CALCULATING WITH DIFFERENT GOALS IN MIND – THE MODERATING ROLE OF THE REGULATORY FOCUS IN THE PRIVACY CALCULUS

Hendrik Brakemeier
TU Darmstadt, brakemeier@is.tu-darmstadt.de

Thomas Widjaja
Universität Passau, thomas.widjaja@uni-passau.de

Peter Buxmann
TU Darmstadt, buxmann@is.tu-darmstadt.de

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CALCULATING WITH DIFFERENT GOALS IN MIND – THE MODERATING ROLE OF THE REGULATORY FOCUS IN THE PRIVACY CALCULUS

Research

Brakemeier, Hendrik, TU Darmstadt, Darmstadt, Germany, brakemeier@is.tu-darmstadt.de
Widjaja, Thomas, Universität Passau, Passau, Germany, thomas.widjaja@uni-passau.de
Buxmann, Peter, TU Darmstadt, Darmstadt, Germany, buxmann@is.tu-darmstadt.de

Abstract

Online social networks gather, store, process, and monetize personal information of their users. It is therefore important to understand in which situations people are willing to disclose private information. The most commonly applied theoretical framework to this class of problems in IS research is the privacy calculus. However, empirical research on the privacy calculus found strongly varying effect sizes of benefits and risks of information disclosure on the intention to disclose personal information. In this research we propose a theoretical explanation for this phenomenon. Based on regulatory focus theory and an experimental study with 59 participants, we develop theoretical arguments, that (1) the perception of high privacy risks evokes a state of heightened vigilance (prevention-focus) and (2) this heightened vigilance in turn changes the weightings of the benefits and risks in the privacy calculus. Results from a second survey-based study with 208 participants provide first insights that perceptions of high risks of information disclosure are correlated with a prevention focus, which in turn increases the negative effect of perceived risks and reduces the positive effect of perceived benefits on an individual’s intention to disclose personal information.

Keywords: Privacy Calculus, Information Disclosure, Regulatory Focus, Prevention-Focus, Promotion-Focus.

1 Introduction

Online social networks (Kane et al., 2014) are a prominent example for a class of information systems that gather, store and process personal information of their users (Gerlach et al., 2015; Krasnova et al., 2012) but also other social media systems are regularly inherently dependent on the disclosure of certain private information by their users. Therefore, users have to accept, that data about them is collected and processed by these systems if they want to use the respective information system. This poses challenges to the providers of such services, because they do not only have to serve customer needs in terms of functionality, but also have to consider privacy concerns of their users.

It is therefore important to understand in which situations people accept intrusions of their privacy and when they don’t. A widely used approach to this question is privacy calculus theory, which posits, that, when faced with the decision between giving up and maintaining their privacy, individuals undertake trade-offs, whether a certain loss of privacy is acceptable for the benefits gained in exchange (Lauffer and Wolfe, 1977; Li, 2012). Various studies have therefore investigated, how the perceived risks of information disclosure as well as the perceived benefits of information disclosure influence the behavioral intention to do so (e.g., Kehr et al., 2013; Keith et al., 2013; Keith et al., 2012; Li et al., 2014; Li et al., 2010; Xu et al., 2009). However, the findings are to some extent inconsistent. While the negative effect of the perceived risks and the positive impact of the perceived benefits on the inten-
tion to disclose personal information are uncontroversial, studies find very different effect sizes for these two relationships. For example Xu et al. (2009), Li et al. (2014) and Shibchurn and Yan (2015) found benefits to have stronger effects than privacy risk in studies about location-based websites and a personal health record system. On the other hand for example Keith et al. (2013) and Kehr et al. (2015) report the perceived risks as the more influential antecedent. Accordingly it seems, that an individual’s sensitivity to benefits and risks differs across studies and contexts. However, a consistent theoretical explanation for this phenomenon is currently missing. This is for example problematic for providers that aim to maximize the adoption of information systems that rely on the collection of user data, because it remains unclear in which situations privacy risks are really hindering the dissemination and when they merely play a subordinate role.

A possible theoretical explanation of the above described inconsistent findings in prior research is regulatory focus theory (Higgins, 1997). This theory proposes, that people can take different mental states, called promotion- and prevention-focus. Promotion focused individuals are in a state of eagerness, which can lead to a “risky bias” (Higgins, 1998, p. 30). A prevention focus in contrast is associated with heightened vigilance (Higgins et al., 1997). This mental state determines people’s sensitivity to negative and positive decision outcomes (Higgins, 1998) and is dependent on situational cues, one of which seems to be the risk people are exposed to (Herzenstein et al., 2007; Lee and Aaker, 2004) and may therefore change across disclosure contexts. We therefore integrate the regulatory focus in the privacy calculus theory in order to dissolve the controversy described above and investigate the following research questions:

RQ 1: Does the regulatory focus determine the weighting of perceived benefits and risks in the decision whether to disclose personal information?

RQ 2: Is the regulatory focus dependent on the degree of perceived privacy risks in a disclosure situation and does it therefore systematically vary between different disclosure situations?

