

A cultural approach of privacy calculus on social media applications: An examination based on individual-level cultural values, risk/benefit perception, and self-disclosure

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### Abstract

We examine the cultural orientation framework and demonstrate that the individual level measurement of culture can be an addition to the spectrum of cultural antecedents in an extended model of privacy calculus. Although culture is a group phenomenon, its impact on individuals' perceptions, values, and behaviors is steered by social interaction. Following this idea, the objective of this study is two-fold: First, we examine the applicability of a measurement scale of a cultural orientation perspective, previously developed in the context of in-person interaction to a context of communication on social media applications. Based on a series of factor analyses we identified that there is a distinct pattern of cultural values that users of social applications have across different context of social interaction. Second, we explore an approach of integrating cultural orientation perspective to the privacy calculus. By measuring personal values of culture as a personal trait in different context of social interaction, we aim to add a cultural perspective of social interaction and communication in the current approach of privacy calculus for social media applications. Based on a series of path analyses, we examined the snapshots of the relationship among cultural values, risk perceptions, and privacy management behavior on social applications across different social groups.

*Keywords:* Privacy calculus, culture, risk & benefit, self-disclosure.

**A cultural approach of privacy calculus on social media applications: An examination based on individual-level cultural values, risk/benefit perception, and self-disclosure**

Privacy calculus has received a significant research attention as a framework for analyzing the user's self-disclosure as a trade-off approximation between expected risks and benefits, especially in using the social media applications for day-to-day communication (Ampong et al., 2018; Chen, 2018; Dienlin & Metzger, 2016; Koohang et al., 2018; Krasnova & Veltri, 2010; Trepte et al., 2017). The underlying idea delineates that users weigh risks and benefits of disclosing private information and make decisions on the degree, e.g., depth, breadth, and amount, of self-disclosure on the social media applications. Studies show that the risks may involve invasion of privacy and abuse of personal data while the benefits can include social support, social capital, information exchange, and relational development (Choi & Bazarova, 2015; Trepte et al., 2015).

General notions of privacy across different cultures are sustained in theories of social psychology. For example, different cultures cultivate different ideas on the value of openness and disclosure, and they play a critical role in user decisions regarding management of privacy boundary (Benn & Gaus, 1983). As a result, social behaviors of community members are considerably influenced by certain expectations they have learned within the cultural boundary (Altman, 1977). With this notion, researchers have explored extended versions of the privacy calculus for social media applications by adding cultural values and norms within the equation (Krasnova et al., 2012; Krasnova & Veltri, 2010; Li et al., 2017; Liu & Fan, 2015; Nemati et al., 2014; Pentina et al., 2013; Trepte & Masur, 2016; Trepte et al., 2017; Tsoi & Chen, 2011; Ur & Wang, 2013; Wei et al., 2017). According to the research, variations of privacy calculus are examined in terms of community-level cultural constructs and risk-benefit perceptions in the

perspective that private information is considered a commodity, i.e., loss or gain based on the disclosure. In analyzing cultural values, norms, and behaviors with respect to the privacy calculus, studies (Krasnova et al., 2012; Krasnova & Veltri, 2010; Kumaraguru et al., 2005; Liu & Fan, 2015; Pentina et al., 2013; Trepte & Masur, 2016; Trepte et al., 2017; Ur & Wang, 2013) embrace Hofstede's cultural dimensions (Hofstede, Geert, 1984; Hofstede, Geert et al., 2005; Hofstede, Gert Jan & Minkov, 2010). For example, Trepte et al. examine user's self-disclosure on social media applications based on their perceptions of privacy risks and social gratifications, in conjunction with *individualism* and *uncertainty avoidance*. The data provided by participants from five countries, i.e., Germany, Netherlands, UK, US, and China, indicates cultural differences in the decisions of self-disclosure on social network sites. People from individualistic countries rate social gratifications less important than those from collectivistic countries while privacy risk is perceived more important by the people from collectivistic countries. In contrast, people from the countries with high uncertainty avoidance consider privacy risks more important whereas the social gratifications are perceived less important by them.

One perspective of interpreting and measuring a culture is that culture is a collective phenomenon that categorizes one group to another, e.g., Hofstede and colleagues (Hofstede, Geert, 1984; Hofstede, Geert et al., 2005; Hofstede, Gert Jan & Minkov, 2010). Hofstede and colleagues examine culture in the community level and presents rankings and scores for basic dimensions of characterizing cultures, i.e., power distance, uncertainty avoidance, masculinity, individualism/collectivism, long-term orientation, and indulgence versus restraint. They describe that individualism is the tendency to place one's own needs above others' needs in one's in-group. Later studies (e.g., Matsumoto et al., 1997) show that the individualism to be multidimensional and identify key features of increased individualism like tendencies toward

self-reliance, self-promotion, competition, emotional distance from in-groups and hedonism.

