, blog, social network service, and cloud service). The intercept value indicates mean online privacy scores when socio-demographics and personality equate to zero. In reporting the results, we have followed the guidelines of the American Psychological Association Publication Manual (2010) to focus on estimation and confidence intervals, rather than null hypothesis significance tests. This matches recent methodological calls from leading journals (Cumming, 2014; Eich, 2014; Halsey et al., 2015; Lin et al., 2013). Forcing our estimation approach to conform to qualitative/categorical effect sizes estimates (e.g., small, medium, large) is subject to the same shortcomings associated with null hypothesis significance testing. In the results section, we report precise estimates (due to the large sample size). This is the most relevant information for judging the magnitude of the effect.

## IV. Results

### 4.1. Prediction of Online Privacy Concern

<Table 2> reports the bivariate correlations among the study variables and characteristics. With respect to RQ1, as displayed in <Table 3>, females were more likely be concerned with online privacy. Moreover, highly educated and high income Internet users were more alert to online privacy concerns. Among the personality traits, each standard deviation increase in conscientiousness and agreeableness were associated with a higher probability of being concerned with online privacy. The other socio-demographic and personality effect sizes were less substantial.

### 4.2. Prediction of Online Privacy Concern Across Different Internet Functions

For RQ2, <Table 4> highlights the relationship

<Table 2> Correlation Coefficients

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 Gender (male)	1															
2 Age	.04*	1														
3 Education	.10*	-.18*	1													
4 Income	.49*	.36*	.19*	1												
5 Openness to experience	.06*	-.14*	.07*	-.00	1											
6 Extraversion	.04*	-.05*	.02	.01	.35*	1										
7 Agreeableness	.02	.02	.01	-.02	.14*	.26*	1									
8 Conscientiousness	-.03	.15*	.00	.06*	-.50*	-.22*	-.08*	1								
9 Emotional stability	.05*	.05*	.01	.03	.16*	.21*	.57*	-.11*	1							
10 Online banking	.00	-.20*	.28*	.07*	.01	-.02	-.07*	.04*	-.07*	1						
11 Online shopping	-.01	-.31*	.29*	.00	.02	-.01	-.07*	.01	-.07*	.78*	1					
12 Instant messaging	-.01	-.27*	.21*	.01	.07*	.01	-.00	-.06*	-.03	.20*	.22*	1				
13 Social network service	-.02	-.35*	.21*	-.03	.03	.02	-.04*	-.02	-.08*	.25*	.29*	.38*	1			
14 Blog	.01	-.24*	.15*	-.02	.01	.02	-.03	.02	-.04*	.18*	.18*	.19*	.30*	1		
15 Cloud	.03	-.20*	.13*	.00	.04*	.02	-.01	-.00	-.05*	.15*	.17*	.14*	.26*	.31*	1	
16 Online privacy concern	-.05*	-.03	.13*	.03	-.02	-.00	.02	.07*	-.01	.13*	.12*	.08*	.13*	.01	.09*	1

Note: \* $p < .01$ .

&lt;Table 3&gt; Prediction of Online Privacy Concern Among All Internet Users

Predictors	$\beta$ [95% CI]
Intercept	.44 [.39, .48]
Gender (male)	-.13 [-.18, -.08]
Age	-.00 [-.00, .00]
Education	.15 [.12, .19]
Income	.03 [.01, .05]
Openness to experience	.00 [-.02, .03]
Extraversion	.00 [-.02, .03]
Agreeableness	.03 [.01, .06]
Conscientiousness	.06 [.03, .09]
Emotional stability	-.02 [-.04, .01]
$R^2$	2.8%

Note: Regression coefficients are unstandardized.  $N = 5,242$

&lt;Table 4&gt; Prediction of online privacy concern across different Internet functions

Predictors	Online banking	Online shopping	Instant messaging	Social network service	Blog	Cloud service
	$\beta$ [95% CI]	$\beta$ [95% CI]	$\beta$ [95% CI]	$\beta$ [95% CI]	$\beta$ [95% CI]	$\beta$ [95% CI]
Intercept	.47 [.43, .52]	.47 [.42, .51]	.44 [.39, .49]	.54 [.48, .60]	.40 [.29, .51]	.83 [.70, .95]
Gender (male)	-.13 [-.19, -.07]	-.12 [-.18, -.06]	-.13 [-.19, -.08]	-.16 [-.23, -.09]	-.17 [-.27, -.06]	-.17 [-.29, -.05]
Age	-.00 [-.00, .00]	-.00 [-.00, .00]	-.00 [-.00, .00]	.00 [-.00, .00]	-.00 [-.01, .00]	.01 [.01, .02]
Education	.14 [.10, .19]	.13 [.09, .18]	.12 [.08, .16]	.14 [.09, .19]	.13 [.04, .22]	.18 [.08, .28]
Income	.02 [.00, .04]	.02 [.00, .04]	.03 [.01, .04]	.02 [.00, .04]	.03 [-.01, .07]	-.04 [-.08, .01]
Openness to experience	.01 [-.02, .04]	.01 [-.02, .04]	.01 [-.02, .04]	.02 [-.02, .05]	.07 [.01, .13]	.06 [-.00, .13]
Extraversion	.01 [-.02, .04]	.01 [-.02, .03]	.01 [-.02, .03]	.02 [-.01, .05]	-.03 [-.09, .02]	-.02 [-.08, .04]
Agreeableness	.04 [.01, .07]	.05 [.02, .07]	.04 [.01, .07]	.07 [.03, .11]	.04 [-.02, .10]	.02 [-.04, .08]
Conscientiousness	.06 [.03, .09]	.06 [.04, .09]	.05 [.03, .08]	.05 [.02, .08]	.03 [-.03, .09]	.06 [.00, .12]
Emotional stability	-.00 [-.03, .03]	-.01 [-.04, .02]	-.01 [-.04, .02]	-.02 [-.06, .01]	-.03 [-.09, .03]	-.04 [-.10, .03]
$R^2$	2.3%	2.3%	2.0%	3.1%	2.6%	7.9%

