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USERS' PERCEPTIONS OF BENEFITS AND COSTS OF PERSONALIZATION

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Abstract

Companies collect a wealth of personal data about their customers to be able to target their promotional messages to customers' interests and demographics. Information technology and the Internet in particular have created new opportunities for data collection, storage and processing. While technology enables companies to address customers directly and therefore to increase sales and customer retention, this form of personalization may infringe upon users' desire for privacy. To examine this trade-off, we first identified benefits and costs of personalization based on the findings of qualitative interviews. Next, we conducted a quantitative survey to assess the risks people perceive for various data types and illustrate how people's general attitudes toward personal data sharing determines their perceptions of benefits and costs of personalization.

Keywords: Online Personalization, Data Types, Privacy

Introduction

The advent of the Internet and its unprecedented opportunities for communication and commerce have fundamentally changed the relationship between companies and Internet users by empowering companies with enhanced methods for data collection and processing (Kelly and Rowland 2000). They can collect click-stream data from the analyses of paths through the site, shopping carts, exit points, or search terms and gather personally identifying information from transactions (Danna and Gandy 2002). Companies solicit these data from users in order to personalize offerings and enhance customer service (Stead and Gilbert 2001). Personalization in electronic commerce can take the form of personalized advertising, e.g. promotional e-mails, or personalized services such as product recommendations, both of which rely on user profiles built with data users provide consciously or unconsciously (Awad and Krishnan 2006).

Since customer information has become a vital asset in the online marketplace, there is always the danger that it is used for purposes other than those it was collected for without the owners' consent, which constitutes an invasion of their privacy (Beltrami 2003; Culnan 1993). A decisive factor is customers' perception of risks and harassments rather than what actually happens to their data. Apart from technical and legal barriers, a major difficulty for companies is thus to anticipate customers' reactions to personalization, which may induce companies to abstain from such measures altogether. Based on the premise that the winning companies in electronic commerce will be those who understand users' privacy concerns and respond adequately (Luo and Seyedian 2003/04), companies need to (1) become aware of the benefits and costs of personalization that users perceive, (2) know users' attitudes toward their personal data, and (3) understand the impact of users' attitudes on their perceptions of personalized communication.

Previous research has analyzed users' willingness to share personal data for personalization (Awad and Krishnan 2006; Chellappa and Sin 2005), but has not considered the effect of different categories of personally identifying information. This paper deals with the collection of user data for personalized marketing communication, which can take the form of personalized promotional e-mails or websites adapting to particular characteristics and interests of repeat visitors. The study presented in this paper explores users' perceived benefits and threats of personalization and examines how these perceptions are affected by users' attitudes toward different types of personal information. This paper is in four parts. The first part reviews the literature on personalization and privacy, before the second part presents the methodology behind the interviews and the survey that were conducted. The interviews assess the risks people perceive when they divulge personal data. Based on these findings, the survey examines whether users' general attitudes toward data disclosure influence their perceptions of various online personalization measures. The findings of the study are reported in the third part. Ultimately, the paper presents implications for both practitioners and researchers.

The Personalization-Privacy Trade-Off

This section first reviews the literature on personalization as well as on users' privacy concerns and their protection strategies, and then combines the two to discuss the trade-off users face when participating in personalization.

Personalization

In previous research, the terms customization, personalization, and individualization have been used to describe the process of tailoring online communication and services to users' interests. While customization is user-initiated, relying on users' instructions to adapt a website according to their preferences, personalization and individualization rely on adaptive systems that do not require user involvement (Nunes and Kambil 2001). The difference between the latter two is that personalization requires personally identifying user information, while individualization relies on anonymous click-stream data such as page views and click sequences (Sackmann et al. 2006). For example, communications can be tailored to users' interests by recommending products based on past queries (action-to-item), recommending complementary products related to those already purchased (item-to-item), or recommending products based on what users with similar previous purchases have bought (user-to-user) (Schafer et al. 1999).