We contribute to the elucidation of these questions by extending the privacy calculus theory (Laufer and Wolfe, 1977), by a regulatory focus perspective. Based on the integration of these theories and an experimental study we develop theoretical arguments, that when people merely perceive a low level of privacy risks, they take a state of incautiousness (named promotion-focus) and base their decisions on the expected benefits of their behavior whereas the perceived risks play a minor role. Only if a certain level of perceived privacy risk is exceeded, people take a state of heightened vigilance (named prevention-focus), which makes them especially sensitive to perceived risks and reduces the influence of perceived benefits. Thus, effect sizes of the perceived risk of information disclosure should be larger in studies investigating relatively invasive information systems, which are associated with high-perceived risks, compared to less invasive ones. The opposite should hold for the effects sizes of the perceived benefits of information disclosure. We provide empirical evidence for these propositions based on a survey among 208 participants and thereby show, that perceptions of high risks of information disclosure evoke a prevention focus, which increases the effect of perceived risks and reduces the effect of perceived benefits in the privacy calculus.

The remainder of this paper is structured as follows: We first outline the theoretical background for our research in two steps: First, we delineate the privacy calculus and depict potential improvements to the theory. Based on literature on regulatory focus theory and a first experimental study, we then develop arguments, that the level of the perceived privacy risks determines the weighting of benefits and risks in the privacy calculus. Afterwards we describe the second survey-based study we conducted to empirically test our deduced hypotheses and present our findings. We then discuss our findings before the paper closes with a depiction of limitations of our study and propositions for future research efforts.
2 Theoretical Background

2.1 The Role of Risks and Benefits in the Privacy Calculus

A considerable amount of literature in the field of IS privacy research is dedicated to the question, under which circumstances people are willing to have their personal information gathered and processed by privacy invasive information systems. In this context, privacy “[…] refers to the claims of individuals that data about themselves should generally not be available to other individuals and organizations […]” (Clarke, 1999, p. 60). However, keeping data private from other individuals and organizations is not always feasible when using modern information systems like online social networks (Gross and Acquisti, 2005). This forces people to either protect their privacy and forego the benefits of using the information system or giving up their privacy and taking advantage of the benefits provided by the information system (e.g., relationship building, Krasnova et al., 2010). This trade-off between benefits and risks of information disclosure is reflected in the privacy calculus theory (Laufer and Wolfe, 1977; Li, 2012). The central constructs of privacy calculus theory are the perceived risks of information disclosure and the perceived benefits of information disclosure. These are weighted against each other and form a behavioral intention to disclose personal information (Li, 2012; Smith et al., 2011). Thus, during the decision whether to disclose personal information or not, people basically evaluate a utility function like the following (e.g., Awad and Krishnan, 2006):

\[ \text{Utility} = \text{Benefit} - \text{Cost} \]

This formula illustrates, that the underlying assumption of privacy calculus theory is, that “… consumers perform the risk–benefit analysis in the privacy calculus and decide whether to disclose information based on the net outcomes” (Li, 2012, p. 475). This net outcome utility is positive (a net gain) if the benefits outweigh the risks and negative (a net loss) if the risk outweighs the benefits. The resulting behavior is then depending on whether the net utility of disclosing personal information is positive or negative, that is to say, a net gain or a net loss. If the act of disclosure promises a net gain, privacy is given up to realize the utility, while maintaining one’s privacy is the alternative of choice when the net utility of disclosing would be negative and thus a net loss.

However, this view of balancing out benefits and risk is problematic, because it implies, that risk-minimization and benefit-maximization are equivalent types of goals for consumers, both increasing net outcome utility. However, while some empirical findings based on the privacy calculus theory have found the effects of the perceived benefits of information disclosure to be stronger than those of the perceived risks (e.g., Li et al., 2014; Xu et al., 2009), others report that the perceived risks are the stronger determinant (e.g., Kehr et al., 2015; Keith et al., 2013) of the disclosure intention and therefore the assumed outcome utility. Some studies even find that risks sometimes have no impact on the disclosure intention and therefore do not contribute to the net outcome utility of disclosing information at all (e.g., Krasnova et al., 2012). It therefore seems, that risks and benefits exhibit more complex relationships to the assumed net outcome utility than the simple trade-off reflected by the privacy calculus.

A theory “reach[ing] beyond the classic conception of outcome utility” (Florack et al., 2013, p. 128) is regulatory focus theory proposed by Higgins (1997). Research from this area has found that people do not simply act according to one goal of maximizing their net utility and do not simply decide based on whether the consequence is a net loss (net utility < 0) or a net gain (net utility > 0). Regulatory focus theory rather “suggests the need to consider a fuller picture regarding gains and losses; specifically, to examine people’s reactions not only to gains (the presence of a positive outcome) and losses (the presence of a negative outcome) but also to nongains (the absence of a positive outcome) and nonlosses (the absence of a negative outcome)” (Idson et al., 2000, p. 253). In this regard, the theory distinguishes promotion- and prevention goals. While promotion goals are concerned with maximizing the presence of positive outcomes (gains) and minimizing their absence (nongains), prevention goals are concerned with maximizing the absence of negative outcomes (nonlosses) and minimizing their presence (losses) (Chernev, 2004).
The privacy calculus is inherently characterized by incorporating these two types of goals in a conflicting manner. As depicted above, the two exogenous constructs in the privacy calculus are the perceived benefits of information disclosure and the perceived risks of information disclosure. Each of these two attributes of a disclosure decision can be mapped to one of the two types of goals introduced by the regulatory focus theory, because “a trade-off between attributes is essentially a trade-off between the goals that these attributes help attain” (Chitturi et al., 2007, p. 703). In the context of online social networks the benefits typically comprise relationship building, self presentation and enjoyment (Krasnova et al., 2010) and in a broader sense this dimension could also include monetary incentives, personalized service (Li, 2012), time savings or social adjustment (Tam et al., 2002). The presence or absence of such benefits determines, in how far the disclosure of personal information is associated with a gain or a nongain. Therefore, the perceived benefits of information disclosure help attain promotion goals. The perceived risk of information disclosure on the other hand determines in how far prevention goals are met. Again, prevention goals are concerned with the presence or absence of losses. The perceived risk of information disclosure is defined as “the expectation of losses associated with the disclosure of personal information” (Heng et al., 2011, p. 804). Thus, when no risks are perceived, there is no expectation of losses associated with disclosing personal information and prevention goals are perfectly met. When, however, there is risk involved, an individual expects a potential loss due to the disclosure of its information and prevention goals might be compromised.