Note: Regression coefficients are unstandardized. Online banking  $N = 3,960$ . Online shopping  $N = 4,087$ . Instant messaging  $N = 4,264$ . Social network service  $N = 2,684$ . Blog  $N = 1,059$ . Cloud service  $N = 587$ .

model across different Internet functions. For online banking, online shopping, instant messaging, social network service, females were more concerned with online privacy. Users with higher levels of education and income had a higher chance of being concerned with online privacy, respectively, compared to those

in the lower education and income bracket. Those with higher levels of conscientiousness and agreeableness tended to be wary of online privacy.

For blog users, females and highly educated users were more likely to be concerned with online privacy. Among the personality traits, higher levels of open-



ness to experience was associated with a higher chance of being concerned with online privacy.

For cloud service users, females were more concerned with online privacy. Each standard deviation increase in age and education increased the probability of being concerned with online privacy. Among the personality traits, a standard deviation increase in conscientiousness was associated with higher levels of online privacy concern.

## V. Discussion

### 5.1. Theoretical Implications

From a theoretical perspective, the study shows that contextualization provides valuable insights for the online privacy concern literature. Online privacy concern has co-evolved with advances in information technology. Extensive research has revealed that such online privacy concern has a negative effect on the adoption of information technology; but relatively little is known about factors that are likely to influence such concern. In addition, although socio-demographic factors and personalities are of great interest in the literature, there has been no systematic investigation of their impact on diverse online contexts. Hence, this paper attempts to address this gap by addressing the following question: what are the effects of socio-demographics and personality traits on online privacy concern in general and across diverse online contexts?

This study demonstrates that individual differences play a role in explaining online privacy concern. More specifically, this study illustrates that socio-demographics are indeed a substantial determinant of online privacy concern. As a plethora of research indicates, online privacy concern is a sub-

jective scale that would be expected to produce differences among socio-demographic groups in levels of concern for online privacy (e.g., Acquisti and Grossklags, 2005; Ahn et al., 2014; Jung and Lee, 2015; Youn and Hall, 2008). Based on this study which used a large, diverse, population representative, South Korean sample, we found that females, educated, and wealthier individuals tend to have greater online privacy concern. Across different Internet functions, these results were generally supported.

The results support the claim that females tend to be more wary of online privacy concern. This finding can be traced to the fact that females, compared to males, are more hesitant to reveal private information because of lurking online threats (Youn and Hall, 2008). Females not only provide less information online, but they change online settings (e.g., Facebook's Privacy & Safety) to make sure information is not leaked (Acquisti and Grossklags, 2005). The findings also indicated higher levels of education being associated with greater levels of online privacy concern, confirming past evidence (Raine et al., 2013; Sheehan, 2002). Highly educated users are more likely to assess the risks and benefits associated with online behavior and are motivated to protect themselves (Raine et al., 2013). Moreover, through additional education, users are able to increase their awareness and knowledge of privacy invasions via privacy education (e.g., monitoring spams and cookies). Finally, evidence demonstrated that income has a positive effect on online privacy concern. It can be speculated that users with higher income have a greater risk of incurring significant losses, either by financial scams or misuse of online financial information, and therefore would be motivated to protect their assets.

Among the personality traits, we found that higher levels of agreeableness and conscientiousness were

generally associated with increased online privacy concern. Agreeable individuals have a better sense of harmony and strive for low levels of conflict in interpersonal relationships (Digman, 1990). They expect others to act in a manner that enhances pleasant and satisfying relationships (Judge et al., 2002). Thus, agreeable individuals are anxious about deviant behaviors (Chauvin et al., 2007). Because privacy invasion is a deviant behavior, individuals with this trait will more likely to be concerned with privacy than others. Conscientious individuals are competent, foresighted and less willing to take risks (Digman, 1990). Because online personal information can potentially be misused, such individuals would be more suspicious and watchful of risky circumstances (Bansal and Gefen, 2010). In all, these circumstances dictate that those with higher levels of conscientiousness would have a heightened sense of online privacy concern.

Across different Internet functions, these results were generally supported for online banking, online shopping, instant messaging, and social network service. However, it is worthwhile to note the substantial effect of openness to experience on online privacy concern for blog users as well as that of conscientiousness on online privacy concern for cloud service users.