Personalized systems thus depend on users' willingness to share personal information, but cater better to users' interests than individualized ones, since the former possess more detailed information about individuals (Kobsa 2002). Divulging personal information on a website increases switching costs for users in the form of time spent on regis-

tration with another website (Chellappa and Sin 2005). To companies, personalization yields a number of benefits, which span the whole customer life cycle, including drawing new visitors to the site, turning visitors into buyers, increasing sales, strengthening advertising efficiency, and improving customer retention (Fink and Kobsa 2000).

Privacy Concerns

Although online retailers might use the information they obtain about visitors and customers exclusively to increase the system's convenience and provide users with more targeted communications (Connon 2002), they may equally misuse it and pass on this information to third parties (Sama and Shoaf 2002). The asymmetric information between companies as data collectors and users as data providers gives rise to concerns about electronic privacy among users (Culnan and Armstrong 1999; Reagle and Cranor 1999). Personalization relies on users' willingness to make personal information available to companies, which depends on their individual privacy thresholds. Various classifications exist that segment Internet users according to the intensity of their privacy concerns: privacy unconcerned, privacy pragmatists who weigh benefits against privacy risks, and privacy fundamentalists (Louis Harris et al. 1995); unconcerned, circumspect, wary, and alarmed Internet users (Sheehan 2002); and marginally concerned, identity concerned, profiling averse, and privacy fundamentalists (Berendt et al. 2005). An important antecedent of privacy concerns is users' social awareness of privacy threats, e.g. through media reports (Dinev and Hart 2005). Further, age and education are positively correlated with the intensity of privacy concerns (Sheehan 2002). A favorable company reputation and pre-existing relationships with a company also influence users' willingness to divulge personal data on a particular website (Olivero and Lunt 2004).

The two major dimensions of electronic privacy are user knowledge and user control. Knowledge refers to users' awareness that data are collected (Foxman and Kilcoyne 1993). Privacy policies may bridge this knowledge gap between companies and users. However, privacy policies have been found to use deceptive language, thereby inciting privacy concerns rather than easing them (Pollach 2007). Further, users can never be sure whether companies actually adhere to their privacy commitments (Milne and Culnan 2002). These may be the reasons why users do not read privacy policies, even though they are concerned about the misuse of their personal data (Jensen et al. 2005). Control refers to the extent to which users can influence what data are collected about them or can opt out of data collection altogether (Foxman and Kilcoyne 1993) and thus reduce the risks they perceive in connection with data disclosure (Olivero and Lunt 2004). Typically, users are unaware of the collection of aggregate user information and notice only the collection of personally identifying information, which they disclose themselves (Caudill and Murphy 2000). Users fear that companies use personally identifying information for purposes other than those it was collected for (Turner and Dasgupta 2003), e.g. share it with third parties or harass users with promotional e-mails (Han and Maclaurin 2002). As for personalization, users have indicated that they prefer to be in control of their personal profiles and do not want Web marketers to use information they have not explicitly divulged (Alpert et al. 2003). This suggests that users may perceive personalization and individualization as a privacy intrusion, if they have not consented to it.

To protect their personally identifying information, users have been found to enter false or inaccurate data when asked to provide personal information, for example in online surveys or when registering with a website (Eirinaki and Vazirgiannis 2003; Hoffman et al. 1999; Milne and Boza 1999). Despite their privacy concerns, users generally do not employ privacy-protection strategies, because they often do not know how to implement them (Dommeyer and Gross 2003). Previous research has also shown that those Internet users who claim to be concerned about data privacy do not behave accordingly online and do not change their online behavior in response to the data handling practices companies disclose in their privacy policies (Berendt et al. 2005; Spiekermann et al. 2001). Numerous efforts have been made to protect people's privacy online with privacy-enhancing technologies, such as pseudonymity networks (Rennhard et al. 2004) or anonymizers (Berghel and Womack 2003). Another such initiative is the Platform for Privacy Preferences (P3P), which was launched by the World Wide Web Consortium (www.w3.org/P3P/). The idea behind P3P is that users' P3P-enabled Web browsers compare their predefined privacy preferences against a website's P3P-formatted privacy policy and notify users if there is a mismatch between their privacy preferences and the website's data handling practices (Cranor et al. 2003). But as is the case with conventional privacy policies, users with P3P-enabled Web browsers can still not be sure whether companies adhere to what they state in their P3P privacy policies (Delaney et al. 2003). In addition to these efforts, industry self-regulation encompasses privacy seals (e.g. TRUSTe, BBBOnline), which signal to users that companies handle data responsibly (Smith and Rupp 2004).

