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PERCEIVED RISKS AND BENEFITS OF ONLINE SELF-DISCLOSURE: AFFECTED BY CULTURE? A META-ANALYSIS OF CULTURAL DIFFERENCES AS MODERATORS OF PRIVACY CALCULUS IN PERSON-TO-CROWD SETTINGS

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Research

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Abstract

Disclosing personal information to a crowd, with all its risks and benefits, is almost ubiquitous in Web 2.0. Drawing on privacy calculus (PC) theory, we investigate whether cultural differences moderate the effect of risk and benefit assessment on online self-disclosure (OSD) in person-to-crowd settings. Empirically, our study relies on a (statistical) meta-analysis of 38 studies.

Our findings support the assumptions regarding the effect of privacy calculus on OSD: benefits and trust beliefs increase OSD, privacy concerns and risk beliefs reduce it. Furthermore, the positive effect of the former PC aspects on OSD is larger than the negative effect of the latter.

The effects of benefits and risk beliefs on OSD are moderated by cultural differences, unlike those of privacy concerns and trust beliefs. Uncertainty avoidance and indulgence reduce the positive effect of benefits on OSD, masculinity and power distance enhance it. The negative effect of risk beliefs is reduced by uncertainty avoidance and long-term orientation, but aggravated by indulgence. In addition to advocating increased cultural awareness for online service providers, our findings support PC as a useful concept in OSD research, but suggest that the most prominent cultural dimensions might not be the most relevant ones in intercultural OSD research.

Keywords: Online self-disclosure, Privacy calculus, Culture, Meta-analysis.

1 Introduction

Using the Internet increasingly requires people to disclose personal information (PI) such as for establishing legitimacy (e.g., Galegher et al., 1998) and authentication (e.g., Joinson et al., 2008, Metzger, 2006) or for receiving personalized services such as personalized recommender systems (e.g., Adomavicius and Tuzhilin, 2005) or advertising (e.g., Bauer and Lasinger, 2014). Moreover, many types of content that users generate on the Web involve online self-disclosure (OSD), including textual information about thoughts and beliefs (e.g., posts and comments), but also visual information such as photos or videos (Chen and Sharma, 2013b, Liu et al., 2013). Trepte and Reinecke (2010) note that "there virtually is no Web 2.0 without self-disclosure in virtual public spaces" and online social networks such as Facebook or Google+ build their business model entirely on what users' share with the crowd (Bauer et al., 2012, Krasnova et al., 2012).

Still, while many Internet users appear to provide PI abundantly, others seem to be reluctant to disclose such information publicly (Metzger, 2004, Aljukhadar et al., 2010). A major barrier to OSD is that disclosing too much PI may have problematic implications (Acquisti et al., 2015, Al-Saggaf and Nielsen, 2014, Kisekka et al., 2013). Threats can be both financial and social, including fraud, identity theft, privacy and security attacks, or cyber-stalking (Al-Saggaf and Nielsen, 2014, Kisekka et al., 2013, Mukherjee et al., 2013, Nosko et al., 2010). The digital availability of PI facilitates copying, transmitting, and integrating such information easily, which allows for the creation of detailed user profiles (Acquisti et al., 2015, Malhotra et al., 2004). This implies a serious threat to privacy if in the wrong hands (Malhotra et al., 2004).

Consequently, people attempt "to manage the level of privacy that they wish to maintain" (Shibchurn and Xiang Bin, 2014). One prominent concept relating to this "privacy management" is social exchange theory. Basically, it postulates that users' willingness to disclose PI is based on their assessments of the costs, risks, and benefits (Andrade et al., 2002, Premazzi et al., 2010). A more specialized concept, the privacy calculus theory (Dinev and Hart, 2006), puts forth four determinants of a person's OSD: anticipation of benefits, privacy concerns, trusting beliefs, and risk beliefs. The privacy calculus perspective could repeatedly be sustained as a suitable framework for studying privacy-sensitive OSD behaviour (Krasnova et al., 2012). However, there is also evidence that OSD differs across cultures/countries (e.g., Ardi and Maison, 2014, Krasnova and Veltri, 2010, Veltri et al., 2011, Gupta et al., 2010, Posey et al., 2010, Treiblmaier and Chong, 2011). This leads to the question whether culture might moderate the effect of the privacy calculus aspects on OSD, and, indeed, Krasnova et al. (2012) could demonstrate such an effect. In particular, they investigated the individualism dimension as well as the uncertainty avoidance dimension by Hofstede (2001). However, existing studies typically rely on a comparison of two countries, which offers valuable insights but does not provide a comprehensive picture.

This paper proposes a more comprehensive perspective by compiling the results of 38 studies on OSD in person-to-crowd settings in 13 countries, analysing the role of cultural differences (operationalised by the six cultural dimensions of Hofstede (Hofstede, 2001, Hofstede et al., 2010)) for the impact of the privacy calculus predictors on OSD. Methodologically, we rely on statistical meta-analysis, "the methodology of choice to synthesize existing empirical evidence and draw science-based recommendations for practice" (Aguinis et al., 2010).