Blog users voluntarily and frequently generate extensive archives of their personal thoughts and interests online, which is publicly available (Viégas, 2005). It stands to reason that those who are creative, curious, and artistic which are traits associated with openness to experience are more likely to blog (Li and Chignell, 2010). Guadagno and colleague (2008)'s research showed that openness to experience is the only personality trait that has a significant relationship with blogging. On the matter of online privacy concern, it can be speculated that blog users enjoy exploring

and publishing new material, but at the same time, they have a deep sense of awareness on how their blog is perceived (Guadagno et al., 2008). Because of such heightened self-awareness, blog users might also pay attention to privacy threats within their blogs.

Cloud service enables users to save their data on information systems that are managed by external parties on remote servers in the cloud (Takabi et al., 2010). Online documents such as Google Docs and online storage such as Dropbox are well-known examples. Conscientious individuals are organized, thorough and exacting (Digman, 1990), and using cloud service is the ideal fit for users since it allows them to organize and backup their data in a safe place. In conjunction with the benefits of cloud services, they also realize the risks that are posed with using it. Cloud computing raises privacy concerns because the service provider has access to personal data. Service providers could accidentally or intentionally disclose it or use it for unauthorized purposes. Thus, individuals with high conscientiousness would be sensitive and careful in disclosing their personal data to avoid the possibility of privacy invasion.

Lastly, the major strength of this study is the use of a large, diverse, population representative sample. By examining a population-representative sample, we are able to evaluate the psychological and socio-demographic characteristics that affect online privacy concern with high precision. In addition, we tested these relationships across different Internet functions. Furthermore, these results open up a new avenue for the exploration of context features and personality traits that influence online privacy concern. Such analysis is relatively novel in information privacy research and demonstrates that managers must consider context and personality in addressing their customers and personalizing online services.

## 5.2. Practical Implications

This study has practical implications; it suggests that business entities may need to intensively analyze customers' personal traits and reflect those results to develop customer strategies. Customers' privacy concerns are considered a critical problem that impedes the continued growth of digital services (Malhotra et al., 2004). In particular, privacy concerns have become exacerbated as the hyper-connected environment driven by Internet of Things has emerged (Peppet, 2014). Our findings show the substantial impact of personal traits on privacy concerns in general and across different online contexts. Thus, business entities need to take into account and customize privacy-protection policies such that it aligns with individual characteristics. One way to do so is to increase the usability of privacy-protection policies by fine-tuning the content and presentation of the privacy policies. Considering the diversity of individual characteristics, such endeavors make it possible for users to be comfortable with using Internet functions. Moreover, this allows users to be motivated to disclose information when it is necessary.

In addition, Internet service providers can use the results of this study to differentiate privacy strategies across different online contexts. For example, permission justification decreases users' privacy concern by informing users how collected information will be used and who can have an access to their information (Gu et al., 2017). For blog users with high openness personality traits, service providers should consider providing a direct explanation of their blogs' practice of information privacy including risks and threats of blog use, areas of vulnerabilities, and consequences of information loss. Such customized privacy strategies enable business entities to cope with privacy breaches in a more efficient and effective way.

## 5.3. Limitations and Future Research

There are several limitations to note. First, the sample was from the South Korean population. Even though the current sample was demographically diverse in terms of gender, age, education, and income, it was not racially diverse. More research with more ethnic/racial diversity in various locations is needed to establish generality. Second, we applied concise measures of personality. Credé et al. (2012) illustrated that short measures of the Big Five can reduce predictive validity compared to longer measures. Lastly, our research used cross-sectional data. Because the data represent a mere snapshot of 2014, we were not able to directly assess fluctuations of online privacy concern over time.

Future studies need to consider extensive personality scales. This would allow for a more in-depth examination of the relationship between facets of each personality trait and online privacy concern. The current results add to a growing body of research that indicates that online privacy concern occurs along the lines of socio-demographics and personality traits. To provide a more mechanistic explanation of online privacy concern, future research would do well to incorporate privacy-related variables such as prior offline or online privacy experience (Cha, 2012; Cho et al., 2010), risk aversion (Lala et al., 2002), intensity of Internet use (Valenzuela et al., 2009), and knowledge about privacy (Acquisti and Grossklags, 2005; Kim and Oh, 2016; Lim et al., 2017).

Another fruitful direction for future research would be to explore how the relationships between individual characteristics and privacy concern change over time in different contexts. For example, these relationships can vary depending on the location (e.g., when individuals use Internet at work or public

place vs. at home or private place). With longitudinal data, we cannot only investigate how relationships change over time but also evaluate the causality of the relationships. Lastly, future research needs to examine how these relationships can be differentiated with more diverse and specific functions. For example, online healthcare (e.g., online healthcare communities, telehealth) and mobile functions (e.g., mobile banking, mobile shopping) would be worthwhile to investigate the relationship between individual characteristics and online privacy concern. Overall,

in a large, diverse sample, we demonstrate that socio-demographics and personality traits provide additional explanatory insights into online privacy concern.

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