2.2 Regulatory Focus as a Moderator in the Privacy Calculus

2.2.1 Moving Beyond Net Utility

In the previous section, we outlined that in the privacy calculus the perceived benefits of information disclosure help attain promotion goals, while the perceived risks of information disclosure determine in how far prevention goals are met. The question resulting from this distinction is in how far the degrees of achievement of prevention- and promotion goals influence an individual’s decision. Regulatory Focus Theory postulates, that the weighting of each of these goals is determined by what is termed a person’s regulatory orientation (Higgins, 2000). In accordance with the distinction between prevention and promotion goals, a person’s regulatory orientation can differ between a prevention- and a promotion focus (Higgins, 1998). Promotion focused individuals are in a state of eagerness and concerned with the presence and absence of positive outcomes or gains (Higgins et al., 1997). This state of eagerness induces “advancement tactics [and] an inclination to approach accomplishments” (Higgins, 1998, p. 30), which can lead to a “risky bias” (Higgins, 1998, p. 30). A prevention focus in contrast is concerned with the absence and presence of negative outcomes (Higgins et al., 1997). It is associated with a state of vigilance (Higgins, 1998), which induces precautionary tactics (Higgins, 1998) and the desire to behave “in a safe and secure manner” (Chitturi et al., 2008, p. 50). These two regulatory orientations determine in how far people are sensitive for promotion and prevention goals. While prevention focused individuals act in favor of their prevention goals and thus try to minimize losses, promotion focused individuals try to fulfill promotion goals by maximizing gains (Chitturi et al., 2008). As risk minimization represents a prevention goal and benefit maximization a promotion goal, promotion focused individuals should therefore be more sensitive to the benefits in the privacy calculus, while prevention-focused individuals are more sensitive to the perceived risks.

However, the term “sensitive to”, which is usually used in reasoning based on regulatory focus (e.g., Florack et al., 2009; Yoon et al., 2012; Zhou and Tuan Pham, 2004) can be interpreted in two ways. These are visualized in Figure 1. First, a prevention-focused individual could perceive the same situation as riskier and the benefits as lower compared to a promotion focused individual. In this case, the regulatory focus would moderate the effect of an objective risk or benefit, which is the risk or benefit one would reasonably assume given all relevant information and the capacity to process all this information, on the perceived risk or benefit, which is the subjective evaluation of a risk or benefit resulting from inferences based on heuristics, assumptions and personal beliefs (alternative A in Figure 1). A second possibility is that prevention and promotion-focused persons perceive equal degrees of risks.
and benefits, but those in a prevention focus are more sensitive to the risks and less sensitive to the benefits in their decision-making process. In this case, the regulatory focus would moderate the effect of the perceived risk and benefit on a person’s behavioral intention (alternative B in Figure 1) and might therefore explain the different effect sizes found in research based on the privacy calculus. To rule out possibility A, we conducted an experimental study, which is presented in the following section.

**Figure 1.** Two possible moderating roles of the regulatory focus.

### 2.2.2 Experimental Study: Perceptions of Benefits and Risks under Prevention and Promotion Focus

The goal of this experiment was to test, whether perceptions of benefits and risks differ between prevention- and promotion-focused individuals (alternative A in Figure 1). Fifty-nine students of a German university took part in the experiment, which was carried out online via a browser. Participants were from different courses and requested to participate via E-Mail. The majority (73%) were male and the age ranged from 19 to 29 with the median being 21. All participants were randomly assigned to one of two groups, which underwent a manipulation of regulatory focus evoking either a prevention- (29 participants) or a promotion-focus (30 participants). To manipulate the regulatory focus, we used an established approach that has successfully been applied in prior studies (e.g., Pham and Avnet, 2004; Trudel et al., 2012). Participants in the primed-prevention-focus condition were asked to think about their past duties, obligations and responsibilities for two minutes and then list two of them. They were then asked to think about their current duties, obligations and responsibilities for two minutes and again list two of them. Participants in the primed-promotion-focus condition underwent the same procedure, but were asked to think of and write down their past and current hopes, aspirations and dreams instead of duties, obligations and responsibilities.