The remainder of the present paper is structured as follows: Section 2 provides the conceptual background of our research. First, we outline the concept of OSD and the privacy calculus theory, which is the perspective that we adopt for investigating the predictors of OSD. Second, we present related work that discusses the role of culture in OSD. Section 3 motivates our research hypotheses on the influence of privacy calculus on OSD as well as the moderating effects of the cultural dimensions by Hofstede (Hofstede, 2001, Hofstede et al., 2010). Details on our meta-analytical approach are outlined in Section 4. Section 5 presents the results of our meta-analysis for both, the mean effect of privacy calculus predictors on OSD and the meta-regressions for culture as a moderator for the four privacy calculus

predictors on OSD. The final section discusses the results and highlights their implications for research and practical use.

2 Conceptual Background

2.1 The Concept of Self-disclosure and Privacy Calculus Theory

Self-disclosure is theoretically rooted in social psychology and is defined as what a person communicates to another person about him- or herself (Cozby, 1973), which includes thoughts, feelings, and experiences (Derlega, 1993) (for a detailed discussion cf. Ignatius and Kokkonen, 2007). In dyads, self-disclosure contributes to mutual understanding (Laurenceau et al., 1998). In groups, it may enhance trust between group members and strengthen group identity (Galegher et al., 1998). Popular online social networks such as Facebook or Google+ build their business model entirely on users' OSD, i.e., what they share with the (partly unknown) crowd (Bauer et al., 2012, Krasnova et al., 2012).

While many Internet users appear to share PI abundantly, others are reluctant to disclose such information publicly (Metzger, 2004, Aljukhadar et al., 2010). One of the major barriers to OSD is users' privacy concern (Bulgurcu et al., 2010, Malhotra et al., 2004, Xu et al., 2008). Recognizing the importance of privacy considerations, Dinev and Hart (2006) advocate the so-called privacy calculus theory, which posits that people weight four beliefs (i.e., anticipation of benefits, privacy concerns, trusting beliefs, and risk beliefs) against each other to mange their OSD.

Anticipation of benefits refers to a user's perception that disclosing PI will lead to benefits such as enjoyment, social acceptance, or (financial) reward, which were found to motivate users to disclose PI (e.g., Krasnova et al., 2012). Privacy concerns reflect "concerns about possible loss of privacy as a result of information disclosure" (Xu et al., 2008), for instance, caused by "opportunistic behavior related to the personal information submitted over the Internet" (Dinev and Hart, 2006); such concerns were found to prevent users from disclosing PI (e.g., Chang and Heo, 2014). Trusting beliefs reflect a user's confidence that PI disclosed "will be handled competently, reliably, and safely" (Dinev and Hart, 2006), which was shown to further OSD (McKnight et al., 2002). Risk beliefs reflect the perception and awareness about "opportunistic behavior related to the disclosure of personal information" (Dinev and Hart, 2006), which hinders OSD.

Previous research provides rich evidence that the privacy calculus perspective is a well-fitting framework to study privacy-sensitive OSD (Krasnova et al., 2012). Hence, we integrate anticipation of benefits, privacy concerns, trusting beliefs, and risk beliefs as key predictors of OSD into our research model, to investigate whether cultural differences moderate the their effects on OSD.

2.2 The Role of Culture

Despite rather scant theoretical foundations, cultural aspects were repeatedly reported to moderate the influence of the privacy calculus factors on OSD. For example, Veltri et al. (2011) report differences in privacy perceptions and OSD patterns of Facebook users from the United States and Morocco. Likewise, Lowry et al. (2011) examine the effects of cultural dimensions on information privacy concerns. Zhao and Jiang (2011) show differences in the visual self-presentation of social network users from China and the United States. Krasnova and Veltri (2011) reveal distinct variability in the cognitive patterns of American and German social network users. The main explanation concerning the moderating effects of culture on the relationship between the privacy calculus factors and OSD goes back to the idea that culture is rooted in values, beliefs and traditions, and thus defines the way users interpret their experiences and respond to them (Hofstede, 2001).

While numerous studies research on cultural differences in various domains, the framework by Hofstede (2001) has received the widest acceptance across various scientific disciplines. Hofstede

(2001) describes culture in terms of the following major dimensions: power distance, individualism, masculinity, uncertainty avoidance, and long-term orientation; a sixth dimension was added later: indulgence (Hofstede et al., 2010). According to this framework, the combination of these six dimensions explains the differences in beliefs and behaviour across national cultures.

Comparing social network users from the United States and Germany, Krasnova et al. (2012) adopted the individualism dimension as well as the uncertainty avoidance dimension in their research model and could show moderating effects of these two Hofstede dimensions on the relation of the privacy calculus concepts and OSD. While these two Hofstede dimensions are frequently referred to as the "skeleton framework" for further theories of cultural differentiation (e.g., Greenfield, 2000, Krasnova et al., 2012), research on cultural differences in OSD should not ignore the other dimensions.

