Thumbs up for privacy?: Differences in online self-disclosure behavior across national cultures

Philip J. Reed [a, *], Emma S. Spiro [a, b], Carter T. Butts [c]

[a] Information School, University of Washington, Seattle, WA 98195-2840, USA
[b] Department of Sociology, University of Washington, Seattle, WA 98195-3340, USA
[c] Departments of Sociology, Statistics, and Electrical Engineering and Computer Science, University of California, Irvine, CA 92697, USA

ARTICLE INFO

ABSTRACT

This study investigates relationships between national-level culture and online self-disclosure behavior. We operationalize culture through the GLOBE dimensions, a set of nine variables measuring cultural practices and another nine measuring values. Our observations of self-disclosure come from the privacy settings of approximately 200,000 randomly sampled Facebook users who designated a geographical network in 2009. We model privacy awareness as a function of one or more GLOBE variables with demographic covariates, evaluating the relative influence of each factor. In the top-performing models, we find that the majority of the cultural dimensions are significantly related to privacy awareness behavior. We also find that the hypothesized directions of several of these relationships, based largely on cultural attitudes towards threat mitigation, are confirmed.

© 2016 Published by Elsevier Inc.

The era of online communication has focused intense scrutiny on the issue of privacy, but increased participation in online environments has also given us opportunities to better understand people's self-disclosure decisions. In this study, we use data from Facebook, the leading online social network (OSN) site, to observe self-disclosure behaviors—neither attitudes nor self-reported behavioral tendencies, but actual user behaviors—in relation to indicators of national-level culture. We find a strong association between various dimensions of culture and self-disclosure decisions, indicating that the social environment in which users are embedded may help predict users' assessment of risks versus rewards of increased self-disclosure in online platforms.

Issues of privacy and self-disclosure have taken on a prominent presence in the public consciousness with the dawn of the online age. Governmental collection of private communications is a topic that figures in the contemporary political discourse of the United States and of other countries (Savage, 2015; "The UN General Assembly adopts anti-spy resolution," 2013). Corporations' collection of data from users, including private communications such as emails, Web navigation histories, and so forth, has constituted another facet of the public debate (President's Council on Advisors on Science and Technology, 2014). Meanwhile, the emergence of predatory and harassing online behavior has emerged as a recognized public safety risk (Dombrowski et al., 2004; Mitchell et al., 2014). Self-disclosure decisions carry economic implications, too; differing cultural views on privacy have been identified as a barrier to international commerce (Bellman et al., 2004). With concerns arising

* Corresponding author.
  E-mail address: reed9999@uw.edu (P.J. Reed).

from observation by a government, by commercial entities, or by malicious individuals, issues of self-disclosure and privacy behavior are seemingly now on every Internet user's mind.

But privacy is far from a new issue. For decades, the search for a better understanding of related behaviors and attitudes has occupied sociologists' attention. For Goffman (1959), the importance of privacy derived from the ubiquity of self-presentation: Human beings are constantly executing a variety of "performances" for different audiences, so privacy is essential to making sure each performance is seen by the appropriate audience, but not by others. The desire for privacy via control over self-presentation forces individuals to negotiate the boundary between exposure and withdrawal. Likewise, privacy may be employed to conceal potentially damaging information about oneself (e.g., membership in a deviant or otherwise ostracized community (Goffman, 1963)) and/or to maintain a strategic advantage over others. Privacy and self-disclosure decisions are inherently linked. Individuals are constantly negotiating these boundaries, taking cues on appropriate behavior based on the social environment in which they are embedded. The norms, social structures, and geography of every society provide some degree of information concealment to its members (Westin, 1967), but the nature, extent, and consequences of such concealment or of exposure vary depending upon one's position with the society. Privacy behaviors are the result of social norm formation within a specific demographic, political, economic and social environment, hence are expected to differ markedly across societies where these conditions also differ.

Despite recent attention to privacy concerns, there is a relative paucity of empirical work that quantifies how self-disclosure behaviors themselves vary and investigates the characteristics of the social environment associated with this variation. These behaviors are, by nature, difficult to measure, much less to do so at scale and in comparative context. In this paper, we study the interaction between environmental characteristics—captured here by national cultural attributes—and individuals' self-disclosure behavior. This research uses a source of data not previously available to researchers, the observed privacy settings of randomly sampled participants around the globe. This data not only provides evidence of the privacy choices made by a large samples of OSN users, but also allows us to consider the extent to which those observed behaviors vary along geographical lines, enabling us to draw inferences about how different geographically-based cultures act upon privacy concerns.

In this research, we explore the following question: How are measurable national-level cultural attributes related to observed online self-disclosure behaviors? Our analysis uses data from Facebook, the most widely used OSN site. This context and these methods have only been feasible for research in recent years, so they offer a new opportunity to explore long-standing questions about the intersection of culture and self-disclosure.

1. Theoretical foundations

Mass participation on the Internet, and particularly on online social networks, has introduced new self-disclosure contexts and concerns. Sociological theories of privacy and self-disclosure developed with reference to the purely offline world, well before the arrival of any sort of mainstream electronic communication, can nevertheless help us make sense of online social behavior. To be sure, online platforms bring new considerations to which extant theories must be adapted, but the fundamental insights of these theories persist despite changes in communication technology. Here, we review some work in this area, linking it with newer scholarship that explores privacy online.

We use a definition of *privacy* as "selective control of access to the self or to one's group" (Altman, 1975) and understand *self-disclosure* to indicate an individual's deliberate decision to reveal more details about him- or herself. Goffman (1959) conceived of privacy as the means by which the individual manages multiple "performances" so that each audience can see only the performance intended for it. In each performance the individual is in control of disclosure to each group of others. Audiences may vary from small "back stage" groups whose members are clearly identified to large "front stage" groups whose members may be known to the ego only in a very general sense, if at all. In this framework, privacy behaviors are ways of constructing barriers specifically to segregate these diverse audiences appropriately. A sudden intrusion by one audience into an unexpected "area" of the ego's informational space carries the threat of that audience seeing an unintended performance; this occurrence creates tension in the individual performer, suddenly obligated either to change the performance to fit the audience or to pretend the audience was welcome all along.

Social settings can vary and likewise performances must adapt; individuals act differently in different social settings. This could be simply one day to the next—weekday at work versus weekend at home, for example—but it also implies differences among settings such as cities, states or national boundaries, where social practices and cultural norms are distinct. So how do individuals make self-disclosure choices? Although Goffman did not emphasize national cultures specifically, his theory implies a strong connection between social context and inclination toward privacy or toward self-disclosure. The individual's desire for privacy is socially embedded, strongly associated with the audiences with which he or she interacts most often. As individuals look to their peers—other actors and their audience—to update and adjust their performance, these shared social environments offer shared norms and expectations, introducing the possibility of a relationship between national culture and individual behavior (Triandis, 1994).

While Goffman's notion of performance was grounded in face-to-face interactions, these ideas are easily extended to online environments. New settings come with new tools for navigating self-disclosure—determining boundaries between back and front stage groups—as well as new avenues for unexpected intrusion and violations of privacy (Bernstein et al., 2013). Palen and Dourish (2003) and Tufekci (2008) made important observations in extending Goffman's ideas to a world

in which temporal, spatial, and contextual constraints on self-presentation are, in theory,[1] suspended. The fact that one's actions might be viewed by others located a long distance away influences and in some ways limits the behaviors used to preserve privacy; closing the door or speaking softly may be ways of asserting privacy in a physical space, but in a virtual space, more deliberate actions can be required to reach a similar outcome (Palen and Dourish, 2003). The audience is invisible, so the "actor" never knows who might be looking on (Tufekci, 2008). Likewise, the individual's behaviors might now be observed by an audience alien to the context of the behaviors—such as an employer observing behavior in a casual social setting that would be inappropriate for a business setting—or even by a future audience by means of artifacts that cannot be deleted (Tufekci, 2008).

Clearly, online environments can magnify the difficulty in maintaining audience boundaries. Indeed, negotiation of the boundary between privacy and disclosure has been a focus of classical theories of privacy as well. Altman's (1977) view of privacy, for example, has been characterized as "optimization between disclosure and withdrawal" (Tufekci, 2008). The salient idea is that privacy behaviors are not merely unidirectional, that is, are not limited to means of moving from lesser to greater privacy. Instead, privacy behaviors fit into a broader strategy of *regulation*: Much like a thermostat regulates the temperature in an attempt to reach a desired outcome, privacy regulation seeks to bring the individual's achieved level of privacy in line with his or her desired level of privacy. Privacy regulation may lead an individual to take steps in either direction, sometimes toward greater privacy but other times toward greater interaction with other people (Altman, 1977, p. 29). In Altman's formulation, our research focuses on behavior in the direction of greater privacy rather than in the direction of self-disclosure (Altman, 1975). Theories of regulation are important here because they place the emphasis squarely on proactive behavior; privacy preference is not just an attitude held silently or subtly, but rather a belief that leads directly to externally observable actions with objective consequences. Privacy calculus (Dinev and Hart, 2006) complements these theories by suggesting that individuals make online self-disclosure decisions by weighing the benefits of disclosure against the risks. In the case of online social networks, many of the afforded benefits of site use are intrinsically tied to disclosure and sharing (Joinson, 2008; Nadkarni and Hofmann, 2012), although balanced by the risks associated with sharing and over-sharing (Reynolds et al., 2011).