Both groups then read the description of a privacy-invasive fitness wristband and answered a questionnaire comprising established measures for the perceived risks of information disclosure (Heng et al., 2011, see Appendix) and the perceived benefits of information disclosure. The benefits were measured by the participant’s utilitarian and hedonic attitudes towards the wristband (Voss et al., 2003). This measure asked the participants to rate the product (1-7) on bipolar scales for the utilitarian (effective/ineffective, helpful/unhelpful, functional/not functional, necessary/unnecessary and practical/impractical) and hedonic attitudes (not fun/fun, dull/exciting, not delightful/delightful, not thrilling/thrilling, enjoyable/unenjoyable) (Voss et al., 2003). We also included a measure for the situation specific regulatory focus proposed by Pham and Avnet (2004) as manipulation check. This measure consists of three differentials on which participants had to indicate in how far they lean towards either prevention-oriented or promotion-oriented behaviors and can be found in Appendix 1.

A multivariate analysis of variance (MANOVA) was used to analyze the data. The results indicate a successful manipulation of the regulatory focus ($m_{prev} = 2.425$, $m_{prom} = 3.200$, $F = 5.682$, $p = 0.020$). However, no significant difference could be observed for the perceived risk of information disclosure ($m_{prev} = 5.319$, $m_{prom} = 5.200$, $F = 0.092$, $p = 0.736$) and either of the dimensions of benefits ($m_{prev} = 4.503$, $m_{prom} = 4.307$, $F = 0.355$, $p = 0.554$ [hedonic]; $m_{prev} = 4.731$, $m_{prom} = 4.387$, $F = 1.116$, $p = 0.285$ [utilitarian]). These results are in conflict with a moderation of the effect of an objective risk or benefit on the perceived risk or benefit (alternative A in Figure 1). We therefore opted for alternative B, when integrating the regulatory focus into the privacy calculus theory: The regulatory focus moder-
ates the effect of the perceived risk and benefits respectively on a person’s behavioral intentions. The privacy calculus (H1 & H2) and the moderating effect of the regulatory focus (H3 & H4) are reflected by the following four hypotheses, which are also depicted in Figure 2.

![Research Model](image)

**Figure 2.** Research Model.

**H1:** The perceived risk of information disclosure has a negative impact on the behavioral intention to disclose personal information.

**H2:** The perceived benefits of information disclosure have a positive impact on the behavioral intention to disclose personal information.

**H3:** The negative impact of the perceived risk of information disclosure on the behavioral intention to disclose personal information is stronger for prevention-focused compared to promotion focused individuals.

**H4:** The positive impact of the perceived benefits of information disclosure on the behavioral intention to disclose personal information is stronger for promotion-focused compared to prevention-focused individuals.

### 2.3 Sources of Regulatory Focus

Now that we hypothesized the moderating effect of the regulatory focus in the privacy calculus (RQ 1) we turn to our second research question, which asked whether the regulatory focus depends on the degree of perceived privacy risks in a disclosure situation. Research on regulatory focus suggests three distinct sources of a person’s regulatory focus: The chronic regulatory focus, a contextual priming before a decision task and the decision task itself (Florack et al., 2005). The chronic regulatory focus can be understood as a general baseline of regulatory focus or a general tendency of a person to be more or less prevention- or promotion focused (Higgins, 1997; Higgins, 1998), determined for example during childhood socialization (Higgins and Silberman, 1998). The second source of regulatory focus, contextual priming, is widely used in research to put people in a state of either prevention or promotion focus and then investigate subsequent behavior (e.g., Chernev, 2004; Idson et al., 2000; Lee and Aaker, 2004; Wang and Lee, 2006). The most popular procedure in this context is asking people to think about either their duties and obligations (prevention) or their hopes and aspirations (promotion) and then write about them or list some of them (Higgins et al., 1994; Liberman et al., 2001; Pham and Avnet, 2009; Sacchi and Stanca, 2014; Wang and Lee, 2006; Yoon et al., 2012) as we have done in our experimental study. Lastly, the regulatory focus can be influenced by a decision task itself (Lee and Aaker, 2004; Zhou and Tuan Pham, 2004). The regulatory focus induced by contextual priming or a decision task is usually referred to as situational or situation specific regulatory focus. Please note that, although being named differently, the chronic and the situation specific regulatory focus both refer to the same concept. The priming procedures described above simply let people deviate from their chronic regulatory focus towards being either more prevention or promotion focused than they chronically are for a certain period of time. Thus, the situation specific regulatory focus incorporates the chronic regulatory focus altered by the priming. If a decision context includes such a priming, it is therefore the situation specific regulatory focus that influences the decision.
Both, contextual priming and priming by a decision task itself are based on the general proposition of Higgins (1997), that people take a prevention focus when they see themselves in situations involving potential losses and a promotion focus when a situation makes potential gains salient (Seibt and Förster, 2004). More specifically and in line with Lee and Aaker (2004, p. 206) we argue, that individuals are more likely to focus on negative outcomes when perceived risk is high and on positive outcomes when perceived risk is low [...]. Specifically, when individuals feel vulnerable, heightened vigilance associated with prevention focus should result” (Lee and Aaker, 2004, p. 206). Although not directly testing the relationship between regulatory focus and perceived risks and a different context, findings from Lee and Aaker (2004) substantiate this assumption. In two experiments a manipulation of the perceived risks of getting a sunburn (1st experiment) and mononucleosis (2nd experiment) had the same effect, as one would have expected for a manipulation of the regulatory focus. Another study by Herzenstein et al. (2007) found that making risks explicit (vs. implicit) can rule out the effect of a primed promotion-focus. This could also be explained by high risks evoking a prevention focus and thereby nullifying the promotion-priming. We therefore argue that an individuals’ situational regulatory focus is endogenously dependent on the perceived risks of information disclosure.