For instance, one assumption could possibly be derived from Lowry et al. (2011) for power distance, where they posit that individuals from cultures high in power distance would "have fewer concerns about sensitive information being distributed" and cite empirical results in favor of a negative effect on privacy concern, which might be extended to a corresponding positive effect on OSD. For long-term orientation Krasnova and Veltri (2010) draw upon an argument by Acquisti (e.g., 2004) that people strive for instant gratification, leading them to disclose despite potential later disadvantages. According to Krasnova and Veltri (2010) this effect is stronger for persons with low long-term orientation. By contrast, both conjectures and cited findings regarding an effect of individualism on OSD are utterly contradictory (e.g., Lowry et al., 2011, Miltgen and Peyrat-Guillard, 2014). The same applies to masculinity and uncertainty avoidance (Lowry et al., 2011). Indulgence has not even been investigated as a potential determinant of OSD yet to our knowledge.

3 Research Hypotheses

3.1 The Influence of Privacy Calculus on Online Self-disclosure

According to privacy calculus theory (Dinev and Hart, 2006), anticipation of benefits and trusting beliefs facilitate OSD, while privacy concerns and risk beliefs hinder OSD.

Users can achieve significant benefits from disclosing their PI. For example, self-enhancement (Boyd, 2007), emotional support and networking value (Koroleva et al., 2011), and enjoyment (Krasnova et al., 2012) are among the identified positive outcomes.

Trust is considered as a necessary condition for disclosing information (Zimmer et al., 2010). Dinev and Hart (2006) argue that trust can overrule the negative impact of risk believes; accordingly, when the level of trust exceeds the level of perceived risk, the trustor will engage in a risky behaviour (Gefen et al., 2003).

H1: Anticipation of benefits has a positive effect on OSD.

H2: Trusting beliefs have a positive effect on OSD.

Confronted with negative media coverage about cases of privacy abuse, people are increasingly concerned about the safety of what they disclose on the Internet (Bulgurcu et al., 2010). Such privacy concerns were found to be one of the strongest predictors of privacy-related behaviour (Dinev and Hart, 2006, Malhotra et al., 2004, Xu et al., 2008), which is also reflected in inhibiting people from disclosing PI on the Internet (Krasnova et al., 2012). In addition, as individuals are motivated to minimize negative outcomes, people will not disclose their PI when their perception of the risk involved is high (Dinev and Hart, 2006).

H3: Privacy concerns have a negative effect on OSD.

H4: Risk beliefs have a negative effect on OSD.

3.2 The Moderating Influence of Culture on the Privacy Calculus Factors

Regarding a moderating effect of the Hofstede dimensions on the association between privacy calculus aspects and OSD, the study by Krasnova et al. (2012) offers a foundation for positing such an effect for individualism and uncertainty avoidance. Specifically, they argue that individualism is related to an inclination towards hedonism, augmenting the effect of benefits on OSD.

H5: Individualism augments the positive effect of benefits on OSD.

Likewise, they posit that members of individualistic cultures are less reluctant to translate trust into OSD, mostly arguing with different perspectives on trust (a calculative approach in individualistic cultures as opposed to an emphasis on predictability and benevolence and a clear distinction between in- and out-group). This assumption is supported in another study, too (Yum and Hara, 2005), where the authors mention the higher importance of face-saving in collectivistic cultures as a potential explanation for the balking effect of collectivism on the translation of trust into OSD.

H6: Individualism augments the positive effect of trust on OSD.

The second Hofstede dimension mentioned in the study by Krasnova et al. (2012) as interacting with a privacy calculus element is uncertainty avoidance, which they find to augment the negative effect of privacy concern on OSD :

H7: Uncertainty avoidance augments the negative effect of privacy concerns on OSD.

Some conjectures can be made on theoretical grounds regarding a moderating effect of power distance, too. Phillips et al. (2009) argue that status distance makes people wary of self-disclosure, potentially heightening their concern with privacy and emphasizing the importance of trust. Translating this reasoning from status distance to its significance in social relations would imply that the effect of both privacy concern and trust on OSD (in opposite directions) is augmented by a higher degree of power distance:

H8: Power distance augments the negative effect of privacy concerns on OSD.

H9: Power distance augments the positive effect of trust on OSD.

Finally, based on the abovementioned reasoning by Krasnova and Veltri (2011) regarding an effect of long-term orientation on OSD and the underlying argument by Acquisti (e.g., 2004), the striving for immediate benefits which leads to higher OSD should also make the effect of benefits on OSD stronger in case of low long-term orientation. By the same reasoning, long-term orientation might increase the mitigating effects of privacy concern and/or risk assessment on OSD.

H10: Long-term orientation reduces the positive effect of benefits on OSD.

H11: Long-term orientation augments the negative effects of privacy concern on OSD.

H12: Long-term orientation augments the negative effect of risk assessment on OSD.

4 Method

Our empirical work relies on a (statistical[1]) meta-analysis, including 38 studies on OSD. Put simply, a meta-analysis "statistically combines results of prior quantitative studies" (Booth et al., 2012). It consists of a systematic aggregation of the findings of previous quantitative empirical studies regarding the extent to which one or several predictors affect a dependent variable, based on so-called effect sizes (e.g., Glass, 1976).