Thus sociological theories of privacy suggest that individuals take cues from their social environment via interaction with others to determine self-disclosure preferences—setting audience boundaries and actively negotiating the balance between disclosure and non-disclosure. National-level culture is one important dimension of the social context in which self-disclosure decisions are made, and at least one theorist of privacy has linked it to historical cultural distinctions. Moore (1984) examined the development of privacy notions through ancient societies. On one hand, the emergence of participatory democracy can promote concern for privacy, as it did in Greece; on the other, theocracy (Israel) or societal structure built around family loyalty (China) prevented "emergence of a protected private sphere." Yet even in the latter societies, specialized factors mitigated these forces to allow a certain modicum of respect for the individual's rights. In the case of Israel, a moral code prohibited oppression of the disadvantaged; in China, several factors including geographical distance from centers of authority had a similar effect. Conclusions are mixed, then: "… It is incorrect to regard a democratic polity as the only possible origin of private rights against public authority, even if such a polity provides the most favorable conditions for their development" (p. 272). The implication for the present day is that magnitude of privacy concern differs from one culture to another because of distinct historical factors, but privacy is relevant in at least some form to a wide variety of cultures.

Empirical investigation of the relationship of culture to privacy attitudes and behaviors has delivered mixed results. One area of focus in this research has been on the involvement of government. Early work in this area found evidence of a relationship between culture and privacy *regulations* by country (Milberg et al., 1995). This line of research on privacy regulation continued in a number of subsequent studies; most notably, cultural values were found to be mediated by national regulations in their relationship with levels of privacy concern (Bellman et al., 2004). More recently, different ethnic groups in New Zealand showed varying levels and qualitatively different kinds of privacy concerns in online dealings with the government (Cullen, 2009). These findings suggest that, at least in the areas of regulations and dealings with the government, there are observable relationships between national or subnational culture and self-reported privacy concerns.

Outside the sphere of government and regulation, research into individual privacy and online social networks has tended to cover either users' attitudes or their self-reported behaviors, with some research spanning both. In this work outside the realm of government, the overall pattern of findings has been less clear. The same research finding a relationship between culture and different countries' privacy regulations also found no confirmation of a possible relationship between measurable cultural dimensions and privacy concern (Milberg et al., 1995). Later work revisited the connection between culture and privacy concerns, with results suggesting support for the hypothesis that "cross-cultural values will be associated with differences in levels of information privacy concerns" (Milberg et al., 2000).

The distinction between attitudes and behaviors is a consequential one; research has shown that the two often do not coincide (Acquisti and Gross, 2006; Bernard et al., 1984). North American universities have been a popular source of participants for research linking Facebook behaviors to psychological states (Mehdizadeh, 2010), self-presentation strategies (Birnbaum, 2008), and privacy attitudes. In particular, early in the development of Facebook, students' attitudes toward privacy were found to bear only a weak relationship to their decision to join or not join the network (Acquisti and Gross,

---

[1] Evidence also exists to demonstrate that traditional opportunity structures still influence online interaction, see e.g. Spiro, Almquist, and Butts (2016) for a discussion of the effect of physical distance on friendship ties online.

2006). Limitations of geography and demographics necessitate caution against generalizing broadly from research done purely among North American undergraduate populations,[2] but this finding does warn against the assumption that attitudes must necessarily be reflected in behaviors.

Research into online social networking privacy behaviors among non-student populations has been less common, but Krasnova and Veltri (2010) found evidence to suggest that perception of these benefits and risks differed cross-culturally, differences they ascribe to specific dimensions of culture. Researchers have identified three distinct kinds of privacy behaviors: *avoidance*, *opt-out*, and *proactive* behaviors, associated with cultural factors (Cho et al., 2009)—but importantly, these are all based on self-reported data. Of the three, our inquiry in this paper concerns opt-in behaviors, specifically the selection of privacy options in Facebook that were not defaults at the time of data collection.

To guide our investigation, we draw on two theories that connect variations in national culture to differences in expectations for behavior. In particular, building on these theories, we hypothesize that the relationship between national culture and behavior reflects each culture's perception of the threats versus the benefits associated with self-disclosure. Triandis (1994) suggested that cultures develop in a Darwinian response to environmental factors relating to threats and to desired resources. For example, the availability of different kinds of food may lead certain societies to be organized around hunting or fishing on one hand, or around farming on the other. Consequently, over time these societies may place greater value on individualism or cooperation, respectively. The cultural attributes develop in response to the material needs of the society, but propagate themselves even when the particular environmental circumstances may have changed.

At the same time, Dinev and Hart (2006), working in the field of management information systems (MIS), theorized that potential e-commerce users deploy a *privacy calculus*, weighing the costs of self-disclosure against its benefits. Although the scope of this theory is specifically e-commerce transactions, its application to social networks is straightforward. In this case the transaction brings benefits of social network participation to the user (Joinson, 2008; Nadkarni and Hofmann, 2012) in exchange for the costs of accepting privacy risks.

Taken together, these two theories imply a simple yet important relationship between national culture and self-disclosure behavior: People will be more likely to protect their own online privacy in cultures that place a higher assessment on the threats of self-disclosure than others. Inversely, people will be more likely to self-disclose online in societies that perceive the benefits of self-disclosure as greater than do other societies. From this theoretical prediction, we can generate specific hypotheses depending on specific characteristics of the society that pertain to threats or benefits of self-disclosure.

2. Hypotheses

So far we have theorized that cultural differences lead people to assess benefits and drawbacks to self-disclosure in predictably different ways, which leads to different behavior. This theoretical prediction leads to hypotheses that can be tested using Facebook data, quantitative measurements of national-level cultural dimensions, and other control variables. General theories of privacy suggest specific ways in which individuals may act in a specific cultural context; they also provide a lens with which to view specific relationships between the cultural variables and observed privacy behavior across the world. Here, we operationalize these ideas, formulating specific hypotheses that relate cultural dimensions to observed privacy behavior—as measured by privacy-aware behavior (PAB) on Facebook. As measurements of national cultural characteristics, we draw on four specific indicators from the GLOBE project, described in more detail in Section 3 below.

In line with these ideas, "middle-range theories" (Rosenfeld, 1979) seek to explain in greater detail *why* people see self-disclosure as a threat. For example, Powell (1969) focused on fear of threats stemming from rejection. "… If I tell you who I am, you might not like who I am, and it's all that I have." (p. 12). Likewise, social theories of deviant behavior (Goffman, 1963) suggest that negative consequences (both social and legal) lead individuals to avoid or hide deviance.

2.1. Gender egalitarianism

Inter-gender interactions are one source of risk in online activity. Adolescent girls in the United States have been found to have a higher probability than boys of being sexually harassed, either online or in-person (Mitchell et al., 2014). In addition, women have been found to be more likely to change their settings in the direction of greater privacy (Joinson, 2008). Proceeding from the assumption that societies with greater gender egalitarianism carry less risk of online harassment, we hypothesize that this cultural attribute will be associated with a lower probability of privacy-aware behavior.

H1.   Gender egalitarianism practice will be negatively associated with privacy-aware behavior.

2.2. Humane orientation

In collectives where individuals are naturally socialized into more humane behavior, this process implies an overall expectation that "members of society are responsible for promoting the well-being of others," and "the interests of others are important" (Vilkus, 2009). The variable for humane orientation practice used here, from the GLOBE project, comes from

---

[2] Notably, Facebook was restricted to university students until September of 2006 (Facebook, 2015).

surveys that operationalized humaneness in questions about five aspects: "being concerned, sensitive toward others, friendly, tolerant of mistakes, and generous" (Kabasakal and Bodur, 2004, p. 571). Where people behave more humanely, they decrease potential threats of all sorts, including threats associated with self-disclosure. On the other hand, lack of a humane orientation leads to more hostile contexts that tend to carry greater risks of self-disclosure. Thus the hypothesis:

H2. Humane orientation practice will be negatively associated with privacy-aware behavior.

2.3. Assertiveness

A national culture's assertiveness is a belief that "people are or should be encouraged to be assertive, aggressive, and tough," versus "nonassertive, nonaggressive, or tender in social relationships" (Den Hartog, 2004, p. 395). When people are more assertive of their own rights and privileges, they tend to create more potential for conflict with the rights and privileges of others. These more hostile contexts tend to lead to greater risks of self-disclosure. Therefore our theoretical view of the cultural relationship with privacy leads us to a third hypothesis:

H3. Assertiveness practice will be positively associated with privacy-aware behavior.