H5: A high (low) perceived risk of information disclosure is associated with a more prevention-oriented (promotion-oriented) situation specific regulatory focus.

All hypothesized relationships are detailed in Figure 2.

3 Main Study

To empirically test the hypothesized relationships, we conducted an online survey study in which participants had the chance to win an Amazon Gift Card worth 50€ when they granted us access to certain information from their Facebook profile via a Facebook Web App we implemented for this study. By choosing a Facebook Web App as context for our study, we follow the call by Smith et al. (2011) to move away from hypothetical scenarios (e.g., Gerlach et al., 2015; Hann et al., 2007; Malhotra et al., 2004; Pan and Zinkhan, 2006) to more realistic settings incorporating actual data disclosure in IS privacy research. Albeit we are able to monitor actual behavior with this App we use the behavioral intention to disclose information as dependent variable, because the intention is the direct outcome of the privacy calculus according to privacy calculus theory (Li, 2012). However, we assume that the realistic context of our study enables us to obtain very reliable measurements for the participant’s behavioral intentions. Furthermore, disclosure of Facebook profiles was chosen because we expected a high variance in the amount of information different people store on their Facebook profile and thus a high variance in the perceived risk of disclosing this information. This variance was required because we wanted our sample to contain individuals for whom the perceived risk is too low to evoke a prevention focus as well as those perceiving a high risk and thus becoming prevention focused.

Before being confronted with our Facebook Web App, the participants were told that we would only analyze the data in anonymized form and assured that there were no right or wrong answers and they can therefore answer all questions honestly. This was done to counteract common method biases (Podsakoff et al., 2003). As described before, regulatory focus theory distinguishes a chronic as well as a situation specific regulatory focus (Florack et al., 2005; Higgins et al., 1994). The relevant moderator in our study is the situation specific regulatory focus, because, as depicted in section 2.3, the situation specific regulatory focus incorporates the chronic regulatory focus altered by a potential priming by contextual factors. We assume the perceived risk of information disclosure to be such a factor (H5) and are therefore interested in the situation specific regulatory focus evoked during the decision task. However, we also measured the chronic tendency to be prevention focused as a control variable for the situation specific regulatory focus with the composite regulatory focus scale by Haws et al. (2010). The perceived benefits of information disclosure were operationalized by the perceived value of the chance to win a 50€ gift card as described above. This perceived value was measured by means of a scale from Okada (2005).
After filling out these measures, participants were presented a text, which read that we were conducting a study investigating what information are publicly posted on Facebook in different countries. We made explicit that we were only interested in information that are publicly available, which means that every Facebook user can access this information. This information comprises the name, age group and gender of the user and further information like posts and the list of Facebook friends if they are explicitly marked as public by the user (Facebook, 2015). We then told participants that we developed a Facebook Application to automatically read this information from their profile in order to avoid collecting the data manually. In exchange for their participation, that is granting our app the permission to access their public profile, they were offered the chance to win the 50€ Amazon gift card mentioned above. We also mentioned that the App would gather the user’s e-mail addresses to contact them in case they won the gift card.

![Figure 3. Screenshot of the Facebook Permission Dialog.](image)

We then showed participants the steps they had to go through when taking part in our study by a series of screenshots. Participants had to click either a button reading “Allow Profile Access via Facebook” or a button reading “Deny profile access”. When they chose to grant us access to their public profile they were forwarded to Facebook, which in turn presented the confirmation window depicted in Figure 3. Before actually forwarding them to our Facebook Web App participants then had to state, in how far they would be willing to disclose their information via the Facebook Web App with the established scale from Malhotra et al. (2004). This was also the moment in which we measured the participants’ situation specific regulatory focus with the three seven point semantic differentials (Pham and Avnet, 2004) that were also used in our first experimental study. Afterwards, participants were forwarded to the Facebook Web App and either granted us access to their profile or not. Lastly, we measured the individuals’ perceived privacy risks with the established scale from Heng et al. (2011). All measurement items in our research model can be found in Appendix 1.

Participants were recruited via Workhub, a crowdsourcing platform on which people are receiving money in exchange for performing short tasks via a browser. This channel was chosen because the users of Workhub are only paid by the platform if they enter a “validation code” after finishing a job, which was displayed on the last page of our survey. Thus, we prevented bias due to drop-out of participants that were not willing to disclose their information and thus had no chance to win the gift card.

4 Results

In total 208 Facebook users from Germany completed the survey of which 87 (41.8%) were female. The age ranged from 16 to 58 with the mean being 28.7. The major groups regarding the work background were salaried employees (43.3%) and students (34.6%). Another 9.1% were self-employed. We used structural equation modeling to analyze our data. This approach allows us to test the construct relationships as well as the psychometric properties of the measurement model simultaneously (Bagozzi and Youjae, 1989; Gefen et al., 2000) and thus provides a comprehensive analysis of all relationships in our research model (Fornell, 1982). The variance-based partial least squares method as
implemented in SmartPLS (Ringle et al., 2015) was chosen over the covariance-based LISREL because it is particularly suited for testing theories in early stages (Fornell and Bookstein, 1982).