Figure 1 shows our research process, which is based on the advices in the information systems literature including Kitchenham et al. (2010), Okoli and Schabram (2010), Brereton et al. (2007), Bandara et al. (2015); details on our specific process are given in the subsections below.

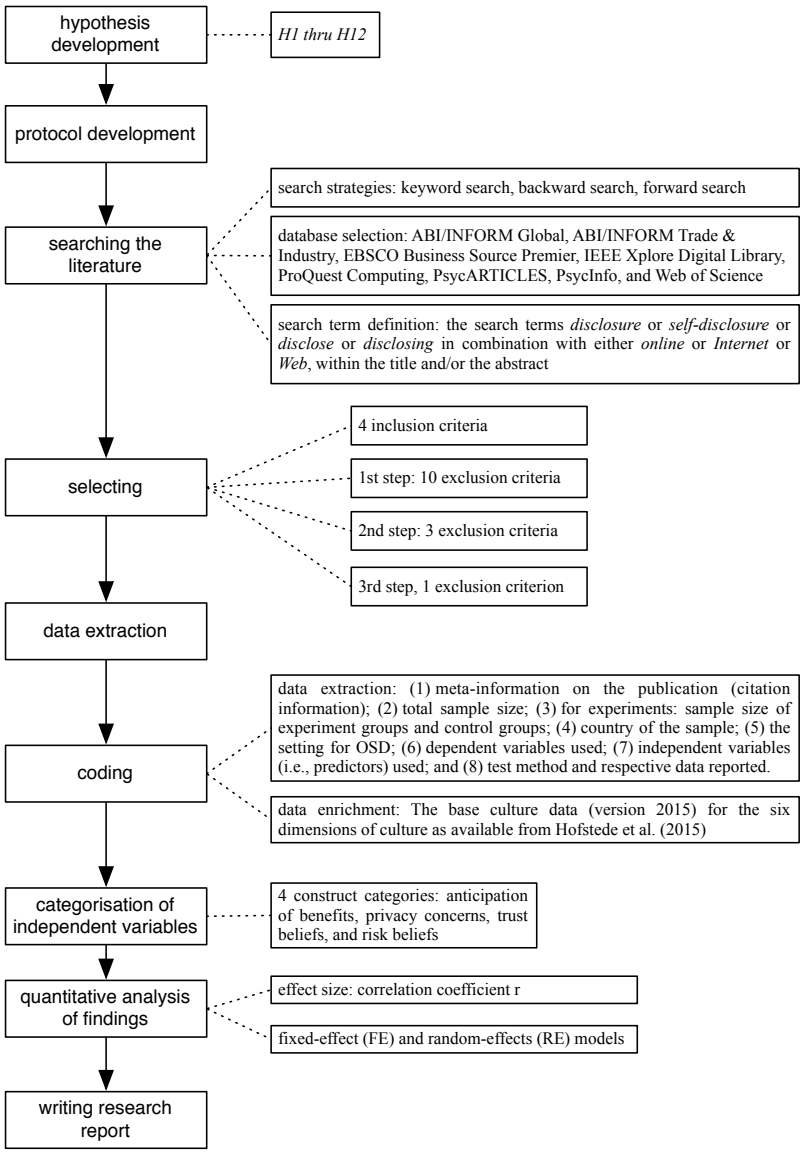

Figure 1. Our research process

[1] Sometimes literature reviews are also presented under the label of "meta-analysis".

4.1 Literature Search

A multistep procedure was used to identify eligible studies, including a keyword-based search, a backward search, and a forward search strategy (see, e.g., Okoli and Schabram, 2010, Bandara et al., 2015, Schryen, 2015). First, we searched for journal articles, conference contributions, and theses in the bibliographic search engines and databases ABI/INFORM Global, ABI/INFORM Trade & Industry, EBSCO Business Source Premier, IEEE Xplore Digital Library, ProQuest Computing, PsycARTICLES, PsycInfo, and Web of Science using the search terms *disclosure* or *self-disclosure* or *disclose* or *disclosing* in combination with either *online* or *Internet* or *Web*, within the title and/or the abstract. The choice of bibliographic search engines and databases consists of the commonly used ones among information systems and psychology scholars (e.g., Bandara et al., 2015, Schryen, 2015). Second, we examined the reference lists of the identified publications for relevant sources (i.e., backwards search) (Levy and Ellis, 2006). Third, we conducted a forward search (Levy and Ellis, 2006), searching for publications that the already identified publications were cited in (i.e., using the 'cited in' functionality of the bibliographic search engines and databases).

4.2 Criteria for Inclusion and Exclusion

Based on a review of the full text of a publication, we identified relevant studies for our meta-analysis in three steps. In the first step, we *included* a study if it fulfilled all of the following criteria: (1) It investigated OSD as a result of one or more influencing factors; (2) self-disclosure was analysed in an online setting; (3) it was an empirical study; and (4) the authors provided adequate data for the computation of effect sizes.