2.4. Performance orientation

Among several explanations proposed by Egan (1970) for individuals to suppress their own self-disclosure, two of them can be brought to bear to understand the implications of a culture's *performance orientation*. First, self-disclosure carries a threat because the individual might want to flee from self-knowledge. Self-knowledge brings greater responsibility, but avoiding it is "a flight from the anxiety and work involved in constructive personal change" (p. 209). In societies with greater emphasis on performance, we postulate that the demand for personal change would be greater, so therefore the threat associated with self-disclosure would be greater. Second, the "reverse halo effect" could cause self-disclosure in one's area of weakness to leave an impression of incompetence in other areas. This bears some similarity to the fear of rejection suggested by Powell (1969), but is specifically focused on questions of competence to perform. In cultures placing more emphasis on performance we expect that egos will fear more attention to their lapses, and hence experience stronger incentives for concealment.

H4. Performance orientation will be positively associated with privacy-aware behavior.

The remaining variables—the remaining cultural practice dimensions, all the cultural values dimensions, and the demographic covariates—do not lend themselves clearly to hypotheses. We include them as potential control variables, subject to the exhaustive model process described below, but do not hypothesize about their direction.

3. Variables and data

3.1. Privacy behaviors on Facebook

Our dataset consists of a uniform random sample of 976,301 Facebook users drawn in 2009. The random sample was possible because Facebook's technical architecture at the time allowed for the generation and queries of arbitrary user IDs, thus using a rejection sampling strategy (Gjoka et al., 2009, 2011) to obtain a truly random sample of users. Subsequent changes to Facebook security policy make it difficult if not impossible to draw a similar uniform sample today. The dataset contains information about each user's privacy setting regarding four different activities by strangers (Gjoka et al., 2011; pp. 1885, 1887): (1) sending a request to add as a friend (2) seeing profile photo (3) seeing friends list (4) sending a message. In 2009, the default setting was to allow a stranger (i.e., someone not added as a "friend" in the specific Facebook usage of the term) to engage in each of these four activities. However, the user could change settings to deny access to any or all of the four. We deem a user who changed *any* of the four settings to have exhibited PAB, and a user who left all four in their default state not to have exhibited PAB.[3] Therefore our outcome of interest is a binary variable, the presence or absence of PAB.

Individuals are associated with nations through the Facebook geographical network setting. At the time of data collection, Facebook allowed users to designate one local, regional or national network to which they belonged, such as "Lincoln, NE" (USA), "West Midlands" (UK), "Wales", "Maldives", or "Mauritius". The United States, United Kingdom, and Canada had several of these local or regional networks, whereas other countries (including China, India, and Russia) had few or none. Individual Facebook users were not required to designate a geographical network, which imposed a limitation on the data: 551,164 users out of our original sample of 976,301 (56.5% of users) did not indicate a network. Moreover, 30.0% of those non-network users

---

[3] Because only 0.003% of our sample (2833 users) had set the first, second, or fourth privacy settings, we elected not to try to differentiate among the four settings, but instead to consider any of the four privacy settings as evidence of privacy awareness.

showed at least one privacy-aware behavior, in contrast to 15.6% of the users with a network decision, a highly significant difference (p < 0.001).

Therefore, this data should not be used to draw inferences about the population of all Facebook users; instead, this research only supports inferences about the subpopulation of Facebook users who do designate a network. However, as long as removing the non-network users (for which the geographical location is unobservable) does not substantially change the underlying distribution of privacy behaviors by nation, our findings should not be compromised. Of the 425,137 users designating networks, we further pare down the sample to those users belonging to countries with a complete set of data available for the selected cultural and demographic variables, as detailed below. Of the 425,137 users with a designated nation network, we consider the 198,310 users who corresponded to one of 30 countries for which all measures of culture and demographic variables are available, as discussed below. National-level PAB values and user counts for the 30 countries comprising our sample are presented in Table 1.

3.2. Measures of national culture

To systematically examine the relationship between culture and individual behavior at scale, it is necessary to quantify cultural attributes. Culture has been defined variously as the "complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society" (Tylor, 1958); "the collective programming of the mind which distinguishes the members of one group or category of people from another" (G. H. Hofstede et al., 2010); or "a pattern of thinking, feeling and acting (behavior) that is learned throughout a person's life, beginning in early childhood" (Calhoun et al., 2002, pp. 294–95).

The question of how best to measure cultural attributes, or indeed whether or not this endeavor is even possible, has inspired considerable debate (G. Hofstede, 2003, 2006; Javidan et al., 2006; McSweeney, 2002a, 2002b; Tung and Verbeke, 2010; Venaik and Brewer, 2010). For us, the salient point emerging from these scholarly discussions is that a culture represents *distributions* of attitudes, beliefs, or habits across a society rather than homogenous attributes shared by all; nevertheless, the culture predominant within a society will influence the ideas and behaviors of the individuals living within it. Quantitative analysis involving cultural attributes allows researchers to harness the advantages of this sort of data—to wit, a large sample size and broader generalizability—in addressing the research questions. Efforts to summarize culture with quantitative indices date back several decades and are well established in the literature of various disciplines, most prominently in that of international business. The four dimensions of Hofstede (Hofstede, 1984) derive from survey data collected at the IBM Corporation in 1967.[4] Since Hofstede's effort, various projects have attempted to improve the measurement of culture (World Values Study Group, 1994; World Values Survey, 2015).

We elect to use dimensions taken from the GLOBE project's comprehensive cultural quantification effort (House et al., 2004). Our choice is based on GLOBE's deliberately multicultural and theory-based approach to instrument design (pp. 128–151), and because of its clear distinction between values and practices. GLOBE's eighteen cultural dimensions, enumerated in Table 2, resulted from a multiphase process of cross-cultural instrument design involving multiple stages of construct identification and validation. Particular care was given to correcting for known forms of systemic cultural bias in filling out surveys and to ensuring the fidelity of the instrument across languages through back-translation.

The resulting GLOBE instruments asked about both practices and values; for example, respondents were asked to complete the statements, "The economic system in this society *is* designed to maximize:" and "I believe that the economic system in this society *should be* designed to maximize:" each with responses on the same seven-point scale ranging from "individual interests" to "collective interests." This questionnaire was administered to 8685 middle managers[5] in the same three industries in 62 different nations or quasi-national cultures[6] leading to the values for the GLOBE cultural variables. We took these values for the GLOBE variables from spreadsheets compiled by a third party (Harzing, n.d.).

In contrast to certain earlier work,[7] the GLOBE variables distinguished between practices (how respondents perceive that their own society *is*) and values (how they believe it *should be*). This distinction was operationalized in GLOBE through measuring variables in practice/value pairs, so that 18 variables are composed of nine pairs. An essential feature of this project is that it focuses on privacy behaviors rather than privacy attitudes; this distinction roughly corresponds to GLOBE's practice/value distinction, in that practices represent externally observable behaviors. While our discussion of the relationships

---

[4] Hofstede's approach has certainly not been without controversy, as critics have attacked on both ontological and methodological fronts (G. Hofstede, 2003; McSweeney, 2002a, 2002b; Venaik and Brewer, 2010). Among those researchers who accept the inherent idea of measuring a cultural quantitatively, some have developed alternative schemes with a limited number of dimensions that focus on specific aspects of intercultural variation, particularly on values in preference to practices (Inglehart and Welzel, 2010; Schwartz, 1992).

[5] Half the GLOBE project's sample of 17,370 managers was given the questionnaire with these societal-level questions with the other half given similar questions pertaining to their own organization (House et al., 2004, p. 132). At the same time, questions about the nature of a good leader were also administered to the entire sample. The intent of the organizational-level questions for half the sample seem to have been to establish the statistical reliability of the leadership questions. Only the society-level questions and the variables generated from them pertain to our research here.

[6] Such as "Canada (English-speaking)" or "Germany (Former West)." For our analysis we only included those countries where the GLOBE variable covers the entire country.

[7] The World Values Survey explicitly studies values and does not cover practices as a distinct entity. The other schemes do not make the distinction explicit as GLOBE does.

Table 1
Incidence of privacy-aware behavior (PAB) of users used in sample from 30 countries.