4.1 Measurement Validation

<table>
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<tr>
<th>Construct</th>
<th>Cr. α</th>
<th>CR</th>
<th>AVE</th>
<th>INT</th>
<th>RF</th>
<th>RSK</th>
<th>BEN</th>
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Table 1. Cronbach’s α (Cr. α), Composite Reliability (CR), Average Variance Extracted (AVE) and Construct Correlations.

We first evaluated the validity of the measurement model by investigating the convergent and discriminant validity of our survey instrument. Convergent validity is assessed by means of the loadings of items on their constructs, composite reliability (CR) of the constructs and the average variance extracted (AVE) by the constructs (Heng et al., 2012). Sufficient item reliability is achieved when all items have loadings higher than 0.65 on their construct (Falk and Miller, 1992). This is the case, as can be seen in Table 2 (printed in bold type). Composite Reliability should exceed 0.7 (Bagozzi and Yi, 2012) and the average variance extracted exceeds the value of 0.5 proposed by Hair et al. (2011). Cronbach’s α is also larger than the proposed criterion of 0.7 (Bagozzi and Yi, 2012) for all constructs, thus convergent validity is given (see Table 1).

<table>
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<th>Item</th>
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<th>RSK</th>
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<td>RF3</td>
<td>0.409</td>
<td>0.902</td>
<td>-0.332</td>
<td>0.192</td>
</tr>
<tr>
<td>Perceived Risk of Information Disclosure (RSK)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RSK1</td>
<td>-0.485</td>
<td>-0.279</td>
<td>0.900</td>
<td>-0.153</td>
</tr>
<tr>
<td>RSK2</td>
<td>-0.474</td>
<td>-0.368</td>
<td>0.914</td>
<td>-0.113</td>
</tr>
<tr>
<td>RSK3</td>
<td>-0.303</td>
<td>-0.202</td>
<td>0.821</td>
<td>-0.016</td>
</tr>
<tr>
<td>RSK4</td>
<td>-0.202</td>
<td>-0.090</td>
<td>0.688</td>
<td>0.021</td>
</tr>
<tr>
<td>Perc. Benefit of Information Disc. (BEN)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BEN1</td>
<td>0.352</td>
<td>0.172</td>
<td>-0.045</td>
<td>0.779</td>
</tr>
<tr>
<td>BEN2</td>
<td>0.404</td>
<td>0.208</td>
<td>-0.088</td>
<td>0.854</td>
</tr>
<tr>
<td>BEN3</td>
<td>0.401</td>
<td>0.185</td>
<td>-0.121</td>
<td>0.877</td>
</tr>
</tbody>
</table>

Table 2. Factor Analysis - Item Loadings and Cross-Loadings.

Discriminant validity is given when (1) all items load higher on their intended construct than on any other construct (Bagozzi and Yi, 2012) and (2) the variance shared between each construct and its items is greater than the correlations between the construct and all other constructs (Fornell and Larcker, 1981). As can be seen in Table 2 all items load higher on their intended constructs than on any other constructs with the highest cross-loading being 0.477. The second criterion is met, when the square root of the AVE, the variance shared between a construct and its associated items, (diagonal
elements in Table 1) is greater than the correlation between the construct and any other construct (non-diagonal elements in Table 1) in the model (Fornell and Larcker, 1981). This criterion is also fulfilled, thus discriminant validity is also met.

Lastly, we performed Harman’s single factor test (Podsakoff et al., 2003) to investigate whether a single factor can explain the majority of covariance among our measures, which would be an indication of potentially problematic common method variance. The most covariance explained by one factor turned out to be 30.17% and thus the test does not indicate problematic common method biases.

4.2 Analysis of the Structural Model

After ensuring our measurement model was valid we proceeded by analyzing the hypothesized relationships between the constructs as reflected by our research model (see Figure 4). The overall model fit is good with a standardized root mean square residual (SRMR) of 0.059 and therewith below the threshold of 0.8 (Hu and Bentler, 1999). Predictive validity is assessed by the amount of variance explained in the dependent variables ($R^2$) and the cross-validated redundancy $Q^2$ (Geisser, 1975; Stone, 1974). Our model explains 13.9% of the variance in the situation specific regulatory focus and 50.8% of the variance in the intention to disclose information. $Q^2$ is 0.089 for the situation specific regulatory focus and 0.444 for the intention to disclose personal information and therefore indicates predictive relevance ($Q^2 > 0$) (Chin, 2010). The relative impact of each path in the model on $Q^2$ values in terms of $q^2$ can be found in Appendix 2.

To investigate the significance of the path coefficients in our model a bootstrapping with 5000 resamples was performed. All path coefficients are significant at least at the 1% level ($p < 0.01$) and the directions of the effects are in line with our hypotheses. Therefore, all our hypotheses are supported. However, when modeling moderations in structural equation models, a direct effect between the moderator (the situation specific regulatory focus in our case) and the dependent variable (the intention to disclose personal information) is included (Chin et al., 2003). This relationship turned out to be significant and positive ($\beta = 0.184^{**}, p = 0.003$) although we did not hypothesize a direct effect between the regulatory focus and the disclosure intention. According to Sharma et al. (1981) the situation specific regulatory focus is therefore not a “pure-" but a “quasi moderator" (Sharma et al., 1981, p. 292). Indicators of effect size $f^2$ (Cohen, 1988) are given in Appendix 2 for each path in the model.