We *excluded* studies that met at least one of the following criteria: (1) It investigated solely the effects of disclosure on other factors or outcomes; (2) it investigated the disclosure of data on health issues; (3) in the field of dating; (4) religion; or (5) sexual orientation; (6) it analysed privacy disclosures[2]; or (7) corporate disclosure; (8) the study covered disclosure merely in offline settings; (9) it was a qualitative study; (10) data necessary for computing effect sizes were not available in the publication.

In the second step, we decided to *include* only studies that analysed settings where an individual discloses PI to a crowd. Accordingly we *excluded* studies investigating disclosure to a company (e.g., Chou et al., 2009) or to a single individual (e.g., Choi et al., 2012) or to a research team (e.g., Joinson, 2001) from our sample. This decision is based on several arguments. OSD is contextual (Frye and Dornisch, 2010, Solano and Dunnam, 1985), and the person-to-crowd setting has some features which set it apart from other settings, specifically the presentation of a "virtual self" via a profile, "a representation of their [selves] (and, often, of their own social networks) – to others to peruse, with the intention of contacting or being contacted by others" (Gross and Acquisti, 2005). This emphasis on the notion and presentation of (virtual) self is of particular relevance for establishing a link to cultural differences, too (Kim and Papacharissi, 2003, Markus and Kitayama, 1991, Zhao and Jiang, 2011).

In addition, when OSD takes place in a in a research context (person-to-researcher disclosure) (e.g., Joinson, 2001), there is comparatively little reason for participants to be concerned about their privacy (Frye and Dornisch, 2010), and privacy calculus theory would not apply in such settings to the same extent. Furthermore, OSD changes as group size increases, leading to more intimate information being disclosed in dyads as contrasted with larger groups (Solano and Dunnam, 1985, Taylor et al., 1979), even more so in the context of love relationships which appear in several studies on OSD (e.g., Dindia et al., 1997, Zhao et al., 2012a, Laurenceau et al., 1998).

[2] As part of privacy policies, notes, and statements, such disclosures are frequently referred to as "privacy disclosures" in legal literature.

Finally, we *excluded* all studies with a culturally mixed or undefined sample, as assigning a specific value on the Hofstede dimension(s) to each sample was a prerequisite for our meta-study.

Frequently, one publication involved more than one study and/or one study more than one predictor variable. The final data set therefore consists of 148 effect sizes of predictors on OSD. The included sources are marked with an asterisk (*) in the reference list.

4.3 Coding from publications

We coded inductively from raw data (the studies). For each study, we obtained the following information: (1) meta-information on the publication (citation information); (2) total sample size; (3) for experiments: sample size of experiment groups and control groups; (4) country of the sample; (5) the setting for OSD; (6) dependent variables used; (7) independent variables (i.e., predictors) used; and (8) test method and respective data reported.

Furthermore, we used the base culture data (version 2015) for the six dimensions of culture as available from Hofstede et al. (2015) to assign for each country the respective values of the Hofstede dimensions to our data set.

4.4 Categorization of Independent Variables

The studies in the sample analysed a wide scope of different independent variables, which we had to categorize to use them for our research model. Accordingly, we assigned the independent variables to one of the four concepts of the privacy calculus model (i.e., anticipation of benefits. privacy concerns, trusting beliefs, and risk) where appropriate (*no* multiple assignments). For an overview see Table 1.

Table 1. Categorization of independent variables

construct category	definition	example variables
anticipation of benefits	Perceived benefits reflecting that personal information submitted to Internet websites are beneficial for the user.	tangible reward incentive compensation net disclosure benefits offer expected perceived customization benefits
privacy concerns	Concerns about opportunistic behavior related to the personal information submitted over the Internet.	privacy concern collection concerns posting concerns
trust beliefs	Trust beliefs reflecting confidence that personal information submitted to Internet websites will be handled competently, reliably, and safely.	trusting beliefs trust in the Internet technology trusting belief: reliability
risk beliefs	Perceived risk of opportunistic behavior related to the disclosure of personal information.	information about social media privacy risks awareness of possible future unauthorized results awareness of consequences

4.5 Analysis

Since the approach of our study is a meta-analytical one, the "variable of interest" is not the value of a parameter such as the degree of OSD (i.e., whether a person discloses much or little). Rather, it is the mean effect of different predictors belonging to one of the four privacy calculus categories on OSD (i.e., to what extent anticipation of benefits, trust beliefs, privacy concerns, and risk beliefs increase or reduce OSD). The effect size chosen here is the correlation coefficient r. Effect sizes not reported as r

coefficients, were converted into r (e.g., Lipsey and Wilson, 2001). For converting beta and/or path coefficients from regressions or path models, we followed the recommendation by Peterson and Brown (2005).