Collectivism is also a complex construct and can be characterized by closeness to family, family integrity, and sociability.

On the other hand, cultural orientation perspective provides an individual level interpretation and measurement of cultural values (Matsumoto et al., 1997; Schwartz, 1994; Triandis, 1988). In this line of research, culture is described as the variations within a society, i.e., a “syndrome that includes values, beliefs, and behaviors” (Matsumoto et al., 1997, p745). People show different social behaviors depending on their communicating partners and the contexts of the communication. A person can display collectivistic tendencies with family members or close friends while revealing individualistic tendencies with colleagues or strangers.

In this study, we adopt the value orientation framework (Kluckhohn & Strodtbeck, 1961) and demonstrate that the individual level measurement of culture can be an addition to the spectrum of cultural antecedents in privacy calculus. Although culture is a group phenomenon, its impact on individuals' perceptions, values, and behaviors is steered by social interaction. Following this idea, we aim to incorporate an aspect of cultural orientation in the context of social media communication, resulted from questions like 1) how people think about other people? 2) how people related to other people? and 3) how people see the world in conjunction with social interaction with different groups?

The objective of this study is two-fold: First, we explore the applicability of a measurement scale of a cultural orientation perspective, previously developed in the context of in-person interaction to a context of communication on social media applications. Second, we examine an approach of integrating cultural orientation perspective to the privacy calculus for social media applications. By measuring personal values of collectivism-individualism as a

personal trait in different context of social interaction, we aim to add a cultural perspective of social interaction and communication in the current approach of privacy calculus for social media applications.

In the following sections; we first discuss the current understanding and approaches of cross-cultural view of privacy calculus in “Literature Review”; our approach and analyses are presented in the “Methods” and “Analyses and Results” sections; then we conclude the paper by summarizing the current study and presenting future directions of our research.

### **Literature review**

Privacy is the fundamental value in the modern society where people are socially connected through networked technologies. Users of the social technologies constantly make privacy related decisions during social interaction and communication with other users. Yet, the decision is a complicated process which may involve elements in a balancing behavior. In attempts to manage their private information, individuals balance the risks and gains of disclosing or concealing private information. Estimating the ratio is critical to further privacy behavior of the individual. This essential principle is the basis for the privacy calculus as coined by Laufer and Wolfe (1977), applied to the internet users (Culnan & Armstrong, 1999; Dinev & Hart, 2006), and studied in the context of social network applications (Ampong et al., 2018; Krasnova & Veltri, 2010; Min & Kim, 2015; Trepte et al., 2017). This is a complex problem because user's privacy decisions in real-world social applications are linked with both rational and heuristic processes while the methodological approach needs to address anticipatory and contextualized nature of privacy decisions.

Within the extended investigation of privacy calculus, studies examine cultural differences in the user behavior with regards to privacy on the internet and on social media

applications (Krasnova et al., 2012; Krasnova & Veltri, 2010; Li et al., 2017; Nemati et al., 2014; Pentina et al., 2013; Treppe & Masur, 2016; Tsoi & Chen, 2011; Ur & Wang, 2013; Wei et al., 2017). For example, while users from the United States show higher level of privacy concerns with regards to using Facebook than those from Germany, people from both culture are susceptible to privacy infringements and data abuse by other users (Krasnova & Veltri, 2010). In the following research, Krasnova et al. (2012) examine enjoyment, privacy concerns, and trusting beliefs with regards to the user's self-disclosure on social network sites depending on the cultural dimensions of *individualism* and *uncertainty avoidance*. In the comparison of the data collected from German and US users, enjoyment is a significant determinant for self-disclosure for both whereas the privacy concerns have significance only for the German users. Trusting beliefs are analyzed as a significant antecedent only for US subjects, i.e., high individualistic country. With this test results, the authors conclude that Individualism is not a discriminating factor in terms of mediating the effects of benefit perception and trust beliefs on the user's self-disclosure. However, uncertainty avoidance is tested as a significant factor, mediating the causality between privacy concerns and self-disclosure across different cultures.