![Figure 4. Results of the PLS estimation of the structural model.](image)

Slope analyses showing the influence of the perceived privacy risk and benefit on the disclosure intention for the mean regulatory focus as well as a regulatory focus one standard deviation above and below the mean are shown in Figure 5. While the negative impact of the privacy risks is stronger for the

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1 A Nagelkerke-$R^2$ of 0.392 was obtained for a binary logistic regression with the disclosure intention as the only predictor for actual disclosure behavior, indicating that a considerable amount of variance in actual behavior is explained by the behavioral intention we measured.
prevention focused (RF at -1 SD) participants the effect diminishes when people are less prevention focused (RF at +1 SD). The opposite holds for the effect of the perceived value of the chance to win the gift card. This effect hardly exists for prevention-focused individuals (RF a -1 SD), but gets more pronounced when people are less prevention focused (RF at +1 SD).

**Figure 5.** Slope analyses for the interaction between the regulatory focus (RF) and the perceived risk (RSK, left) as well as the perceived benefit of information disclosure (BEN, right).

## 5 Discussion

In this research we investigated the role of a person’s regulatory focus (Higgins, 1997) in the privacy calculus theory (Laufer and Wolfe, 1977; Li, 2012). We empirically found a positive correlation between the perceived risks of information disclosure and a prevention-focus (RQ 2). This prevention-focus is associated with heightened vigilance (Higgins, 1998). This in turn changes the weighting of benefits and risks in the privacy calculus. Therefore, an individual’s regulatory focus moderates the effects of the perceived risks and benefits in the privacy calculus (RQ 1). Specifically, the more prevention focused (compared to promotion-focused) a person is, the more sensitive is this person to the perceived risks of information disclosure, while the opposite applies to the perceived benefits of information disclosure.

These findings have several implications for research based on the privacy calculus theory. We see three theoretical contributions that all extend privacy calculus theory: First, we integrated a regulatory focus perspective into the privacy calculus theory and thereby proposed a shift from considering only net outcome utility (Awad and Krishnan, 2006) towards viewing risk minimization and benefit maximization as different types of goals serving either prevention or promotion needs (Higgins, 1997; Higgins, 1998). Therefore, an individual’s regulatory focus acts as a moderating variable in the trade-off described by the privacy calculus. Future studies building upon the privacy calculus should consider this variable in their research models. Furthermore, the moderating effect of regulatory focus may also help to consolidate previous research based on the privacy calculus. While in some studies the perceived risks are more influential than the benefits (Kehr et al., 2015; Keith et al., 2013), others find that the disclosure intention is mainly dependent on the benefits (Li et al., 2014; Shibchurn and Yan, 2015; Xu et al., 2009). These dissonant findings could be explained by varying regulatory foci.

This leads us to our second theoretical contribution. To our knowledge, this is the first study directly testing a correlation between the perceived risks of information disclosure and a person’s regulatory focus. Other studies on regulatory focus theory usually employ experimental research designs and focus on the observation of decision outcomes (e.g., Chernev, 2004; Idson et al., 2000; Lee and Aaker, 2004; Wang and Lee, 2006). However, the relationship between one’s regulatory focus and the perceived risk and therefore an antecedent of the final decision has not been tested empirically yet. Our first study provided evidence that prevention- and promotion-focused individuals perceive the same degree of risks from a situation involving the disclosure of personal information. The findings from our second study then provided support for the hypothesis, that people weight the risks differently in the decision-process. This is in line with common reasoning in the domain of regulatory focus (Higgins, 1998; Zhou and Tuan Pham, 2004).
A third theoretical contribution arises from the non-linearity of the effects of risk and benefit perceptions on the intention to disclose personal information, i.e., the combination of the two contributions above. As we have shown, when perceiving a high risk for their privacy, people tend to adopt a state of heightened vigilance and become less incautious (contribution 2). This state in turn leads to a higher weighting of risks and a lower weighting of benefits in the privacy calculus (contribution 1). Consequently, one would expect the effect of the perceived risks of information disclosure in the privacy calculus to be higher for a more invasive technology compared to a less invasive one. Contrary, the effects of the perceived benefits of information disclosure should be lower the more invasive the technology is. Thus, the perceived risk of information disclosure as well as the corresponding benefits are not linearly related to the behavioral intention to disclose personal information, which has been a fundamental assumption in most research based on the privacy calculus theory (Laufer and Wolfe, 1977; Li, 2012). Research on relatively invasive information systems should in fact find stronger negative effects for privacy risks while the effects of perceived benefits on the disclosure intention should be lower compared to a relatively privacy-friendly information system.

Apart from these theoretical implications our research also has important implications for practitioners. Providers of privacy-invasive information systems should be aware which kind of regulatory focus their product evokes for customers. Research on regulatory focus, specifically the so-called regulatory fit (Higgins, 2000) has shown, that advertising messages framed in accordance with one’s regulatory focus are more persuasive than those with conflicting framing (Lee and Aaker, 2004). Therefore, customers should find prevention-framed messages more persuasive for relatively invasive information systems while promotion-framed messages are more effective for systems carrying only minor risks.