Country	With PAB	Without PAB	Proportion with PAB
Albania	22	94	0.190
Argentina	583	2397	0.196
Australia	1216	8795	0.121
Bolivia	76	219	0.258
Brazil	293	730	0.286
Colombia	861	3958	0.179
Costa Rica	45	201	0.183
Ecuador	93	274	0.253
Egypt	354	1592	0.182
El Salvador	33	104	0.241
Georgia	11	29	0.275
Greece	214	1552	0.121
Guatemala	25	167	0.130
Hong Kong	306	1901	0.139
India	1589	2666	0.373
Indonesia	757	3202	0.191
Israel	290	1757	0.142
Japan	170	594	0.223
Kazakhstan	10	37	0.213
South Korea	82	250	0.247
Kuwait	45	155	0.225
Malaysia	435	1699	0.204
Mexico	876	2249	0.280
Namibia	5	42	0.106
Netherlands	227	895	0.202
New Zealand	203	1357	0.130
Nigeria	25	71	0.260
Philippines	348	1280	0.214
Qatar	29	108	0.212
Singapore	239	1434	0.143
Slovenia	26	213	0.109
Sweden	405	3527	0.103
Taiwan	208	418	0.332
Thailand	185	489	0.274
Turkey	1474	6695	0.180
United States	24,577	116,107	0.175
Venezuela	491	1908	0.205
Zambia	7	25	0.219

between culture and privacy-aware behavior is focused on specific dimensions, we include all 18 of the GLOBE variables in our modeling procedure. The variable selection procedure employed allows us to compare the relative influence of each predictor variables, eliminating those when data does not support a significant association but allowing for the inclusion of unanticipated relationships.

To our knowledge, ours is the first study that has tested hypotheses relating GLOBE dimensions to observed privacy behaviors. Therefore care must be taken in comparing our findings with other research using other cultural dimensions, perhaps even similarly named dimensions that measure subtly different constructs. For example, Hofstede and GLOBE both have dimensions called *uncertainty avoidance*, but important differences characterize the respective constructs (Venaik and Brewer, 2010).

3.3. Demographic control variables

In addition to the cultural variables discussed above, several demographic control variables also enter into our model selection process. It would be undesirable to ascribe variation in privacy behaviors to differences in culture if such variation could be better explained by, say, economic prosperity or age demographics. To account for the influence of confounding variables, we started by considering several possible covariates, including several measures of economic attributes and of democracy and political openness, for consideration in our model selection process. For tractability of the subsequent analysis, and to avoid collinearity issues, we sought to minimize the number of variable pairs with high correlations, generally seeking to opt for the variable that was more directly related to an underlying social or economic reality. However, in some cases high correlation between a pair of variables was deemed to be acceptable in light of the desirability of including both variables. The seven covariates finally selected are listed in Table 3.

The United Nations Human Development Index (HDI) is a composite indicator of life expectancy, educational variables, and gross national income per capita. Because GDP per capita (World Bank) is such a fundamental socioeconomic indicator,

Table 2
GLOBE cultural dimensions and other demographic variables
included in model selection.

GLOBE cultural dimensions (18 variables)
Assertiveness (practice and value)
Future orientation (practice and value)
Gender egalitarianism (practice and value)
Humane orientation (practice and value)
In-group collectivism (practice and value)
Institutional collectivism (practice and value)
Performance orientation (practice and value)
Power distance (practice and value)
Uncertainty avoidance (practice and value)
Socio-economic indicators (7 variables)
Human Development Index, 2010
GDP per capita
Female-to-male ratio, primary and secondary school
Population age 65 and over
Urban population
Trust (from World Values Survey)
Internet users as a proportion of population

we also include it in our original set, even though it bears a high correlation (0.91) to HDI. Female to male ratio in primary and secondary education (World Bank) (F:M) is included as a measure of gender equality in reality, not just in perception.[8] Although primary and secondary students are only a narrow subset of a country's population, opportunities offered to these younger generations reveal the willingness of each country to deploy resources equitably. Internet users per 100 people (World Bank) gives us a simple indicator of the incidence of Internet usage in each country. Trust is the only variable used from the World Value Survey, capturing a notion of generalized trust among other people. However, trust exhibits a high correlation with uncertainty avoidance practice (0.834) and fairly highly correlations with power distance value (0.726) and uncertainty avoidance value (−0.710), so inferences from coefficients of WVS trust must be made with caution. Finally, population age 65 and older and urban population percentage (both World Bank) are included to represent other fundamental demographic attributes, despite their high correlations with HDI, GDP per capita, and internet usage.

Demographic variables are taken from the United Nations Development Programme (2014), World Bank (2015), and World Values Survey (2015). In the interest of temporal consistency, where possible we use observations from 2009.[9] Alternatively, in some cases we employ linear interpolation to estimate the value for 2009. Where there is neither data for 2009 nor for two years bracketing 2009, for example if all observations are from before 2009, we drop observations.

We use only those countries with values for all 25 candidate variables, which narrows our sample to 30 countries. This approach could tend to bias our sample toward countries where data is more readily available—typically countries with more developed infrastructure to measure national statistics, hence those with a higher level of development. However, the covariates for HDI and GDP, as well as the other covariates, serve as a statistical control, and in fact our final set of 30 countries includes quite a few large low-HDI countries. All independent variables are normalized in order to eliminate any effects of comparisons across measurements in different units.

4. Methods

Whereas privacy choices are observed at an individual level, the research question and hypotheses pertain to national-level variation in self-disclosure choices. Moreover, measures of the social context for privacy decisions, for example measures of culture, are also national-level variables. We therefore utilize the aggregate measure of privacy-aware behavior for each country based on the fraction of users in a given geographic network who have at least one of the four privacy settings turned on. This results in a privacy-aware behavior score that is actually an estimate of the probability that a random user from that country will exhibit at least one privacy-aware behavior.

Privacy-aware behavior is then modeled as a function of different covariates representing social environment—the cultural and demographic context in which self-disclosure decisions are made. Country level PAB can thus be considered a series of Bernoulli trials, one for each individual in a country, such that there are two disjoint outcomes for each user—either they are privacy aware and have at least one privacy setting turned on or they are not privacy aware and have default privacy settings.

---

[8] F:M has an unclear relationship to the two GLOBE GE variables: Both correlations are surprisingly low (0.102 with GE practice, 0.442 with GE value). Because GLOBE is based on a survey of middle managers, the GE practice variable can be interpreted as their perception of GE in their own society, with the value variable indicating their desire for GE.

[9] HDI was an exception, because the United Nations only reports HDI every few years. Therefore we chose 2010 as the closest year with an HDI report.

Table 3
Demographic control variables included.

	UN HDI	GDP	F:M school ratio	Internet usage	Trust	Urbanization	Population 65+
Albania	0.746	3846	97.3	41.2	51.2	51.2	9.8
Argentina	0.805	7674	104.4	34.0	40.6	92.2	10.5
Australia	0.935	42,551	97.6	74.3	92.4	88.9	13.3
Brazil	0.726	8373	102.6	39.2	17.5	84.0	6.7
Colombia	0.714	5117	104.5	30.0	30.9	74.7	5.5
Costa Rica	0.768	6386	101.9	34.3	48.9	63.7	6.4
Ecuador	0.719	4237	100.4	24.6	72.7	66.2	6.1
Egypt	0.661	2462	96.6	25.7	37.2	43.3	5.5
El Salvador	0.678	3341	98.4	12.1	60.4	63.8	6.8
Georgia	0.735	2441	98.5	20.1	38.2	52.7	14.3
Greece	0.866	28,452	97.6	42.4	54.6	61.0	18.9
Guatemala	0.579	2697	94.7	9.3	51.9	48.9	4.4
India	0.547	1147	97.4	5.1	52.5	30.6	5.0
Indonesia	0.620	2272	98.8	6.9	16.9	49.1	5.0
Israel	0.896	26,032	101.3	63.1	48.3	91.8	10.4
Japan	0.909	39,473	100.1	78.0	79.6	89.6	22.3
Kuwait	0.786	37,161	99.8	50.8	48.5	98.2	2.3
Malaysia	0.763	7278	98.2	55.9	17.7	71.1	4.7
Mexico	0.770	7691	102.7	26.3	41.7	77.5	5.8
Namibia	0.604	4133	103.0	6.5	57.8	37.3	3.4
Netherlands	0.919	48,174	98.3	89.6	90.6	82.2	15.0
New Zealand	0.917	27,474	101.8	79.7	102.2	86.2	12.7
Nigeria	0.462	1091	89.6	20.0	29.8	48.4	2.7
Philippines	0.649	1832	101.2	9.0	20.1	48.5	3.7
Slovenia	0.892	24,051	99.9	64.0	38.6	50.1	16.5
Sweden	0.913	43,640	99.4	91.0	134.5	84.9	17.9
Thailand	0.686	3979	102.3	20.1	83.1	33.4	8.6
Turkey	0.715	8626	94.4	36.4	10.2	69.8	6.9
United States	0.934	46,999	100.9	71.0	78.8	81.9	12.8
Zambia	0.438	998	94.1	6.3	28.1	38.3	2.7

At the country level this implies that we should model binomial proportions; we do so using binomial regression models. These models are the adaption of standard multiple linear regression to a binomial response variable (James et al., 2013).