### **Research in cultural values: Individual-level measurement of cultural values**

The most prevalent method of analysis in the cross-cultural research is using a community level analysis, e.g., rankings and scores for basic dimensions of characterizing cultures. Hofstede and colleagues (Hofstede, Geert, 1984; Hofstede, Geert et al., 2005; Hofstede, Gert Jan & Minkov, 2010) provide a means to measure and interpret cultures in the national level based on the dimensions of power distance, uncertainty avoidance, masculinity, individualism/collectivism, long-term orientation, and indulgence versus restraint by examining culture in the community level. Although it is the most widely used analytical framework for

cultural values, the methodology has not been without a criticism. As the questionnaire was originally designed for the measurement of workplace attitudes within IBM, questions about construct validity have been raised (Orr & Hauser, 2008). Researchers like McSweeney (2002) addresses an issue of external validity with an argument that the data was collected with insufficient size of samples. In addition, there is certainly a problem in selecting the sample from a less representative sampling frame, i.e., IBM employees. Most importantly, the theory of Hofstede and colleagues projects a static view of culture in the past, lacking in reflecting the changes of modern societies.

Cultural values can be considered as the tenets that are endorsed by most members of the culture. Instead of averaging the value priorities of a social group, it can be more appropriate to collect the responses from the research participants to estimate an average notion of the cultural group. Based upon the conflicting views about how culture can be analyzed, we present a research question to shed light on the possibility of integrating the cultural orientation perspective in the privacy calculus for social media applications:

RQ1: How do the patterns of user's self-evaluated cultural values differ in different contexts of interaction with different social groups on social network applications?

### **Social interaction and risk/benefit perception on social applications**

People with different cultural values shape distinct patterns of relationship boundaries and use different modes of behavior to others based on different levels of intimacy. Although the definitions of in-group / out-group vary, distinguishing in-group from out-group is a basic human instinct (Brewer & Campbell, 1976). Consequently, people develop a particular person



perception with regards to those who they interact with. In individualistic countries, e.g., United States and Canada, people are more concerned with individualistic needs and put those over the group needs and harmony. In contrast, people from collectivistic countries, e.g., China and Korea, identify themselves as a member of groups and emphasizes the relationship and harmony among in-group members (Ting-Toomey & Chung, 2005).

In this study, cultural values in the individual level are measured with Matsumoto's Individualism-Collectivism Interpersonal Assessment Inventory (ICIAI, Matsumoto et al., 1997). The original ICIAI contains 19 items measuring cultural values and behaviors in relation to individualism-collectivism at the individual level measurement. The theoretical framework underlying the inventory items consists of 4 conceptual areas, i.e., 1) social harmony, 2) social identification, 3) self-control, and 4) social sharing of recognition. Table 1 shows how the inventory items fall under the conceptual categories.

To address the construct of risk/benefit perception, we use the categorization delineated in Communication Privacy Management Theory (Petronio, 2002) about risk/benefit ratio. Basically, risk /benefit ratio represents a certain threshold that a person has about perceived risk under any given benefit context. Petronio classifies five risk types and five benefit types to consider.

**Benefit Factor:** Benefit factor involves perceived advantages that people have when they decided to disclose their private information. In other words, it is reason why people decide to reveal their private information. Petronio identifies five benefit contexts.

- Expression: Disclosing something private to others offers us ability to cope with the information. For example, when we are in emotional distress, we may want to express our feelings to others.

- Self-clarification: Verbalizing our private thoughts can allow us to reconstruct the line of thoughts about issues important to us.
- Social validation: By telling others our private thought, we can have chance to confirm or disconfirm our views or values.
- Relationship development: We may be able to enhance our relationships with others by revealing private information to them.
- Social control: By telling our private thoughts about how we feel about in issue, we might be able to influence the way others consider a topic.

**Risk Factor:** The basic idea that comprises the theme of risk factor is related to our conceptions of self in relation to others. Therefore, the risk of revealing is deeply related to interaction with others.

- Security risks: We evaluate safety of ourselves and our loved ones before we disclose private information.
- Stigma risks: We concern that disclosing can cause others to discredit us and thus hurt out self-identity.
- Face risks: Sometimes, disclosing private information can cause embarrassment of ourselves or people involved in the information.
- Relational risks: Disclosing private information may cause threat to relationship with others.
- Role risks: Revealing private information can jeopardize our social status.

Based on the combination of cultural values and risk/benefit perception, a research question is presented as below;

RQ2: How can the models of privacy calculus be composed to reflect individual level cultural values and risk/benefit perception?

## **Methods**

### **Sample and procedure**

To examine the proposed research questions and hypotheses, we constructed a comprehensive survey to measure cultural values, risk/benefit perceptions, and the user's self-disclosure behavior. Participants (N=405) were recruited from the Surveygizmo<sup>1</sup> panels, in addition to those who connected from listserv messages on AISWorld and DBWorld. They filled out the survey mostly from United States (93.2%). Caucasian was the most participated race (65.2%, African American 11.3%, and Asian 8.5%), and gender proportion was male, 54.7%, and female, 45.3%. Also, more than 80% of participants had college education or higher. Ages between 30 and 39 were the most frequent age group (27.5%) and twenties and forties followed in the proportion of 24.3% and 19.8%, respectively. Participants were filtered based on a contingency question on the disclaimer page, asking whether they have had an experience of using a social media application. 91.4% reported that they use a social application on a daily/semi-daily basis (more than several times a day: 51.6%, once or twice a day: 30.9%, and once every other day: 8.9%).