A second practical implication addresses the shortcoming of the privacy calculus, that specific recommendations for providers could hardly be deduced. From the privacy calculus we know that, in simple terms, benefits are good and privacy risks are bad. The implication for application providers is therefore very general: Decrease the perceived privacy risks evoked by your application as much as possible. However, as privacy risks usually cannot be eliminated completely, because certain data is necessary to provide functionality and/or their reduction usually involves the investment of resources, the ability to make statements about which level of privacy is “good enough” is desirable. When taking the regulatory focus into consideration more specific recommendations can be made: If an information system involves such high privacy risks that it evokes a prevention focus, the adoption decision is mainly driven by risk perceptions and providers should try to reduce these risks. When the risk however reaches a sufficiently low level, benefits are the more influential antecedent for the customer’s disclosure intention and thus indirectly their likelihood of adoption. Lastly, to reduce the negative influence of risk perceptions on the adoption rate, providers could try to market their systems in a fashion that evokes a promotion-focus during the adoption decision (Florack et al., 2005).

6 Limitations and Future Research

The findings of this research have to be interpreted in consideration of its limitations. We contacted participants via a crowdsourcing platform to ensure demographic heterogeneity (Steelman et al., 2014) and prevent bias due to drop-out when participants were not willing to disclose their information and thus would have had no incentive to complete the survey. However, our sample still contains a lot of relatively young participants (mean age 28.7). Also the advantage of using a Facebook Web App to create a realistic setting incorporating actual information disclosure is on the other hand attended by a restriction of potential participants on Facebook users. These might possess special characteristics regarding their attitudes towards privacy, because using Facebook already requires a certain degree of information disclosure on the internet and trust towards the platform. Future research could therefore investigate whether the relationships found in our study also hold in different contexts. Finally, cultural aspects might limit the generalizability of our findings. Our study was conducted in Germany. Future research could extend our findings by investigating the role of regulatory focus in different cultural context, as different effect sizes of benefits and risks were found in privacy literature in different
countries (Krasnova et al., 2012). These could partly be attributed to differences in regulatory foci and/or the interplay of regulatory focus and cultural dimensions. Investigating the factors evoking a prevention focus in the privacy context in more detail can also make valuable contributions to IS research. For example Malhotra et al. (2004) distinguish concerns regarding the collection of data, the control about one’s data and the awareness of privacy practices. These dimensions of privacy concerns might evoke a prevention focus to different degrees.

Appendix

<table>
<thead>
<tr>
<th>Perceived Risk of Information Disclosure (RSK) – Heng et al. (2011) – 7pt Likert (agreement)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSK1 In general, it would be risky to give personal information to this Facebook App.</td>
</tr>
<tr>
<td>RSK2 There would be high potential for privacy loss associated with giving personal information to this Facebook App.</td>
</tr>
<tr>
<td>RSK3 Personal information could be inappropriately used by this Facebook App.</td>
</tr>
<tr>
<td>RSK4 Providing this Facebook App with my personal information would involve many unexpected problems.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BEN1 What is the value of the chance to win the gift card? (1 = not at all valuable / 7 = extremely valuable)</td>
</tr>
<tr>
<td>BEN2 How well off are you with the chance to win the gift card? (1 = not at all well off / 7 = extremely well off)</td>
</tr>
<tr>
<td>BEN3 How happy are you with the chance to win the gift card? (1 = I would not care about it at all / 7 = extremely happy)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Situational Regulatory Focus (RF) – Pham and Avnet (2004) – I would prefer to... (1 – 7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF1 do whatever it takes to keep my promises / go wherever my heart takes me</td>
</tr>
<tr>
<td>RF2 do what is right / do whatever I want</td>
</tr>
<tr>
<td>RF3 pay back my loans / take a trip around the world</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Behavioral Intention to Disclose Personal Information (INT) – Malhotra et al. (2004)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please specify the extent to which you would reveal your personal information to the Facebook App. (1 - 7)</td>
</tr>
<tr>
<td>INT1 unlikely / likely</td>
</tr>
<tr>
<td>INT2 not probable / probable</td>
</tr>
<tr>
<td>INT3 impossible / possible</td>
</tr>
<tr>
<td>INT4 unwilling / willing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chronic Prevention Focus (Control variable) – (Haws et al., 2010) – 7pt Likert (agreement)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRF1 I frequently think about how I can prevent failures in my life.</td>
</tr>
<tr>
<td>CRF2 I worry about making mistakes.</td>
</tr>
<tr>
<td>CRF3 I see myself as someone who is primarily striving to become the self I “ought” to be—fulfill my duties, responsibilities and obligations.</td>
</tr>
<tr>
<td>CRF4 I usually obeyed rules and regulations that were established by my parents.</td>
</tr>
<tr>
<td>CRF5 Not being careful enough has gotten me into trouble at times. (R)</td>
</tr>
</tbody>
</table>

Appendix 1 Measurement Items.

<table>
<thead>
<tr>
<th>Path</th>
<th>$f^2$</th>
<th>$q^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSK $\rightarrow$ RF</td>
<td>0.111</td>
<td>0.070</td>
</tr>
<tr>
<td>CRF $\rightarrow$ RF</td>
<td>0.049</td>
<td>0.025</td>
</tr>
<tr>
<td>RSK $\rightarrow$ INT</td>
<td>0.307</td>
<td>0.243</td>
</tr>
<tr>
<td>BEN $\rightarrow$ INT</td>
<td>0.392</td>
<td>0.304</td>
</tr>
<tr>
<td>RSK x RF $\rightarrow$ INT</td>
<td>0.122</td>
<td>0.095</td>
</tr>
</tbody>
</table>

Appendix 2 Effect Sizes ($f^2$) and relative predictive relevance ($q^2$) of each path in the model.
References