In this modeling context, the number of observations (30 countries) is not much larger than the number of variables (25 potential covariates—seven demographic control variables, nine GLOBE practices, and nine GLOBE values). As such it is likely a standard model would overfit the data and consequently lead to poor predictive performance. Moreover, it is often the case that some or many of the potential covariates are in fact not associated with privacy-aware behavior. Including these irrelevant variables leads to unnecessary complexity in the resulting model (James et al., 2013). As such, we employ standard methods for variable selection in linear models in order to obtain a model that is parsimonious, while still capturing variability in the data.

We conduct a targeted model search—a slight modification of traditional best subset selection methods—to identify the strongest possible binomial regression model. All of the demographic controls and GLOBE variables were at risk of inclusion in this model. Variable selection methods result in a set of candidate models, each of which contains a subset of the eligible covariates. In order to choose the "best" model for use in subsequent analysis, we require a criterion for comparing models. Our choice is Akaike's Information Criterion (AIC), a standard metric designed to estimate test error by making an adjustment to training error to account for bias due to overfitting (James et al., 2013); preferable models have lower AIC scores.

We have considered every model that includes at least one of the 18 GLOBE variables and any number (including zero) of the seven demographic control variables. This yields a total of 2^{25} minus 2^7 models, for a count of 33,554,304 models. This procedure for model selection can be viewed within the framework of traditional hypothesis testing, rejecting or failing to reject specific hypotheses about the association between PAB and the many different covariates. Each of the eligible explanatory factors (e.g. cultural dimension) not selected into the best model can be seen as failing to reject the null hypothesis about effect of this predictor of privacy-aware behavior, given the selection criteria, indicating that this set of factors reveals no significant relationship to PAB.

5. Findings

Table 4 provides detail on the model with the best fit (lowest AIC), and Table 5 summarizes our hypotheses in light of the study findings. Of the four variables with hypothesized relationships, the relationship held in the top-ranked regression model for two of them: gender egalitarianism practice and assertiveness practice. In fact, the coefficient for gender egalitarianism practice (representing that each standard deviation change in IGC is associated with a minus-0.34 standard deviation change in log odds of privacy-aware behavior, p < 0.001) is the greatest absolute value for a GLOBE cultural variable's coefficient in the model. The coefficient for assertiveness practice is substantially smaller in absolute value terms—each standard deviation change in assertiveness is associated with a 0.09 standard deviation change in log odds of PAB—but this

finding is also statistically significant ($p < 0.05$). The top model provided no support for the hypotheses involving the other two variables, humane orientation practice and performance orientation practice. In no case were either of the variables found to have an opposite relationship to privacy-aware behavior from the direction hypothesized.

All dependent variables were normalized before model selection and regressions were binomial, so coefficients represent the change expected in the log odds of privacy-aware behavior in response to a one standard deviation change in the dependent variable in question. Variables with a coefficient of 0.3 or greater in either direction are, in descending order of magnitude: HDI (positive), F:M (positive), and gender equality practice (negative). Further variables with a coefficient of 0.2 or greater in either direction are future orientation, in-group collectivism, and uncertainty avoidance, all positive. Fig. 1 shows the relationship between three illustrative GLOBE variables and probability of privacy-aware behavior. The points graphed demonstrate hypothetical predicted values of privacy-aware behavior probability for −1, 0, and +1 standard deviations for each of the GLOBE variables, with every other dependent variable held at the mean value.

Table 6 summarizes the top ten regression models from our exhaustive search. From the details reported in this table, a few broad trends are clear. Both the demographic controls and the GLOBE variables show a high level of consistency among the top models. Of the 25 total variables available for selection, 14 appeared in either nine or all ten of the top models. Seven appeared in either none or only one. Notably, the top-rated model is representative of the entire top ten: Each of the 15 variables included in the top model was included in the majority of the top ten, always with the same coefficient sign. In addition, each of the coefficients of the top model is statistically significant to $p < 0.05$. Fig. 2 displays the six GLOBE practice variables included with 95% confidence intervals for the estimated coefficients.

The two hypothesis variables not included in our top-ranked model did appear in other models in the top ten. Humane orientation practice had a significant negative coefficient in the fifth-ranked model, whereas performance orientation practice had a significant positive coefficient in the fourth-ranked model by AIC and an insignificant coefficient in the seventh-ranked model. Although both signs match our hypothesized direction of the relationship, these findings can only be interpreted as weak evidence supporting the respective hypotheses because those variables were not in the top-rated model.

6. Discussion

Our analysis reveals clear relationships between cultural variables and self-disclosure choices. We find strong confirmation of two of our four theoretical predictions, and weaker confirmation of the other two. These findings provide evidence for the theoretical position that national-level culture is associated with self-presentation by means of threat perception, by which different cultural influences are associated with different assessments of threat versus payoff—in other words, people from different cultures tend to have different parameters to their "privacy calculus" (Dinev and Hart, 2006).

In general terms, we find that privacy-aware behavior bears significant relationships to several of the GLOBE dimensions even after controlling for standard demographic covariates. All five of the six demographic covariates and all ten of the 18 GLOBE dimensions selected into the top model showed a statistically significant relationship to privacy-aware behavior. Of these, three of the five demographic controls and eight of the ten GLOBE dimensions had a highly significant relationship (to $p < 0.001$). This finding provides support for the proposition that measurable cultural attributes are indeed related to privacy behavior.

At the level of specific hypotheses, a more nuanced picture comes into focus. Of the four predictions related to privacy calculus, two are supported by our top regression model and the other two are neither supported nor rejected. However, the latter two are at least weakly supported by their appearance and sign in other models within the top ten models by AIC. In general, then, we find support for privacy calculus as a theoretical means of understanding the relationship between culture and self-disclosure decisions. The specific variables covered by the confirmed hypotheses—gender egalitarianism and assertiveness—might be particularly fruitful research areas to further test the privacy calculus model. In particular, there would be great value to further empirical testing of the proposition that these variables illustrate different means by which cultural attributes influence self-disclosure decisions because of difference in perception of risk and benefit across cultures.

In addition to supporting our theoretical predictions, these findings add to the body of knowledge on self-disclosure (or privacy) and culture in at least three important ways. First, by using observed data pertaining to behaviors rather than self-reported attitudes or behaviors, we bolster previous findings based on self-reports. Second, we illustrate the application of traditional methods from statistical learning, particularly variable selection methods, to compare a large set of potential regression models. This method carries the advantage of allowing us to narrow the set of covariates found to have significant association with privacy-aware behavior, eliminating those that do not show such an association, while avoiding overfitting the observed data. Third, by utilizing the GLOBE dimensions in contrast to other work on culture and privacy, we draw on the characteristics of that particular cultural measurement scheme—for example, GLOBE's differentiation between practice and value variables.

This work is not without limitations. Around half of our original sample did not designate a geographical network, but geographical network is the only viable means of assigning a country to an individual in this data. However, this consideration need not constitute a threat to internal validity if users not designating a network are distributed uniformly among the population of different countries; alternatively, having more users without a network who are in higher-privacy-aware behavior countries would actually cause us to understate our findings.

All national cultures are at least somewhat heterogeneous, and some are highly heterogeneous (Tung and Verbeke, 2010). The use of national-level indicators in cultural research has been justified on the grounds that these indicators represent

Table 4
Detail of top rated regression model.

	Coefficient	Std err	p	
(Intercept)	−1.496	(0.023)	<0.001	***
Hypothesized variables				
Gender egalitarianism practice	−0.337	(0.032)	<0.001	***
Assertiveness practice	0.093	(0.036)	0.010	*
Other GLOBE variables				
Future orientation practice	0.258	(0.043)	<0.001	***
Future orientation values	0.152	(0.024)	<0.001	***
Institutional collectivism practice	−0.099	(0.042)	0.019	*
In-group collectivism practice	0.246	(0.036)	<0.001	***
In-group collectivism values	−0.135	(0.031)	<0.001	***
Gender egalitarianism values	0.151	(0.032)	<0.001	***
Humaneness values	−0.084	(0.023)	<0.001	***
Uncertainty avoidance practice	0.214	(0.049)	<0.001	***
Demographic control variables				
HDI (2010)	−0.383	(0.071)	<0.001	***
F:M ratio in primary/secondary education	0.338	(0.023)	<0.001	***
Population 65 or older	0.147	(0.04)	<0.001	***
Urban population	0.121	(0.045)	0.008	**
Trust	0.099	(0.032)	0.002	**

$^{*}p < 0.05$.
$^{**}p < 0.01$.
$^{***}p < 0.001$.
AIC: 253.53.

means of each country's distribution (Hofstede, 1984; Trompenaars and Hampden-Turner, 1998). No doubt certain individuals represent outliers in their own country's distribution, but on the whole, the mean of the distribution for each country is estimated by the cultural dimensions. The GLOBE surveys sampled one particular subset of society, middle managers in three different industries, with the industries selected to be common across countries. Thus the survey authors assert that the tendencies reflected in the dimensions are representative of those societies as a whole (House et al., 2004).