Trading Data for Personalization

Hagel and Rayport (1999) hold that Internet users' privacy concerns result not so much from people's desire for protection of their personal data as from the fact that companies fail to offer sufficient benefits in return for people's data. Generally, people weigh costs and benefits when dealing with privacy matters in commercial settings (Laufer and Wolfe 1977), which also applies to Internet users. In e-commerce exchanges, users do not disclose personal information to create intimacy as they do in interpersonal exchanges, but pragmatically evaluate the benefits they obtain when disclosing personal information (Olivero and Lunt 2004). Chellappa and Shivendu (2006) examined the trade-off between personalization and privacy, suggesting that people's usage of personalized services depends on their "personalization for privacy ratio", i.e. the ratio between their marginal value for personalized services and their privacy concerns expressed in terms of information privacy costs. In order to measure the trade-off between benefits and costs of personalization, various authors (Culnan and Bies 2003; Laufer and Wolfe 1977; Stone and Stone 1990) use the 'privacy calculus'. They argue that a potential loss of privacy can be offset by the benefits of the disclosure of private data. The privacy calculus model was further refined by Dinev and Hart (2006), who measured the influence of users' Internet privacy concerns, their perceived Internet privacy risk, Internet trust and personal Internet interest on their willingness to provide personal information to transact on the Internet. In order to measure the latter construct, they ask about users' anticipated behavior in four different situations that require the disclosure of personal data (e.g. purchasing goods and retrieving information).

Users incur privacy costs when they divulge personal information as part of Web personalization in the form of time consumption for data entry and increased risks of vulnerability (Olivero and Lunt 2004; Volokh 2000). People are willing to divulge more personal data when they purchase products for later upgrading and thus establish long-term relationships with companies (Hui et al. 2006). They are also willing to bear these costs and disclose personal information, if they are offered valuable benefits (Phelps et al. 2000). The value people expect from personalization in exchange for their data includes enhanced information and service quality (Sheehan and Hoy 2000), higher content relevance (Tam and Ho 2006), financial rewards (Teo et al. 2004) as well as time savings, enjoyment, and novelty (Hui et al. 2006). Generally, Web personalization has been found to result in positive attitudes toward the website among users (Kalyanaraman and Sundar 2006). Personalized services, such as recommendations, clearly provide higher utility to users than advertising. However, users also benefit from personalized advertising when companies send them fewer irrelevant offerings (Ansari and Mela 2003; Liang et al. 2006), given that users perceive irrelevant promotional e-mails more irritating than irrelevant postal direct mail (Morimoto and Chang 2006).

This theory-building paper adds to existing research by differentiating between various data types that represent different facets of privacy. The paper concentrates on several (positive and negative) consequences which may arise from data disclosure. In line with previous research we argue that a high level of privacy concerns will lead to a more favorable assessment of the benefits of online personalization and vice versa. We therefore propose that Internet users' attitudes toward their personal data influence their assessment of benefits and costs of online personalization. We measure these attitudes by assessing the perceived level of risk users associate with the disclosure of various data types. Furthermore, we seek to assess whether clustering users according to different groups of data produces varying results when measuring their attitudes toward online personalization. These results will help to refine existing models by showing which data types might be useful to cluster customers into groups according to their privacy preferences. Additionally, we examine whether the groups differ in their perceptions of various personalization measures.

Research Method

This study is exploratory in nature, investigating how Internet users' attitudes toward various types of personal data impact their perceptions of personalization measures. Previous research has highlighted a number of reasons why users would trade off privacy for personalization, but has not considered that users may not perceive all types of data as equally critical. We first conducted a qualitative survey in order to identify the most important consequences of online personalization. A quantitative survey was then used to assess Internet users' perceived privacy risk associated with various data types as well as their perception of personalization measures.