### **Measures**

The questionnaire consisted of three parts. First, some essential behaviors of social media use were asked, i.e., frequency of use, length of use, and the method of use. Then, the next set of questions were about cultural values, risk/benefit perception, and self-disclosure behavior. The last part investigated demographic information such as gender, age, education, race, and physical

location. The measurement items for cultural values were adopted from the related studies (Matsumoto, 1996; Matsumoto et al., 1997) and revised to reflect the measurement of user values in the context of social application use. Measures for risk/benefit perception and disclosure behavior were developed for this survey based on the theoretical tenets of Communication Privacy Management Theory (Petronio, 2002) and the Theory of Planned Behavior (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 2010), respectively.

### **Cultural values.**

19 items, adapted from ICIAI (see Table 1), Individualism-Collectivism Interpersonal Assessment Inventory (Matsumoto et al., 1997), were employed to measure the predominant cultural values at the individual level. The participants were asked to rate their opinion on 19 individual statements in the context of interacting with family, close friends, colleagues, and strangers on the social media application of their choice. Each item is rated on a 7-point Likert scale from 1, "Not at all important", to 7, "Very important". Overall, the scale showed high internal consistency throughout each context of social interaction (Cronbach's alpha; family  $\alpha=.91$ , close friends  $\alpha=.89$ , colleagues  $\alpha=.90$ , strangers  $\alpha=.93$ ). Self-evaluated individualistic-collectivistic tendency is reflected in this measure. Since the assessment inventory consists of a list of questions that investigates individual's tendency of collectivism, the higher the score, the more the individual has collectivistic tendency. In order to get the scores for this variable, response values of across the 19 items (see Table 1) are averaged across four social groups for the four scales representing "Social harmony", "Social identification", "Self-control", and "Social sharing of recognition".

INSERT TABLE 1 ABOUT HERE

**Risk/Benefit perception.**

Measurement for risk/benefit perception was operationally defined as a risk perception for a particular benefit context. Measurement items were developed based on the Cartesian product of risk factor components and benefit factor components as indicated in Figure 1. First, participants were given a statement for each benefit context. Then, they were given five different statements representing five risk situations and asked to rate the risk statements under the given benefit context. For example, to measure the perceived *security risks* when the benefit of self-disclose is *expression*, the respondents were asked to read a general statement about the benefit of revealing, *"By telling others something private, we may be more able to cope with the information. If a person close to us died, we might want to express our grief by talking about our feelings"*, and then asked to rate perceived risk under such situation; *"Disclosing private information for 'Expression' on a social networking website is risky because it may jeopardize my personal safety or the safety of others."* in 7 point Likert scale from Strongly disagree (1) to Strongly agree (7). To cover 5 x 5 situations, total of 25 questions were asked. Internal consistency across different context were relatively high (Cronbach's alpha: expression  $\alpha=.89$ , self-clarification  $\alpha=.91$ , social validation  $\alpha=.93$ , relationship development  $\alpha=.92$ , and social control  $\alpha=.92$ ).

INSERT FIGURE 1 ABOUT HERE

**Behavioral intention.**

Two items, adopted from Fishbein & Ajzen (Fishbein & Ajzen, 2010), were used to measure the behavioral intention of adjusting the amount of self-disclosure. Participants were asked to report their intention to adopt the self-disclosure behavior. Two questions, on a 7-point Likert scale, were; *“I plan to control how much to share in the everyday use of social networking website”* (from 1, “extremely unlikely” to 7, “extremely likely”) and *“I will make an effort to control how much to share in the everyday use of social networking website”* (from 1, “I definitely will not” to 7, “I definitely will”). This scale showed an acceptable internal consistency (Cronbach’s alpha  $\alpha=.76$ ).

**Analyses and results****Analyses and Results for the Research Question 1**

To answer the RQ1, we conducted a series of Exploratory Factor Analyses for four social groups. The factor structure for each social group was interpreted based upon Matsumoto’s conceptual structure. The overall results of the factor analyses are illustrated in Table 2.

**Context of interaction with family.**

The Kaiser-Meyer-Olkin measure of sampling adequacy was .93, above the commonly recommended value of .6, and Bartlett’s test of sphericity was significant ( $\chi^2 (171) = 4471.57, p < .001$ ). Also, the communalities were all above .3 which indicates that each item shared some common variance with other items. Based on these indicators, it was justified that the collected data was well-suited for factor analysis of all 19 items.