In summary, our empirical results show that cultural attributes contribute to deeper understanding of privacy and self-disclosure than would otherwise be derived solely from non-cultural variables. We have developed and tested a theory of culture and self-disclosure based on Triandis' cultural evolution and Dinev and Hart's privacy calculus. The support found for this theoretical structure, especially pertaining to gender egalitarianism and assertiveness, suggests that relationships between culture attributes and privacy follow predictable patterns. The research presented here does not aim to make causal claims about the relationships between culture and self-disclosure behavior, but this evidence supports the existence of those relationships, regardless of causality. Attempting to understand self-disclosure in the online age without considering cultural factors misses much of the story.

6.1. Further research

In this work we have explored the relationship of culture, as operationalized by the GLOBE variables, to observed privacy and self-disclosure behaviors. Our evidence shows a clear connection between these factors in general, and points the way toward relationships between certain specific cultural attributes and privacy. But more specific understanding of these relationships is needed, so further opportunities for beneficial research present themselves.

Our means for measuring cultural attributes, the GLOBE dimensions, has its roots in the business literature, but proves useful in other non-business fields. However, it would be desirable to continue developing tools to measure culture that are less rooted in the scholarship of business. For example, relaxing the limitation of the sample to middle managers would provide better coverage of a society as a whole. The ongoing World Values Survey is one example of a less business-oriented sampling approach, but in contrast to GLOBE, WVS measures cultural values without also attempting to measure cultural practices. We would like to see instruments and data that combine GLOBE's value/practice divide with WVS's wider sampling strategy.

Some qualitative investigation into cultural dimensions of online privacy has come onto the scene in recent years, but further mixed-methods work can play an important role in shedding light on the still unclear relationship between cultural practices and values. In truth, any of the nine pairs of GLOBE variables could support a vigorous research agenda. The use of ethnographic observation and open-ended interviews will help us better understand cultural aspects of the online self-disclosure that may not have been fully reflected in quantitative indicators from GLOBE, Hofstede, WVS, or similar. In particular, different cultures may interpret questions on the GLOBE or other surveys with specific nuances of understanding, so single-country or regional work (e.g., Abokhodair, 2015) helps to provide a more complete picture.

Ultimately, research into these different cultural aspects should fit together into a broader theory of the relationship between practices and values. An interesting thread in the cultural measurement concerns the surprising, mostly negative

Table 5
Hypotheses and associated findings.

Hypothesis	Finding
H1: Gender egalitarianism practice will be negatively associated with privacy-aware behavior.	Supported in top model***
H2. Humane orientation practice will be negatively associated with privacy-aware behavior.	Not supported in top model
H3. Assertiveness will be positively related to privacy-aware behavior.	Supported in top model*
H4. Performance orientation will be positively associated with privacy-aware behavior.	Not supported in top model

*p < 0.05.
**p < 0.01.
***p < 0.001.
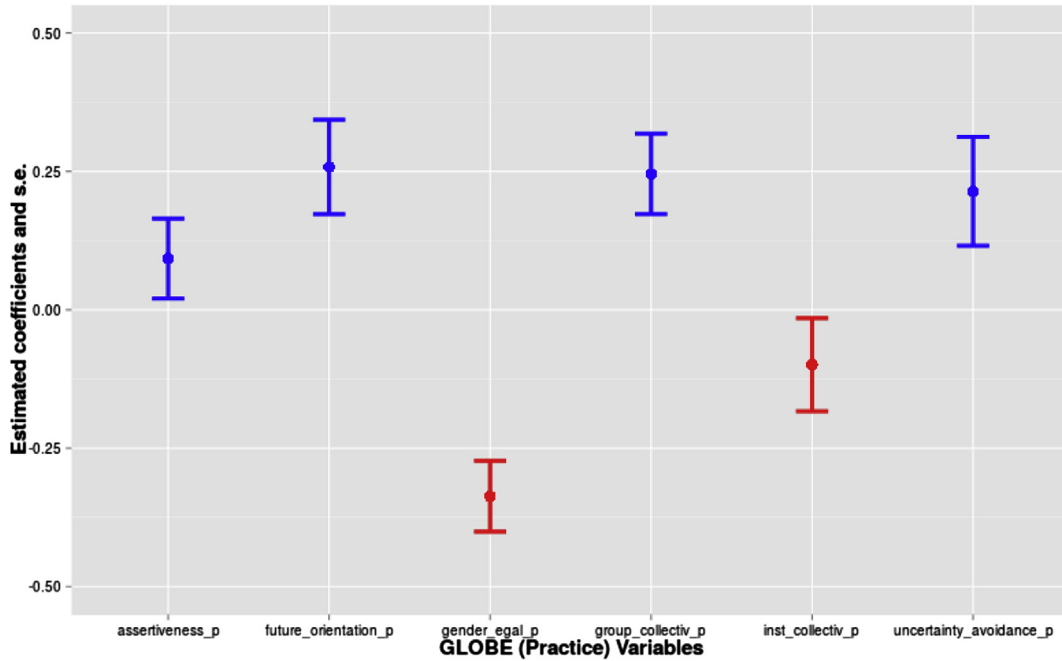
Blue: positive values. **Red:** negative values. Bars indicate 95% confidence interval.

Fig. 1. Predicted probability of privacy-aware behavior, while varying selected GLOBE practice dimensions.

practice/value relationship found in GLOBE. Specifically, it has been theorized that this relationship is a reflection of diminishing marginal utility (Maseland and van Hoorn, 2009, 2010) or of Maslow's hierarchy of needs (Brewer and Venaik, 2010; Venaik and Brewer, 2010). More theory-building dialogue is needed. Empirically, future work could add to this discourse by looking at countries where one or more specific practice variables have a particularly high positive or negative correlation with their corresponding value variables.

The heterogeneity of culture within any one country is a persistent problem in cultural research at the national level. The only obvious way around this limitation is more intra-national research, digging into the differences in the same cultural values and practices among different communities within countries. Data produced from this work would then facilitate research into the relationship between subnational culture and self-disclosure.

The study presented here used data from Facebook in 2009, but many of the characteristics of Facebook's privacy model at that time no longer apply. Facebook now defaults to much more privacy-aware settings, requiring users to opt out of those settings if they wish to self-disclose to the public. In addition, public awareness of online privacy issues has evolved since 2009. Therefore, cultural analysis of contemporary Facebook data would provide a complementary perspective to our work by exploring to what degree cultural factors act symmetrically on the decisions to disclose less or to disclose more. Facebook has changed the assignment of user ID numbers in ways that would complicate drawing another uniform sample, but quasi-random generation of user names (rather than ID numbers)—perhaps even using linguistic characteristics of user names to stratify the sample by user's language—could provide a viable alternative to the uniform sampling used here.

Finally, more detailed data not accessible to the public could help foster empirical work to test more of Goffman's theory about self-presentation. A notable component of this theory is that individuals present themselves differently to different audiences. The Facebook "friend groups" feature allows users to customize which friends can see certain information, and

Table 6
Variables included in top ten models by AIC, with signs of coefficients.

Model	AIC	Assertiveness		Future orientation		Gender egalitarianism		Humane orientation		In-group collectivism		Institutional collectivism		Performance orientation		Power distance		Uncertainty avoidance		UN HDI	GDP	F:M school ratio		Internet usage	Trust	Urbanization	Population 65+
		P	V	P	V	P	V	P	V	P	V	P	V	P	V	P	V	P	V			P	V				
1	253.53	+		+	+	−	+			−	+	−	−					+		−		+			+	+	+
2	254.43			+	+	−	+			−	+	−	−	−				+		−		+		(+)	+	+	+
3	254.52	(+)		+	+	−	+			−	+	−	−		(−)			+		−		+			+	+	+
4	254.64			+	+	−	+			+	−	−		+		−		+		−		+			+		+
5	254.88	+		+	+	−	+	−		+	−	−	−				(+)	+		−		+			+	+	+
6	254.93	+	(+)	+	+	−	+			−	+	−	−					+		−		+			+	+	+
7	255.06	+		+	+	−	+			−	+	−	−	(+)				+		−		+			+	+	+
8	255.09			+	+	−	+			−	+	−	−					+		−		+			+	+	+
9	255.15	(+)		+	+	−	+			−	+	−	−	−				+		−		+		(+)	+	+	+
10	255.18	+		+	+	−	+			−	+	−	−		(−)			+		−	(−)	+			+	+	+