Research Design

For the purpose of assessing people's attitudes toward personalization, it was first necessary to identify benefits and costs associated with individualization and personalization. Although authors of previous studies have suggested a number of benefits and costs, they did not examine them in sufficient detail for the design of this questionnaire. Therefore, we interviewed 25 people who had experience with different aspects of personalized communication and asked them to frame their answers from the customer's point of view. In order to generate as broad a spectrum of opinions as possible, the interviewees included consumer advocates, vendors of and consultants for CRM software as well as market researchers and academics. The primary selection criterion was their previous experience with individualization or personalization issues. While the vendors and consultants represent the industry perspective of customer interests, the consumer advocates represent a multitude of actual consumer concerns. For example, we interviewed one of the leading Austrian data protection officers and the Austrian Internet ombudsman, who advises Internet users free of charge. The interviews were semi-structured and took 30 to 90 minutes. They were taped, transcribed, and analyzed by paraphrasing those passages containing relevant statements about the benefits and costs of personalization and by generalizing these paraphrases. Ultimately, these new statements were combined into an abstraction system and checked against the original data. According to the principles of qualitative content analysis, the objective was to identify as many different opinions as possible rather than to ensure the representativeness of individual statements (Lacity and Janson 1994). The benefits and costs identified lay the groundwork for the survey questions pertaining to people's perception of personalization. Each of these benefits and costs is exemplified by two paraphrases in Tables 1 and 2. Since all interviews were conducted in German, we translated and back-translated the answers and checked them for consistency with the original.

Table 1. Benefits of Personalization for Customers (emphasis added)	
Benefits	Paraphrases (examples)
<i>Decision support:</i> Targeted offers should meet customers' requirements.	"communication is more <i>targeted</i> " "such tools also ensure ... that people actually <i>get what they want</i> "
<i>Special offers and gifts:</i> Regular customers are granted better conditions and receive special offers to increase customer loyalty.	"customers threaten to <i>leave</i> and then we try and make them <i>a new offer, depending</i> on their <i>value to us</i> " "customers are typically <i>happy</i> ... about receiving <i>special offers</i> "
<i>Faster communication:</i> Companies pre-select offers, which shortens the decision-making process for customers.	"it's about ... <i>time savings</i> , it should be <i>faster</i> , it should be <i>easier</i> for me" "if customers can do this over the Web and are satisfied with the result, they can <i>avoid</i> this whole <i>long process</i> "
<i>More relevant communication:</i> Companies eliminate irrelevant offers.	"we try and avoid customer <i>information overload</i> " "mailings are more <i>focused</i> and not mass mailings"

Table 2. Costs of Personalization for Customers (emphasis added)	
Costs	Paraphrases (examples)
<i>Invisible and permanent data collection:</i> Automated data collection concerns users. It is often unclear when and what data are collected, for how long they are stored, and how they are used.	"this is <i>not</i> about data that customers divulge <i>voluntarily</i> ... this is about the bits of information that you leave behind throughout your life" " <i>active consent</i> is essentially <i>not possible</i> "
<i>Insufficient information:</i> While companies collect detailed knowledge about	"shipping and handling charges are <i>personalized</i> ... for particular people" (i.e. price discrimination: those who

their customers, the latter feel poorly informed about data usage. Also, companies are able to base their prices on customers' maximum willingness to pay.	seemingly can afford it, unknowingly have to pay more) "the basic idea of <i>equal communication partners</i> is <i>violated</i> by the party that has the technological means to do so"
<i>Loss of control:</i> Customers are not aware of the value of their data and about their rights. In addition, customers have only limited access to the data companies have collected and stored about them.	"they know something about me and can use this in a way that benefits them and there is <i>nothing I can do about it</i> " "users <i>don't know</i> ... what happens to their data and even if they knew, they would not be able to assess the economic value"
<i>Increased unsolicited communication:</i> Decreasing communication costs and easy access to customer data makes it easier for companies to send promotional messages to users. Often, an offer's potential suitability for customers determines communication, without taking into account the frequency of previous contacts.	" <i>they would not stop</i> sending me that" "my first e-mail addresses have become <i>impossible to use</i> "

The survey was conducted together with *AON Austria*, the country's largest telecom provider. The questionnaire was advertised on the shopping site of the company's Web portal. No incentives were offered for completing it. The data were cleaned in a multi-level process, eliminating those that were filled out implausibly fast and those which contained apparent non-responsive answering (i.e. long strings of answers with the same response category) (Johnson 2001), which left us with a total of 405 usable responses.