Principal components analysis was used to examine the factor structure. The four-factor solution which explained 67.8% of the variance was used due to the meaningful interpretation of

the factor structure. The first factor, "Social harmony", included 9 items (i.e., items 8, 10, 11, 5, 17, 4, 16, 12, and 13 in the descending order of factor loading values), second factor, "Social compromise", included 3 items (i.e., items 7, 6, and 9 in the descending order of factor loading values), third factor, "Social identification", included 2 items (i.e., items 15 and 14 in the descending order of factor loading values), and the fourth factor, "Social sharing of recognition", included 2 items (i.e., items 2 and 3 in the descending order of factor loading values). Overall, the factor analysis identified that four distinct factors were underlying participant responses to the ICIAI items. A new factor, "Social compromise" emerged while "Self-control" factor was merged to another factor and/or receded. Much of the original factor structure proposed by Matsumoto (Matsumoto et al., 1997) was retained.

#### **Context of interaction with close friends.**

The Kaiser-Meyer-Olkin measure of sampling adequacy was .91, above the commonly recommended value of .6, and Bartlett's test of sphericity was significant ( $\chi^2(171) = 3730.85, p < .001$ ). The communalities ranged from .46 to .79. Collected data was well-suited for factor analysis of all 19 items.

Principal components analysis was used to examine the factor structure. The four-factor solution which explained 64.6% of the variance was adopted. The first factor, "Social harmony", included 10 items (i.e., items 8, 10, 5, 17, 11, 4, 12, 16, 13, and 1 in the descending order of factor loading values), second factor, "Social identification", included 3 items (i.e., items 15, 14, 19, and 18 in the descending order of factor loading values), third factor, "Social Compromise", included 3 items (i.e., items 7, 6, and 9 in the descending order of factor loading values), and the fourth factor, "Social sharing of recognition", included 2 items (i.e., items 2 and 3 in the descending order of factor loading values). The factor analysis identified that four distinct factors

were underlying participant responses to the ICIAI items. Most of the original factor structure was retained except for the item 18 which was removed.

#### **Context of interaction with colleagues.**

The Kaiser-Meyer-Olkin measure of sampling adequacy was .91 and Bartlett's test of sphericity was significant ( $\chi^2 (153) = 3336.76, p < .001$ ). The communalities ranged from .50 to .70. Based on these indicators, it was justified that the collected data was well-suited for factor analysis of all 19 items.

Principal components analysis was used to examine the factor structure. The three-factor solution which explained 59.4% of the variance was used. The first factor, "Social harmony", included 9 items (i.e., items 13, 8, 17, 10, 16, 4, 11, 12, and 5 in the descending order of factor loading values), second factor, merged from "Social identification" and "Social compromise", included 7 items (i.e., items 14, 15, 19, 7, 6, 9, and 18 in the descending order of factor loading values), and third factor, "Social sharing of recognition", included 2 items (i.e., items 3 and 2 in the descending order of factor loading values). The factor analysis identified that three distinct factors were underlying participant responses to the ICIAI items. Although most of the original items were kept within the factors, factor structure proposed by Matsumoto was changed to a three-factor model. Most significant change was the emergence of a new factor, presumably the combination of "Social identification" and "Self-control" from the original factor structure. The items loaded to this factor were related to the values that put others before self.

#### **Context of interaction with strangers.**

The Kaiser-Meyer-Olkin measure of sampling adequacy was .93, and Bartlett's test of sphericity was significant ( $\chi^2 (120) = 3629.49, p < .001$ ). The communalities ranged from .50



to .66. Based on these indicators, it was justified that the collected data was well-suited for factor analysis of all 19 items.

Principal components analysis was used to examine the factor structure. The three-factor solution which explained 59.4% of the variance was used due to the relatively better interpretation of the factor structure than other solutions. Although three factors were extracted, many items cross loaded or loaded in different scales and, therefore, a meaningful interpretation of the factor structure was difficult.

INSERT TABLE 2 ABOUT HERE

Due to the lack of criteria, making a statistical comparison of the different patterns of item loadings between the different communication contexts seem unfounded. However, we conclude that there is a descriptive difference in the patterns of user's cultural values represented in the factor structure shown in the Table 2. In-group interaction and out-group interaction contexts show this difference, especially the loading patterns of the interaction context with colleagues and strangers were distinctively different from those of family and friends.