Signs of coefficients are indicated; statistically significant signs (p < 0.05) in bold, insignificant in parenthesis.
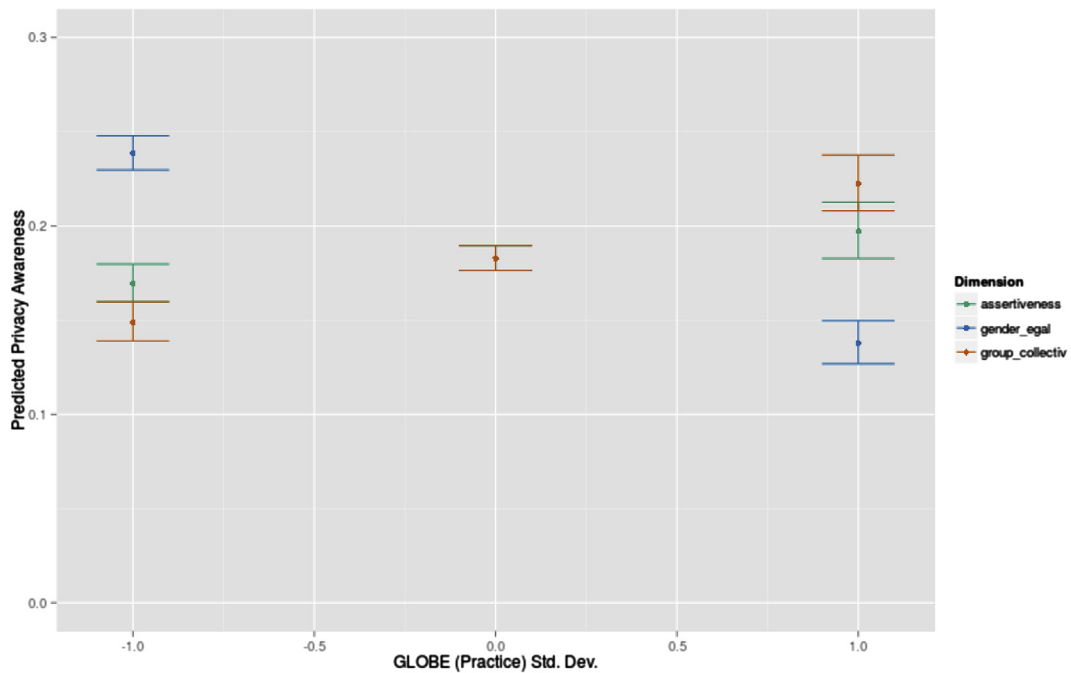
Each GLOBE practice variable is varied in isolation, holding all other dependent variables at mean value (zero). Bars indicate 95% confidence interval.

Fig. 2. Coefficients of GLOBE variables included in top-rated regression, with confidence interval.

thus would seem to provide opportunities to test this aspect of Goffman's theory. However, this data is not part of our dataset—indeed, it may not be available to the public—so we do not explicitly test Goffman's theory here.

7. Conclusion

Our findings here have implications for researchers', policymakers', and practitioners' understanding of privacy behaviors in multicultural contexts. For researchers, this knowledge is important as we extend the cultural theories of Triandis to our contemporary, more globalized, "always on" world and as we seek to understand the privacy calculus (Dinev and Hart, 2006) that people apply therein. Triandis' view of culture as an evolutionary response to resources and needs suggests that we can better understand cultural influence by more accurately pinpointing the factors that make certain kinds of self-disclosure look more or less desirable to certain cultures. By supporting the notion that people's self-disclosure decisions, the privacy calculus that they apply, is reflective of culture, these results can motivate more narrowly targeted scholarly inquiry into the specific cultural factors that relate to privacy, most notably gender egalitarianism and assertiveness.

Understanding these cultural relationships is important for governments and others in a position to regulate online privacy, for two reasons. First, better understanding cultural roots of their own citizens' expectations of privacy through comparison with those expectations in other countries will help guide policy (Cullen, 2009). The result is privacy regulation that more specifically reflects the national-level preferences of users. Second, international cooperation is fostered by mutual understanding of both self-disclosure attitudes and behaviors. This has been a motivating factor for much of the line of business research on privacy and culture; Bellman et al. (2004, p. 313) noted, "International differences in culture and national regulation create challenges for global information management strategies, sometimes limiting or even preventing the free flow of valuable information." Although harmonization of privacy regulation may sometimes be the best solution, flexibility and adaptability to different cultures' values should always be taken into consideration. Research into privacy and culture can play an essential role.

This knowledge is also important for providers of online social networking services such as Facebook. If attributes of national cultures relate to privacy behaviors, then services can be designed to better meet privacy needs for a user's inferred national culture. Certain lower-risk privacy settings could be made either opt-in or opt-out depending on national-level privacy expectations. Or, more specifically, users in those cultures with higher assertiveness or lower humane orientation might desire a default privacy setting that allow them to mitigate specific risks associated with those cultural attributes.

Understanding the relationship between privacy behavior and culture helps social networking sites more accurately target their design.

Finally, individual users benefit from this knowledge because better understanding the cultural factors associated with their own privacy behavior can help them make better self-disclosure decisions. For example, many of our hypotheses deal with perceptions of threats. Users in cultures that tend to emphasize specific kinds of threat can reflect on whether their threat perception corresponds to reality or not, helping them better navigate self-disclosure tradeoffs or motivating them to learn to more effectively use fine-grained privacy options.

Concern for privacy has exploded in recent years, but this new level of concern reflects much older issues of the individual's relationship to society. Privacy and self-disclosure only have meaning within a societal context, so understanding the influence of culture is essential to responding to this newfound concern. Research that moves forward our understanding of the relationship between culture and self-disclosure behavior can help policymakers, corporations, and individual social network users make more informed decisions, leading to a higher quality of life for users.

Acknowledgements

References

Abokhodair, N., 2015. Transmigrant Saudi Arabian youth and social media: privacy, intimacy and freedom of expression. In: Proceedings of the 33rd Annual ACM Conference Extended Abstracts on Human Factors in Computing Systems. ACM, New York, NY, USA, pp. 187–190. http://dx.doi.org/10.1145/2702613.2702629.

Acquisti, A., Gross, R., 2006. Imagined communities: awareness, information sharing, and privacy on the Facebook. Priv. Enhancing Technol. 36–58. Springer. Retrieved from. http://link.springer.com/chapter/10.1007/11957454_3.

Altman, I., 1975. The Environment and Social Behavior: Privacy, Personal Space, Territory, and Crowding.

Altman, I., 1977. Privacy regulation: culturally universal or culturally specific? J. Soc. Issues 33 (3), 66–84.

Bellman, S., Johnson, Eric, Kobrin, Stephen, Lohse, Gerald, Johnson, E., Kobrin, S., Lohse, G., 2004. International differences in information privacy concerns: a global survey of consumers. Inf. Soc. 20 (5), 313–324.

Bernard, H.R., Killworth, P., Kronenfeld, D., Sailer, L., 1984. The problem of informant accuracy: the validity of retrospective data. Annu. Rev. Anthropol. 495–517.

Bernstein, M.S., Bakshy, E., Burke, M., Karrer, B., 2013. Quantifying the invisible audience in social networks. In: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. ACM, pp. 21–30. Retrieved from. http://dl.acm.org/citation.cfm?id=2470658.

Birnbaum, M.G., 2008. Taking Goffman on a Tour of Facebook: College Students and the Presentation of Self in a Mediated Digital Environment. ProQuest.

Brewer, P., Venaik, S., 2010. GLOBE practices and values: a case of diminishing marginal utility? J. Int. Bus. Stud. 41 (8), 1316–1324.

Calhoun, K.J., Teng, J.T.C., Cheon, M.J., 2002. Impact of national culture on information technology usage behaviour: an exploratory study of decision making in Korea and the USA. Behav. Inf. Technol. 21 (4), 293–302. http://dx.doi.org/10.1080/0144929021000013491.

Cho, H., Rivera-Sánchez, M., Lim, S.S., 2009. A multinational study on online privacy: global concerns and local responses. New Media Soc. 11 (3), 395–416. http://dx.doi.org/10.1177/1461444808101618.

Cullen, R., 2009. Culture, identity and information privacy in the age of digital government. Online Inf. Rev. 33 (3), 405–421.

Den Hartog, D.N., 2004. Assertiveness. Cult. Leadersh. Organ. Globe Study 62, 395–436.

Dinev, T., Hart, P., 2006. An extended privacy calculus model for e-commerce transactions. Inf. Syst. Res. 17 (1), 61–80.

Dombrowski, S.C., LeMasney, J.W., Ahia, C.E., Dickson, S.A., 2004. Protecting children from online sexual predators: technological, psychoeducational, and legal considerations. Prof. Psychol. Res. Pract. 35 (1), 65–73. http://dx.doi.org/10.1037/0735-7028.35.1.65.