First, to determine how particular types of data impact the risk people perceive, respondents were given the following task for 15 different types of data: *Imagine, a well-known market research company asks you as part of a street survey to provide the following data. Please indicate how risky you consider divulging this information.* The street survey and the well-known market research company were deliberately mentioned in order to determine how risky people perceive divulging personal data in general, thereby eliminating external influences (e.g. trust in the Internet or in a company) as far as possible. Respondents entered their answers in an online form with sliders, choosing values from 1 (High risk) to 100 (Low risk) for each data type. Second, the questionnaire items measured to what extent respondents agree with statements on benefits and costs of personalization, with values ranging from 1 ("Strongly Disagree") to 100 ("Strongly Agree"). Again, the survey was conducted in German and translated by a qualified English translator for this paper.

The results of the survey were subjected to a principal component analysis to test the above proposition that Internet users' perceived level of risk associated with the disclosure of personal data influences their assessment of benefits and costs of online personalization. Based on these results, respondents were segmented into three groups of equal size according to their willingness to divulge personal information. Then their attitudes toward benefits and costs of online personalization were examined for differences among groups.

Results

Types of Data

The survey first assessed users' attitudes toward the risks associated with divulging different types of personal data. Its goal was to determine whether different aspects of privacy exist that may be useful to cluster user groups. To find out which variables make up the same construct, a principal component analysis with Varimax rotation was used. Essentially, principal component analysis seeks to reduce a set of variables with high factor loadings into fewer categories. The Kaiser-Meyer-Olkin measure of sampling adequacy for our dataset is 0.864, which is considered 'meritorious' (Kaiser and Rice 1974). Both the Kaiser criterion and the scree plot suggest a solution with three components (see Table 3). The first component (C1) contains those types of data that neither enable companies to con-

tact users nor are considered to be particularly risky by users. The second component (C2) can be interpreted fairly easily, since all variables with high factor loadings include those types of data that enable companies to contact users (viz. phone number, home address, e-mail address, name). The third component (C3) contains data that are typically divulged only to trusted people or companies (viz. income, political views, religious belief). The data type 'credit card number' cannot be assigned to any of the components, since its loading never exceeds the 0.5 threshold. Based on these results, we labeled the components 'demographic and psychographic data' (C1), 'contact data' (C2) and 'private data' (C3).

	Potential risk**	Component		
	Mean (SD)	C1	C2	C3
Shopping behavior	63.55 (33.23)	.537		
Personal interests	63.95 (33.64)	.583		
Education	72.56 (29.34)	.782		
Marital status	74.02 (30.22)	.741		
Occupation	74.06 (28.93)	.792		
Age	80.04 (26.69)	.835		
Gender	85.53 (22.38)	.813		
Telephone number	33.53 (32.57)		.773	
Home address	40.54 (33.63)		.860	
E-mail address	50.96 (35.41)		.726	
Name	56.40 (34.95)		.779	
Income	31.35 (32.84)			.568
Political views	42.42 (36.52)			.856
Religious belief	53.36 (37.44)			.844
Credit card number*	4.94 (11.41)			
Eigenvalue		4.13	2.83	2.54
Variance explained		27.56%	18.86%	16.90%
Factor loadings below 0.5 have been suppressed for better readability. * No loading above 0.5, ** 1: High risk ... 100: No risk				

The second column in Table 3 ('Component') shows the means for each type of data, with low values indicating that the type of data is considered to be risky. Within each component, data are sorted according to risk level. The values of the first component (demographic and psychographic data) range from 63.55 to 85.53, thus bearing the lowest perceived risk. The values of the second component (contact data) are substantially lower (33.53 to 56.40). Especially divulging telephone numbers (33.53) and home addresses (40.54) is considered to be quite risky. In the third component (private data), values range from 31.35 for income to 53.36 for religious belief. At 4.94, the value for 'credit card number', which has not been assigned to any of the components, is by far the lowest and thus considered to be the riskiest.