### **Analyses and Results for the Research Question 2**

To answer the RQ2, causal models were constructed and tested for four different contexts of social interaction, i.e., family, friends, colleagues, and strangers. Four path models were identified and computed with AMOS 26 statistical package using the maximum likelihood method. We report the results of the significance tests in addition to model fit, assessed based on the comparative fit index (CFI), the goodness-of-fit index (GFI), the root mean square error of approximation (RMSEA), and the standardized root mean square of residuals (SRMR). Criteria

used for good Model fit were 1) RMSEA of .06 or lower, 2) a CFI above .95, 3) GFI above .95, and 3) an SRMR of .09 or lower (Hu & Bentler, 1999).

INSERT FIGURE 2 ABOUT HERE

The first model (Figure 2) examined the RQ2 and the idea concerning the privacy calculus for the interaction context with *in-group* members. The results of two separate path analyses (for the contexts of social interaction with family and friends) were identified, with the parameters for the friends context enclosed in parentheses (Figure 2). Our first model examined the social media user's behavioral intention to adjust the amount of private information. Exogenous variables in the model included cultural values of social harmony and social identification, in addition to the stigma risk perception and relational risk perception. For the context of family interaction, the model showed a good fit (CFI = 1, GFI = .99, RMSEA = .000, 90% CI = [.000, .097], and SRMR = .01) as the context of friends interaction also showed a good fit (CFI = 1, GFI = .99, RMSEA = .000, 90% CI = [.000, .097], and SRMR = .01).

Our second model (Figure 3) examined the RQ2 and the idea concerning the privacy calculus for the interaction context with *out-group* members. Exogenous variables in the model included cultural values of social harmony and self-control, in addition to the security risk perception and role risk perception. For the context of colleague interaction, the model showed a good fit (CFI = .94, GFI = .98, RMSEA = .13, 90% CI = [.078, .196], and SRMR = .07). In addition, the model for strangers showed a relatively good fit (CFI = .99, GFI = .99, RMSEA = .06, 90% CI = [.000, .128], and SRMR = .04).

INSERT FIGURE 3 ABOUT HERE

Based on a series of tests with different set of configurations, we identified the models with better fitting indices. *In the context of in-group communication* on social media applications, users who consider social harmony important will have higher concern of losing credit and self-identity (family  $\beta=.19$ , friends  $\beta=.13$ ,  $p<.05$ ) and at the same time will have higher intention to control the amount of disclosure (family  $\beta=.28$ , friends  $\beta=.24$ ,  $p<.05$ ). However, users who have more desire to socially identify themselves will less likely to control the amount of disclosure on social media applications (family  $\beta=-.28$ , friends  $\beta=-.25$ ,  $p<.05$ ).

*In the context of out-group communication* on social media applications, users who consider social sharing of recognition important will have higher concern of jeopardizing their social status (colleagues  $\beta=.12$ , strangers  $\beta=.18$ ,  $p<.05$ ), while they will be less likely to control the disclosure amount (colleagues  $\beta=-.20$ , strangers  $\beta=-.29$ ,  $p<.05$ ). Users who consider self-control toward the others important will more likely to control the disclosure amount (colleagues  $\beta=.22$ , strangers  $\beta=.16$ ,  $p<.05$ ).

### Discussion and conclusion

In this study, we demonstrated two research questions. First, we examined the applicability of a measurement scale of a cultural orientation perspective, previously developed in the context of in-person interaction to a context of communication on social media applications. Based on a series of factor analyses we identified that there is a distinct pattern of cultural values that users of social applications have across different context of social interaction. Second, we explored an approach of integrating cultural orientation perspective to the privacy calculus. By measuring personal values of culture as a personal trait in different context of social

interaction, we added a cultural perspective of social interaction and communication in the current approach of privacy calculus for social media applications. Based on a series of path analyses, we examined the relationship among cultural values, risk perceptions, and privacy management behavior on social applications.

Our models showed that cultural values and risk/benefit perception in relation to privacy management behavior are multi-dimensional, and thus, complex combinations of scenarios derived from the models will offer system designers with more exhaustive analysis context to design a privacy system on social media applications. Based on the original study by Matsumoto in the context of face-to-face communication, this study replicated factor analyses on the Individualism-Collectivism Interpersonal Assessment Inventory in the context of communication on social media applications. The patterns of factor structure across different social groups shows a similarity from the factor structure in the original study, i.e., social harmony, social identification, self-control, social sharing of recognition. However, there were some individual items that were loaded under different factors as compared with the original study. Although we observed a similar pattern of factors between the original study and this study, in the future research, we will need to investigate the specific discrepancies that are unaccounted for in the present study.