Using a standard procedure, the r coefficients were converted into Fisher z values and weighted with the sample size of the respective study for the calculations (e.g., Borenstein et al., 2009). According to a widespread categorization by Cohen (1988) – an r coefficient of .1 represents a weak effect, r = .3 a medium and r ≥ .5 a strong effect, although in many fields of organizational research, lower thresholds are apparently more appropriate (Bosco et al., 2015). Analyses were conducted with the metafor package (Viechtbauer, 2010) for R (R Core Team, 2015). To examine the moderating effects of the cultural dimensions, the Hofstede variables were first z-standardized since a potential change in correlation with OSD per unit would be impractically small with that unit being one point on the Hofstede scales ranging from almost 0 to slightly over 100.

We report the results of both fixed-effect (FE) and random-effects (RE) models, with a Hunter-Schmidt estimator (Hunter and Schmidt, 1990) used for the RE models. Put simply, FE models examine (merely) the pool of studies included in the analysis, with the interpretation of results consequently restricted to these studies. By contrast, RE models regard the chosen pool of studies as just a (random) sample of an underlying population of findings, making the results more generalizable. For a more thorough discussion of these two models, see, e.g., Hedges and Vevea (1998).

5 Results

For the privacy calculus predictors on OSD, we stated in Section 3 that anticipation of benefits and trust beliefs should promote OSD, while privacy concerns and risk beliefs reduce it. Table 2 presents the mean correlations based on a meta-regression with category as predictor (no intercept), including both FE and RE results and heterogeneity indices (see e.g., Higgins and Thompson (2002)).

Regarding the effects of the privacy calculus predictors (Table 2), it is apparent that anticipation of benefits and trust beliefs are indeed positively associated with OSD (positive mean correlation), while privacy concerns and risk beliefs are negatively associated with OSD (negative mean correlation), lending support to hypotheses 1 thru 4. Furthermore, the results suggest that the positive effects of anticipation of benefits and trust beliefs are on a comparable level and that they are larger than the negative effects of privacy concern and risk beliefs.

Table 2. Mean effect of privacy calculus predictors on OSD

predictor category	n	k	**r(FE)**	lb	ub	sig	Q	**r(RE)**	lb	ub	sig	H
anticipation of benefits	22181	29	**.27**	.25	.28	**	429.7**	**.30**	.24	.36	**	3.8
trust beliefs	23647	39	**.19**	.18	.21	**	397.0**	**.19**	.14	.24	**	3.2
privacy concerns	24409	37	**-.05**	-.07	-.04	**	631.3**	**-.06**	-.12	-.00	*	4.1
risk beliefs	24823	43	**-.10**	-.11	-.09	**	770.8**	**-.10**	-.16	-.04	**	4.2

n: total sample size; k: number of studies; r(FE/RE) mean correlation in fixed/random effects model; lb/ub: lower and upper bound of the 95% confidence interval for r; Q: Q statistic; H: heterogeneity measure (relative excess in Q over its degrees of freedom; cf. Higgins and Thompson (2002)).

* p < .05; ** p < .01

As mentioned above in Section 4.5, the Hofstede variables were z-standardized before conducting the moderator analyses. For the following meta-regressions, the units underlying the b coefficients are therefore standard deviations of the Hofstede dimensions, which range from 7.4 points for masculinity to 30.7 points for individualism (see Table 3).

Table 3. Descriptive statistics for the Hofstede dimensions in the meta-analysis sample

cultural dimensions	min	max	mean	s.d.
power distance	35	104	50.5	17.6
individualism	17	91	71.2	30.7
uncertainty avoidance	8	94	45.8	14.3
masculinity	19	70	60.8	7.4
long-term orientation	26	100	43.3	25.3
indulgence	17	69	56.0	18.9

Tables 4 thru 7 show the results of meta-regressions for each predictor category and the respective effects of the Hofstede dimensions on r. The intercept (icpt) column represents the mean correlation with OSD for the mean value of the respective Hofstede dimension as presented in Table 3. The b column indicates the change in the correlation of the specified OSD predictor with OSD if the respective Hofstede dimension increases by one standard deviation. For instance, according to the RE model, the estimated effect of anticipation of benefits on OSD (expressed as a correlation coefficient) would be 0.24 (0.29 – 0.05) for a country with a power distance value of 33 (i.e., one standard deviation below the mean) and 0.34 (0.29 + 0.05) for a country with a power distance value of 68 (i.e., one standard deviation above the mean).

For those privacy calculus elements augmenting OSD, i.e., anticipation of benefits and trust beliefs, four hypotheses posit a moderating effect of culture, i.e., individualism augments the positive effects of anticipation of benefits (H5) and trust beliefs (H6), power distance augments (H9), and long-term orientation reduces (H10) the positive effect of anticipation of trust and benefits on OSD, respectively.

For the privacy calculus elements that reduce OSD, four hypotheses were formulated, too: Uncertainty avoidance (H7), power distance (H8), and long-term orientation (H11) augment the negative effect of privacy concerns on OSD. For long-term orientation, this effect extends to risk assessment, too (H12).