Perceived Benefits and Costs of Online Personalization

For each of the three data types (demographic/psychographic, contact, private) we used the factor values to segment respondents into three equally sized groups depending on their levels of privacy concerns. Respondents were not segmented based on absolute numbers but only relative to each other. For each data type, the three groups were la-

beled 'Concerned/C', 'Neutral/N' and 'Unconcerned/U'. These labels do not reveal anything about the answers they gave to individual items, but only indicate whether respondents belong to the top, the middle, or the bottom third of all respondents in terms of one particular privacy concern. For example, a respondent may be classified as 'concerned' for one type of data but as 'unconcerned' for the other two. Figure 1 gives a breakdown of the component analysis for those 279 users in the sample who have been classified as 'concerned' for at least one data type. Numbers in sections A, B and C indicate how many users fall into the group of 'concerned' users for one data type only, while sections E, D and F state the number of respondents who fall into the 'concerned' third of respondents for two data types. Section G contains the highly concerned users in the sample, who belong to the 'concerned' group for all three data types. This clearly indicates that people have different levels of sensitivity toward personal data, and that the three types of data give rise to varying levels of concern.

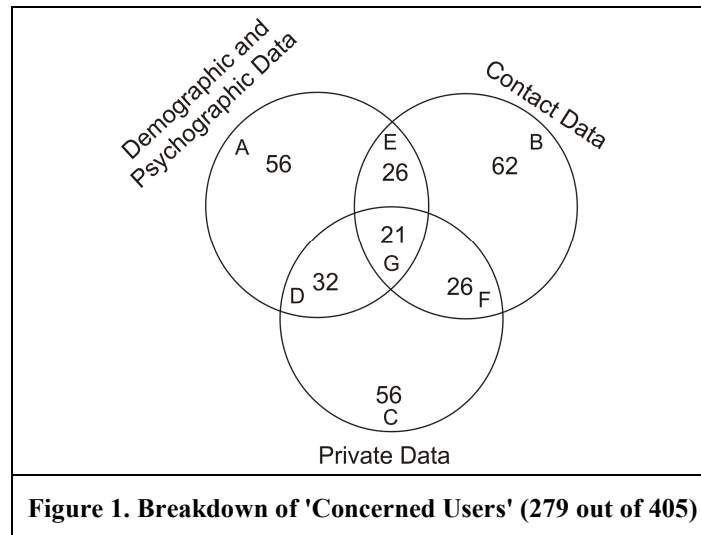
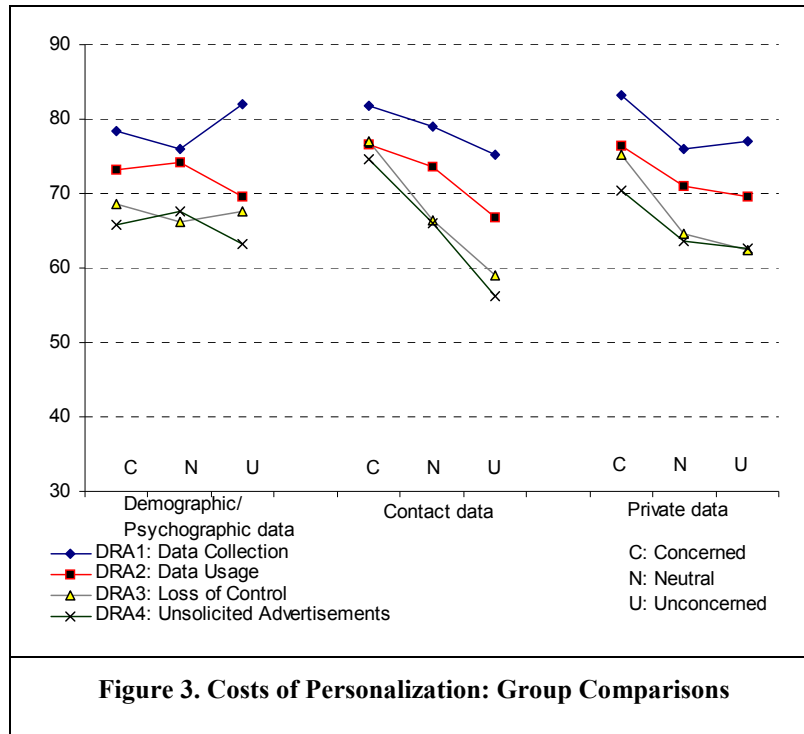