Egan, G., 1970. Encounter: Group Processes for Interpersonal Growth. Brooks/Cole Publishing Company, Belmont, CA.

Facebook, 2015. Company Info.

Gjoka, M., Kurant, M., Butts, C.T., Markopoulou, A., 2009. A Walk in Facebook: Uniform Sampling of Users in Online Social Networks arXiv Preprint arXiv: 0906.0060. Retrieved from. http://arxiv.org/abs/0906.0060.

Gjoka, M., Kurant, M., Butts, C.T., Markopoulou, A., 2011. Practical recommendations on crawling online social networks. IEEE J. Sel. Areas Commun. 29 (9), 1872–1892.

Goffman, E., 1959. The Presentation of Self in Everyday Life. Anchor Doubleday Books, Garden City, NY.

Goffman, E., 1963. Stigma: Notes on the Management of Spoiled Identity. Simon & Schuster, New York.

Harzing, A.-W., 2016. Cross-cultural Resources. n.d.. Retrieved July 29, 2015, from. http://www.harzing.com/weblinks7.htm.

Hofstede, G., 1984. Culture's Consequences: International Differences in Work-related Values, second ed., vol. 5. Sage Publications, Beverly Hills, CA.

Hofstede, G., 2003. What is culture? A reply to Baskerville. Account. Organ. Soc. 28 (7), 811–813.

Hofstede, G., 2006. What did GLOBE really measure? Researchers' minds versus respondents' minds. J. Int. Bus. Stud. 37 (6), 882–896.

Hofstede, G.H., Hofstede, G.J., Minkov, M., 2010. Cultures and Organizations: Software of the Mind : Intercultural Cooperation and its Importance for Survival. McGraw-Hill, New York.

House, R.J., Hanges, P.J., Javidan, M., Dorfman, P.W., Gupta, V., 2004. Culture, Leadership, and Organizations: the GLOBE Study of 62 Societies. Sage Publications, Thousand Oaks, Calif.

Inglehart, R., Welzel, C., 2010. Changing mass priorities: the link between modernization and democracy. Perspect. Polit. 8 (02), 551–567. http://dx.doi.org/10.1017/S1537592710001258.

James, G., Witten, D., Hastie, T., Tibshirani, R., 2013. An Introduction to Statistical Learning. Springer. Retrieved from. http://link.springer.com/content/pdf/10.1007/978-1-4614-7138-7.pdf.

Javidan, M., House, R.J., Dorfman, P.W., Hanges, P.J., De Luque, M.S., 2006. Conceptualizing and measuring cultures and their consequences: a comparative review of GLOBE's and Hofstede's approaches. J. Int. Bus. Stud. 37 (6), 897–914.

Joinson, A.N., 2008. Looking at, looking up or keeping up with people?: motives and use of facebook. In: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. ACM, pp. 1027–1036. Retrieved from. http://dl.acm.org/citation.cfm?id=1357213.

Kabasakal, H., Bodur, M., 2004. Humane orientation in societies, organizations, and leader attributes. Cult. Leadersh. Organ. Globe Study 62, 564–601.

Krasnova, H., Veltri, N.F., 2010. Privacy calculus on social networking sites: explorative evidence from Germany and USA. In: System Sciences (HICSS), 2010 43rd Hawaii International Conference on. IEEE, pp. 1–10.

Maseland, R., van Hoorn, A., 2009. Explaining the negative correlation between values and practices: a note on the Hofstede–GLOBE debate. J. Int. Bus. Stud. 40 (3), 527–532.
Maseland, R., van Hoorn, A., 2010. Values and marginal preferences in international business. J. Int. Bus. Stud. 41 (8), 1325–1329.
McSweeney, B., 2002a. Hofstede's model of national cultural differences and their consequences: a triumph of faith – a failure of analysis. Hum. Relat. 55 (1), 89–118. http://dx.doi.org/10.1177/0018726702551004.
McSweeney, B., 2002b. The essentials of scholarship: a reply to Geert Hofstede. Hum. Relat. 55 (11), 1363–1372.
Mehdizadeh, S., 2010. Self-presentation 2.0: Narcissism and self-esteem on facebook. Cyberpsychol. Behav. Soc. Netw. 13 (4), 357–364.
Milberg, S.J., Burke, S.J., Smith, H.J., Kallman, E.A., 1995. Values, personal information privacy, and regulatory approaches. Commun. ACM 38 (12), 65–74. http://dx.doi.org/10.1145/219663.219683.
Milberg, S.J., Smith, H.J., Burke, S.J., 2000. Information privacy: corporate management and national regulation. Organ. Sci. 11 (1), 35–57.
Mitchell, K.J., Ybarra, M.L., Korchmaros, J.D., 2014. Sexual harassment among adolescents of different sexual orientations and gender identities. Child Abuse Negl. 38 (2), 280–295. http://dx.doi.org/10.1016/j.chiabu.2013.09.008.
Moore, B., 1984. Privacy: Studies in Social and Cultural History. ME Sharpe, Armonk, NY.
Nadkarni, A., Hofmann, S.G., 2012. Why do people use Facebook? Personal. Individ. Differ. 52 (3), 243–249. http://dx.doi.org/10.1016/j.paid.2011.11.007.
Palen, L., Dourish, P., 2003. Unpacking privacy for a networked world. In: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. ACM, pp. 129–136. Retrieved from. http://dl.acm.org/citation.cfm?id=642635.
Powell, J., 1969. Why Am I Afraid to Tell You Who I Am? Argus Communications, Niles, IL.
President's Council on Advisors on Science and Technology, 2014. Big Data and Privacy: a Technological Perspective. Retrieved from. https://www.whitehouse.gov/sites/default/files/microsites/ostp/PCAST/pcast_big_data_and_privacy_-_may_2014.pdf.
Reynolds, B., Venkatanathan, J., Gonçalves, J., Kostakos, V., 2011. Sharing ephemeral information in online social networks: privacy perceptions and behaviours. In: Campos, P., Graham, N., Jorge, J., Nunes, N., Palanque, P., Winckler, M. (Eds.), Human-computer Interaction – INTERACT 2011. Springer Berlin, Heidelberg, pp. 204–215. Retrieved from. http://link.springer.com/chapter/10.1007/978-3-642-23765-2_14.
Rosenfeld, L.B., 1979. Self-disclosure avoidance: why I am afraid to tell you who I am. Commun. Monogr. 46 (1), 63–74.
Savage, C., 2015, January 11. F.B.I. Is Broadening Surveillance Role. New York Times, p. A10. Report Shows.
Schwartz, S.H., 1992. Universals in the content and structure of values: theoretical advances and empirical tests in 20 countries. Adv. Exp. Soc. Psychol. 25 (1), 1–65.
Spiro, E.S., Almquist, Z.W., Butts, C.T., 2016. The persistence of division: geography, institutions, and online friendship ties. Socius Sociol. Res. Dyn. World 2, 2378023116634340.
The UN General Assembly Adopts Anti-spy Resolution, 2013, December 18. BBC News. Retrieved from. http://www.bbc.com/news/world-latin-america-25441408.
Triandis, H.C., 1994. Culture and Social Behavior. McGraw-Hill, New York.
Trompenaars, F., Hampden-Turner, C., 1998. Riding the Waves of Culture. McGraw-Hill, New York. Retrieved from. http://ocan.yasar.edu.tr/wp-content/uploads/2013/09/Riding-the-waves_Part-1.pdf.
Tufekci, Z., 2008. Can you see me now? Audience and disclosure regulation in online social network sites. Bull. Sci. Technol. Soc. 28 (1), 20–36.
Tung, R.L., Verbeke, A., 2010. Beyond Hofstede and GLOBE: improving the quality of cross-cultural research. J. Int. Bus. Stud. 41 (8), 1259–1274.
Tylor, E.B., 1958. Primitive Culture (1871). JP Putnam's, New York.
United Nations Development Programme, 2014. Human Development Index Trends, 1980-2013. Retrieved from. http://hdr.undp.org/en/content/table-2-human-development-index-trends-1980-2013.
Venaik, S., Brewer, P., 2010. Avoiding uncertainty in Hofstede and GLOBE. J. Int. Bus. Stud. 41 (8), 1294–1315.
Vilkus, S., 2009. Humane Orientation. Tallinn University. Retrieved from. http://www.tlu.ee/~sirvir/IKM/Leadership%20Dimensions/humane_orientation.html.
Westin, A.F., 1967. Privacy and Freedom. Atheneum, New York.
World Bank, 2015. Data. Retrieved July 29, 2015, from. http://data.worldbank.org/.
World Values Study Group, 1994. World Values Survey, 1981-1984 and 1990-1993. Inter-university Consortium for Political and Social Research.
World Values Survey, 2015, April 18. Findings and Insights. World Values Survey. Retrieved from. http://www.worldvaluessurvey.org/WVSContents.jsp.