Table 4. Meta-regressions for culture as a moderator of benefits on OSD

anticipation of benefits (29)	icpt.	**b(FE)**	lb	ub	sig	icpt.	**b(RE)**	lb	ub	sig	R^2(%)
power distance	.27	**.049**	.032	.066	**	.29	**.050**	-.009	.109	†	8.4
individualism	.26	**-.046**	-.062	-.029	**	.28	**-.042**	-.098	.015		7.7
uncert. avoid.	.27	**-.083**	-.103	-.064	**	.30	**-.082**	-.142	-.021	**	17.2
masculinity	.27	**.065**	.046	.084	**	.31	**.069**	.008	.130	*	11.7
long-term ori.	.27	**.044**	.029	.059	**	.29	**.038**	-.014	.091		7.9
indulgence	.27	**-.065**	-.083	-.046	**	.29	**-.058**	-.120	.003	†	11.9

lb/ub: b 95% confidence interval lower/upper bound; ** p < .01; * p < .05; † p < .10

No support was found for H5 or H10; neither individualism nor long-term orientation significantly moderate the role of anticipated benefits on OSD according to the more generalizable RE models. For the FE models which merely apply to the studies involved, the sign of the effect is contrary to the hypotheses. By contrast, results suggest that uncertainty avoidance reduces and masculinity increases the positive effect of anticipation of benefits on OSD. The same applies to indulgence and power distance, respectively, with apparently weaker and merely marginally significant effects in the RE models.

Table 5. Meta-regressions for culture as a moderator of trust on OSD

trust beliefs (39)	icpt.	**b(FE)**	lb	ub	sig	icpt.	**b(RE)**	lb	ub	sig	R^2(%)
power distance	.19	**.026**	.010	.042	**	.19	**.023**	-.031	.076		2.7
individualism	.19	**-.005**	-.020	.011		.19	**-.006**	-.057	.045		0.1
uncert. avoid.	.19	**.008**	-.003	.019		.19	**-.005**	-.050	.040		0.5
masculinity	.19	**.013**	-.004	.030		.20	**.018**	-.040	.076		0.6
long-term ori.	.19	**.017**	.000	.034	*	.19	**.002**	-.052	.055		1.1
indulgence	.19	**-.005**	-.019	.009		.19	**-.007**	-.053	.039		0.2

lb/ub: b 95% confidence interval lower/upper bound; ** p < .01; * p < .05; † p < .10

Hence, the role of trust for OSD is not significantly moderated by any of the cultural dimensions in the RE models (and merely in two cases for the more liberal FE models). This amounts to merely partial support for H9 (FE model only) and no support at all for H6. In addition, judging by the number of findings and mean moderator effect sizes, the effect of anticipation of benefits on OSD is more amenable to cultural influences than those of trust beliefs.

Table 6. Meta-regressions for culture as a moderator of privacy concerns on OSD

privacy concerns (37)	icpt.	**b(FE)**	lb	ub	sig	icpt.	**b(RE)**	lb	ub	sig	R^2(%)
power distance	-.05	**.024**	.009	.038	**	-.06	**.038**	-.022	.097		1.7
individualism	-.05	**-.039**	-.055	-.023	**	-.05	**-.044**	-.109	.021		3.8
uncert. avoid.	-.05	**.005**	-.006	.016		-.06	**.018**	-.039	.075		0.1
masculinity	-.05	**-.024**	-.035	-.012	**	-.06	**-.036**	-.088	.017		2.8
long-term ori.	-.05	**.000**	-.016	.016		-.06	**.010**	-.057	.078		0
indulgence	-.04	**-.043**	-.061	-.025	**	-.05	**-.044**	-.116	.028		3.7

lb/ub: b 95% confidence interval lower/upper bound; ** p < .01; * p < .05; † p < .10

Likewise, the data do not support H7, H8 or H11, and again, the RE models provide no evidence for any moderating effect of culture on the role of privacy concerns on OSD. Uncertainty avoidance (H7) and long-term orientation (H11) do not even appear as moderators in the FE models, and the effect of power distance is contrary to the prediction.

Table 7. Meta-regressions for culture as a moderator of risk beliefs on OSD

risk beliefs (43)	icpt.	**b(FE)**	lb	ub	sig	icpt.	**b(RE)**	lb	ub	sig	R^2(%)
power distance	-.09	**.054**	.040	.069	**	-.10	**.033**	-.026	.091		7.1
individualism	-.09	**-.060**	-.076	-.044	**	-.09	**-.037**	-.098	.025		7.3
uncert. avoid.	-.11	**.069**	.055	.083	**	-.10	**.054**	-.010	.116	†	12.7
masculinity	-.10	**.007**	-.005	.019		-.10	**.008**	-.050	.065		0.2
long-term ori.	-.09	**.083**	.067	.100	**	-.09	**.056**	-.006	.118	†	13.4
indulgence	-.09	**-.093**	-.107	-.078	**	-.10	**-.061**	-.114	-.007	*	21.9

lb/ub: b 95% confidence interval lower/upper bound; ** p < .01; * p < .05; † p < .10

Finally, the only cultural dimension acting as a moderator on the risk beliefs – OSD relation is indulgence, which augments the negative effect of risk in both the RE and FE models. An inverse effect of comparable magnitude can be observed for uncertainty avoidance and long-term orientation, but this is

merely marginally significant in the RE model, and the effect of long-term orientation runs contrary to H12.