Table 4 shows the wording and the results of the five questionnaire items on online personalization benefits, which pertain to users' willingness to divulge personal data and their attitudes toward these benefits. The results suggest that abstract benefits such as shopping support are less important than visible benefits obtained in exchange for data sharing. These visible benefits include prizes, time savings, and access granted to valuable content. For most benefits, differences among the three groups of users (concerned/neutral/unconcerned) occur in the direction expected. Users in Group C, whose willingness to divulge data is the lowest, tend to agree with these items to a lesser extent than Group N. Users assigned to Group U tend to agree to a greater extent than those in Group N. Thus, users who are concerned about divulging data perceive the benefits provided by personalization to be less favorable than users who are less concerned.

In addition to the means and SD for the whole sample, mean differences between concerned, neutral and unconcerned users with regard to the three components (D/P, Con, Pri) were examined in more detail in the form of pairwise comparisons. The results are depicted in the last three columns of Table 4 under 'Group Comparison'. In order to understand which group is responsible for the significance of the differences, a Fisher LSD test and a Tukey HSD test were performed. The former can be regarded as the most liberal of all post-hoc tests, while the latter is more conservative and reduces type-one errors at the expense of statistical power. In those cases where the tests yield different levels of significance, the results from the Tukey HSD tests are shown first, with any asterisk *after* the slashes indicating the level of significance *added* by the Fisher LSD test (e.g. */* means that the difference is significant at $p < .1$ for the Tukey HSD test and at $p < .05$ for the Fisher test).

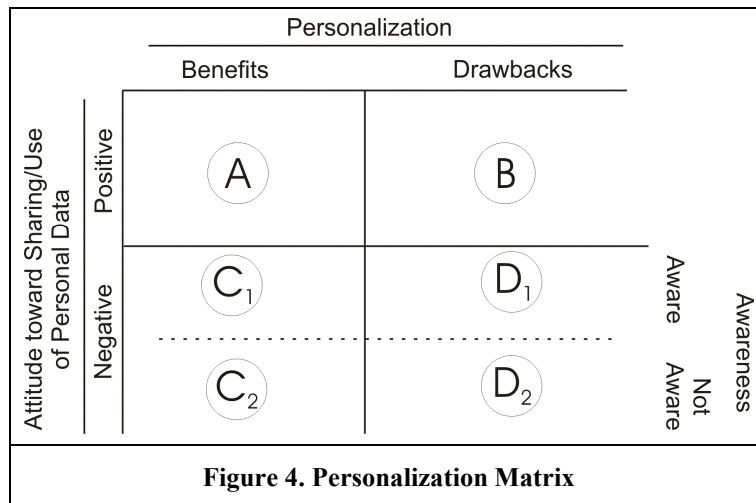
Table 4. Perceived Benefits of Online Personalization							
		Whole Sample		Group Comparison (Mean Differences)			
Variable	Wording	Mean	SD	D/P	Con	Pri	



Discussion

This paper has highlighted that personalization does not necessarily produce the results companies may expect. In the past few years, the issue of privacy has been paid increasing public attention, which has also created awareness of privacy violations among users. In view of the rising importance of data collection and the increased capabilities of data analysis, one can assume that the debate about the trade-off between personalization and user privacy will continue. The interviews and the survey conducted for this study have explored the benefits and costs of personalization. The results indicate that users differentiate among different types of data when it comes to data sharing. In addition, their general attitude toward personal data (i.e. their perceived level of risk associated with the disclosure of various data types) determines their perceptions of personalized marketing communication. The finding that users expect personalization to lead to an increase in unsolicited commercial messages suggests that personalization may have varying consequences, depending on how responsibly companies use the data they collect.