An increasing body of research provides perspectives on the privacy calculus in relation to culture while the majority of studies have adopted a country-level analysis of culture and therefore cannot account for the individual difference within the cultural boundary. Therefore, the primary contribution of this study is that we explored a possibility of an alternative approach in analyzing cross-cultural perspective of privacy calculus. Although we were able to test the cultural approach of privacy calculus and provide the model snapshots, the models are based on a

simple theoretical scheme of in-group / out-group communication. Further study will examine more complex theoretical foundations with regards to particular constructs and causal relationships among them within the models.

The main drawback with measuring values as "the desired" motivations through importance ratings, i.e., opinion rating of "unimportant" on one end and "important" on the other end, is that respondents may experience an ambiguity in interpreting their underlying meaning. Values that individuals judge as important can either reflect the intrinsic motivation or the extrinsic motivation. The important values that we want to measure are those that were extrinsic in nature and have been learned by the individual from the society. Through socialization processes, the motivations may have been mixed and normalized. The second motivational source is completely different representing an intrinsic kind of motive. In addition, individuals may judge values as important because fulfilling them can influence their inherent satisfaction. In this way, it is difficult for the researcher to distinguish between two different sources of motivation.

In this study, we intentionally did not consider the samples from different countries because the main purpose of the study was to measure the individual-level cultural values. In the future, we plan to compare the users from different countries for the factor structure and privacy calculus composition.

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Footnotes

<sup>1</sup>Now rebranded to Alchemer.com

## Tables

Table 1

*ICIAI measurement scales (Matsumoto et al., 1997)*

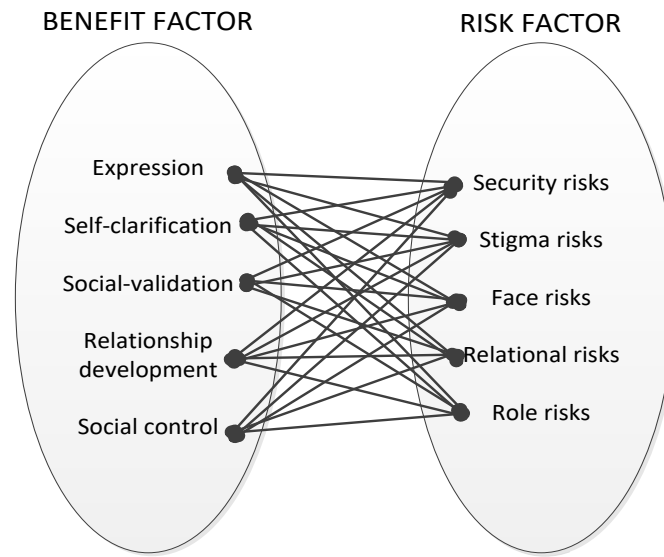
Scale	Item #	Item
Social Harmony	4	Respect and honor their traditions and customs
	5	Be loyal to them
	8	Respect them
	9	Compromise your wishes to act in unison with them
	10	Nurture or help them
	11	Maintain a stable environment (e.g., maintain the status quo) with them
	12	Maintain harmonious relationships with them
	16	Cooperate with them
Social Identification	17	Communicate verbally with them (reverse code first)
	14	Be like or similar to them
	15	Accept awards, benefits, or recognition based only on age or position
	18	Save “face” for them
Self-control	19	Follow norms established by them
	1	Maintain self-control toward them
Social sharing of recognition	13	Exhibit “proper” manners and etiquette
	2	Share credit for their accomplishments
	3	Share blame for their failures
	6	Sacrifice your goals for them
	7	Sacrifice your possessions for them

Table 2

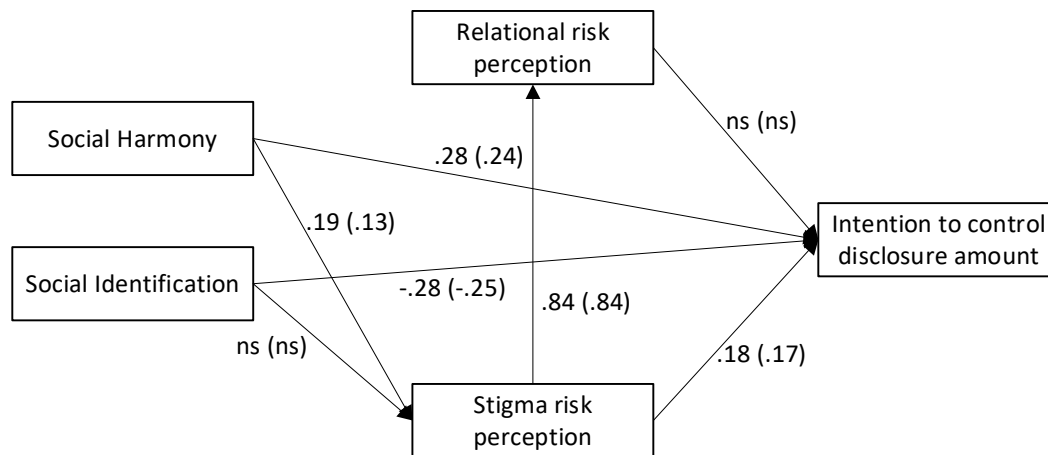
*Factor loadings for items (\*\* indicates cross loading)*