6 Discussion

When interpreting the results of our meta-study, several caveats and limitations should be considered. Some of them relate to Hofstede's concept of cultural dimensions. Mainly, these "methodological concerns include the generalizability of his findings, subjectivity, cultural boundedness of the researcher and the method of data collection" (Chiang, 2005). Furthermore, our findings being based on a meta-analysis, each of the four OSD predictors related to the privacy calculus model is operationalized in quite different ways and examined with different samples. This is also reflected in the considerable (albeit not excessive, (cf. Higgins and Thompson, 2002)) heterogeneity values. Likewise, there are clearly numerous other moderators of the effect of privacy calculus predictors on OSD, which are not considered here. These might interact with culture, too, and provide explanations for findings that appear somewhat counterintuitive (see below).

These caveats notwithstanding, our meta-analysis offers some potentially interesting insights. From a theoretical standpoint, the meta-analytic results support the privacy calculus perspective for on OSD, indicating that the applicability of this theory to the person-to-crowd context stands on solid ground. Besides being in the predicted direction (i.e., positive for anticipation of benefits and trust beliefs and negative for privacy concerns and risk beliefs), the results suggest that the effect of anticipation of benefits on OSD is largest, followed by trust beliefs. By contrast, the mitigating effects of risk beliefs and privacy concerns on OSD are considerably smaller.

From a practical standpoint, this result may be interesting for online service providers that build their business models on OSD and are, thus, eager to find ways to drive users' OSD. Privacy concerns – the least important OSD predictor – is arguably the privacy calculus element most innate to the user and least influenceable by online service providers. By contrast, all other elements may be manipulated to a certain extent, with the most influential one being "extrinsic" benefits. These can be flexibly tailored by online service providers and have an immediate effect, as opposed to requiring a slow and consistent buildup and maintenance such as trust beliefs or its "counterpart" risk beliefs.

Still, the meta-analytic results challenge the universal nature of privacy calculus for OSD, as cultural differences moderate the effects of the privacy calculus predictors on OSD considerably. Thereby a similar discrepancy can be observed for the moderating effect of culture as for the privacy calculus predictors on OSD. Taking the total effect of all cultural dimensions (as expressed by the R^2 values), it is apparent that the moderating effect of culture is several times larger for anticipation of benefits and risk beliefs (mean R^2 of about 0.1) compared to privacy concerns and trust beliefs with a mean R^2 of merely 0.02 and 0.01, respectively. So, while trust beliefs and privacy concerns appear to be "culturally universal" in their effect on OSD, the effectiveness of anticipation of benefits and risk beliefs for users' OSD appears to depend on culture to a considerable extent.

Turning to the detailed results for those privacy calculus predictors that are considerably moderated in their association with OSD (i.e., anticipation of benefits and risk beliefs), uncertainty avoidance and indulgence are the most influential cultural dimensions. That uncertainty avoidance mitigates the effect of anticipation of benefits on OSD is not surprising. By contrast, the observed effect on risk beliefs appears counterintuitive: higher uncertainty avoidance reduces the negative effect of risk beliefs on OSD. Besides other unidentified moderators potentially being at work here, an admittedly speculative explanation amounts to a kind of substitution effect. Cultures high in uncertainty avoidance are inclined towards establishing strict rules and guidelines, which also extends to the online environment (Hwang and Lee, 2012). With such safeguards against misuse of PI provided via OSD, risk beliefs might lose their relevance as an OSD barrier.

Likewise, the results for the moderating effect of indulgence are somewhat puzzling. This applies both to the finding that indulgence reduces the incentive to disclose of anticipation of benefits and to its

moderating effect on privacy concerns and risk beliefs, where a higher degree of indulgence exacerbates the effects of both privacy concerns and risk beliefs. It might have to do with indulgence not merely representing gratification of desires, but also "control over one's life" (Smith, 2011). An emphasis on this latter aspect might explain how indulgence amplifies the negative effect of privacy concerns and risk beliefs and reduces the effect of anticipation of benefits, but this is a speculative conjecture.

The lack of clear theoretical explanations for some of our findings underlines the need for further theoretical development in intercultural OSD research. Still, our meta-analytic results generally support the idea of privacy calculus as a useful concept for explaining OSD, which also applies to an intercultural research context; although it appears that future work should include more cultural dimensions than the two most prominent ones in extant research, i.e., individualism/collectivism and uncertainty avoidance. Especially the first one seems quite far from being the most important culture-related moderator of OSD according to our results.

From a practical perspective, besides the abovementioned dominance of OSD-enhancing elements of privacy calculus (i.e., anticipation benefits and trust beliefs) compared to OSD-reducing elements, our findings also emphasize that online service providers might benefit from targeting users differently depending on their cultural background. From an OSD perspective, a culturally universal "Internet user" seems to be a delusion.

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