To illustrate the potential success or failure of personalization, Figure 4 matches its potential benefits and costs against users' positive and negative attitudes toward divulging personal data. The upper left cell (A) includes those users whose attitude toward sharing is positive and to whom personalization provides the benefits identified above. In this case, users consider personalization to be helpful when making purchasing decisions. If users' attitude toward sharing is positive but personalization efforts fail (B), companies send irrelevant promotional messages to users, which is essentially the same as sending them non-personalized promotional material they are not interested in.



Users whose attitude toward sharing data with companies is negative need to be segregated into those who are aware of personalized promotions and those who are not. Especially on the Internet, users may fail to notice that the content of a page has been tailored to their interests, given that Web content is always in a state of flux. Similarly, they may not be aware that a commercial e-mail has been tailored to their interests, since e-mail is meant to be an interpersonal communication tool. If users whose attitude toward sharing is negative are unaware of personalization (C₂), they may perceive promotions they are interested in as helpful when making purchasing decisions. However, even appropriately personalized promotional messages may result in negative reactions from users when they perceive it as an infringement on their privacy, which may also have a negative impact on future business (C₁). If users do not consider recommendations made by companies to be relevant (D₂), the situation is equivalent to that of non-personalized messages, unless users are aware of this personalization. In this case (D₁), users feel that personalization legitimizes their concerns and their attitudes toward personalization may even change for the worse.

The six scenarios depicted in Figure 4 give rise to a number of implications for managerial practice:

- *Differentiation according to types of data:* The principal component analysis has highlighted that users consider sharing data to be risky, if these data enable companies to contact them. Sharing credit card information is considered to be particularly risky. Nevertheless, many forms – both offline and online – contain mandatory fields, which solicit information from users that is not needed to complete a purchasing transaction. Although on the Internet it is easy to force people to fill in particular fields thanks to dynamic forms, the results suggest that companies should only ask customers – and in particular new customers – for those types of data that are absolutely necessary to complete a purchase and that are perceived as non-critical by users.
- *Differentiation according to user segment:* Our proposition postulates that people's attitudes toward personal data influence their perception of personalization, which has generally been confirmed with a small probability of error. Users who are highly skeptical of the collection and use of their personal data tend to pay more attention to negative consequences than to positive ones. Therefore, we suggest using opt-out facilities in order to segregate different groups of users. Most importantly, users need to be made aware that they can change their data handling preferences (personalized vs. non-personalized) at any time.
- *User data and transparency:* It has turned out that users know very little about the actual extent to which their personal data are collected and used. This calls for informing users better about personalization and the value it adds. Companies should also disclose what types of data (e.g. demographic data vs. site usage data) companies use, since only transparent data handling can build trust and ease people's concerns about data misuse. Very few people know exactly in which databases data about them are stored. Therefore, users should be given the opportunity to view their own profiles and change or delete information collected about them. Also, users should be provided with contact details of employees responsible for questions on data handling so that they can get in touch with them using offline media.
- *Reduction in personalization:* Companies' high expectations regarding the benefits of personalization have led to a rapid increase in customer communication in the past few years. If companies contact customers too often, even if they do so for a valid reason, customers will begin to ignore their offerings. Even users who are relatively uncon-

cerned regarding the sharing of their personal data see the potential costs of personalization. This suggests that companies should assess the value that users gain from each personalization effort and drop measures that fail to provide value to users.

The results of this study indicate a relationship between users' attitudes toward personal data and their perceptions of personalization. This suggests that people's attitudes toward data sharing should be accounted for as a moderating variable in future studies examining the impact of personalization on dependent variables, such as customer satisfaction and customer loyalty. Future studies should also identify potential influences on attitude changes. In particular, they should address the question whether personalization is capable of influencing people's general attitudes toward data sharing, which opens up avenues for future interdisciplinary research.

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