Factor	Value items	Family	Friends	Colleagues	Strangers
Social Harmony	Honor tradition	.752	.743	.724	.722 in SI
	Loyalty	.806	.786	.597	.698 in SS
	Respect	.858	.841	.771	.788 in SI
	Compromise	.704 in SI	.641 in SC	.672 in SI	.686
	Harmony	.823	.807	.733	.595 in SI
	Nurturing	.816	.746	.652	**
	Status quo	.679	.623	.655	**
	Cooperation	.693	.657	.716	**
	Verbal comm	.794	.780	.737	.566 in SI
Social identification	Similarity	.779	.781	.832	.803 in SH
	Position	.829 in SC	.794	.739	.757 in SH
	Face	.502	.544	.602	.678 in SH
	Norms	.595 in SC	.691	.710	.734 in SH
Self-control	Self-control	.5 in SH	.558 in SH	.666 in SH	.651 in SH
	Manner	.618 in SH	.606 in SH	.764 in SH	.749 in SI
Social sharing	Share credit	.767	.807	.757	.783
	Share blame	.725	.739	.774	.747
	Sacrifice goal	.778 in SI	.795 in SC	.668 in SI	.652
	Sacrifice poss.	.815 in SI	.834 in SC	.695 in SI	.639 in SH

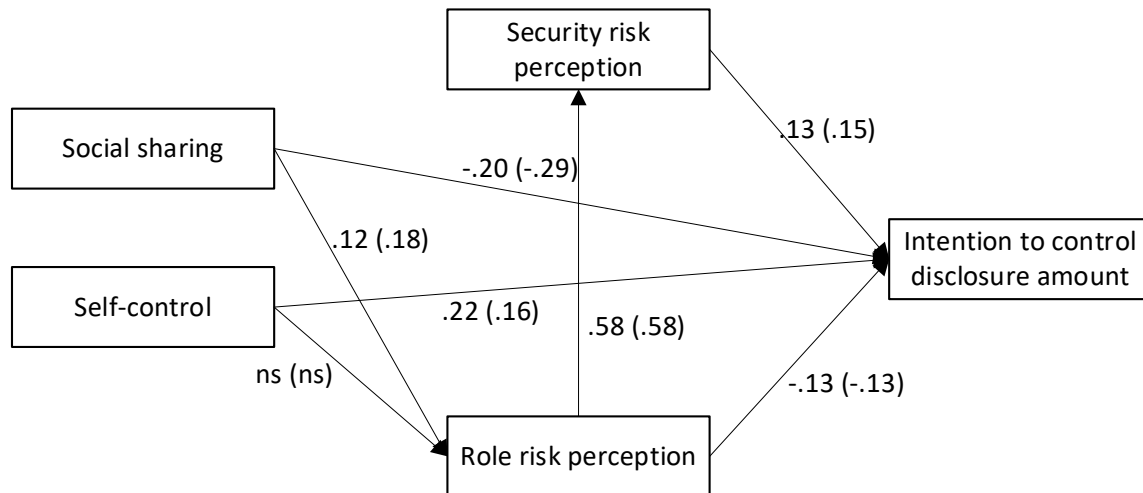
Figures



*Figure 1.* A graphical representation of Cartesian product between benefit factor and risk factor



*Figure 2.* The model for in-group interaction, family:  $\chi^2(2)=1.88$ ,  $p=.390$ , CFI = 1, GFI = .99, RMSEA = .000, 90% CI = [.000, .097], and SRMR = .01, friends:  $\chi^2(2)=1.92$ ,  $p=.382$ , CFI = 1, GFI = .99, RMSEA = .000, 90% CI = [.000, .097], and SRMR = .01. The scores in the figure are standardized path coefficients significant at  $p < .05$ .



*Figure 3.* The model for out-group interaction, colleagues:  $\chi^2(2)=16.28$ ,  $p=.000$ , CFI = .94, GFI = .98, RMSEA = .13, 90% CI = [.078, .196], and SRMR = .07, strangers:  $\chi^2(2)=4.73$ ,  $p=.094$ , CFI = .99, GFI = .99, RMSEA = .06, 90% CI = [.000, .128], and SRMR = .04. The scores in the figure are standardized path coefficients significant at  $p < .05$ .