



THE COMPLEXITY OF CONSUMER WILLINGNESS TO DISCLOSE PERSONAL INFORMATION: UNRAVELING HEALTH INFORMATION PRIVACY CONCERNS

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ABSTRACT

There is little else that is as consequential to an individual as his or her health. As healthcare becomes increasingly digitized, the promise of improved healthcare enabled by technological advances must inevitably be traded off against any unintended negative consequences. In this context, the privacy of one's personal health information has escalated as a matter of significant concern for the public. The value from drug discovery, medical research, and public health policy can be realized only if consumers are willing to allow their health information to be electronically stored and manipulated. Under what circumstances will individuals be willing to disclose identified personal health information and permit it to be digitized? This question must be answered in order to craft appropriate policy and encourage usage of healthcare technology in the future. We conducted a study to address this question. Using a nationally representative sample of 545 consumers, we measured individual willingness to disclose personal health information under 27 different scenarios, adapted from those developed by the Health Information and Security Privacy Collaboration. We manipulated the type of information (general health, genetic, and mental health), the intended purpose (patient care, marketing, research), and the requesting stakeholder (hospitals, pharmaceutical companies, government). Further, we explored the impact of emotion linked to one's health condition on willingness to disclose. We find strong significant effects for all the situational factors and emotions on the extent to which an individual is willing to share their personal health information.

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INTRODUCTION

It is undeniable that today, one of the most vexing obstacles to the digitization of healthcare is consumer concerns about the privacy of health information. Beyond the adoption of electronic health records (EHRs) and related artifacts, we are poised on the brink of a future where information technology (IT) enables the practice and delivery of medicine to be increasingly personalized (Glaser et al. 2008), in much the same way as products and services are customized to the needs and preferences of consumers in commercial domains (Awad and Krishnan 2006). For instance, today, an individual can inexpensively avail of genetic testing that allows for customization of healthcare. However, the ability to personalize and fully leverage the benefits of digitized health information is fundamentally predicated on the capture and analysis of large quantities of personal information (HHS 2007), and consumers' willingness to buy-into the electronic storage of information.

The specter of personal health information being compromised is alarming: a nationwide Harris poll conducted in 2006 confirms that approximately one quarter of U.S. adults have significant concerns about the use of their health information and 50% believe they have lost control of how their medical records are used by insurance companies, employers and governmental agencies (Harris 2007). Consequently, even as these breakthrough developments in technology offer unprecedented opportunities for improved access to digitized information, greater control over one's health, and the promise of personalized healthcare, they simultaneously pose a number of serious risks to the privacy of personal health data. In addition to the more passive concern of the public reflected in survey results, privacy advocacy groups have begun to form initiatives aimed at actively representing patients' rights which could impede progress toward the goal of digital capture of health information for all US citizens by 2014 (e.g. EPIC 2008). Public agencies are similarly cautious: NIH recently blocked public access to its DNA database after concerns that the information may not be as anonymous as previously believed (Felch, 2008).

The visceral nature of consumer privacy concerns related to health information is not surprising, given the potential ramifications of loss in the health information privacy context that can include financial, social and psychological risks (Beckerman et al. 2008). The volume and scope of personal health information being captured and stored in digital form by both healthcare institutions such as hospitals (Kush et al. 2008) and non-health entities such as Google and Microsoft (Liedtke 2008; Mandl and Kohane 2008) is increasing every day. While the highly publicized forays by Google and Microsoft into the personal health record space are purportedly intended to empower consumers so that they electronically manage their own health information, these organizations are officially not covered under the Health Insurance Portability and Accountability Act (HIPAA) (Mandle and Kohane 2008). Thus, a consumer's personal health information is not guaranteed the same privacy protection it is when the consumer provides it to a doctor or pharmacist working for a healthcare organization (Liedtke 2008). The risks are similar for individuals seeking genetic testing for non-pathological purposes¹. For example, an individual can submit a cheek swab sample for testing to obtain personalized nutritional recommendations tailored for her genome. This type of test is typically broad based compared to traditional pathologic testing which might look for one particular gene mutation (Kohlmeier 2007). As a result, the volume of information which becomes vulnerable is exponentially greater. Even in the more traditional healthcare setting with electronic health records, privacy concerns continue to be raised (DesRoches 2008; Harris 2007).

However, offsetting consumer privacy concerns are a number of significant benefits to be realized by the digitization of health information, including reduced medical errors, improved patient care and reduced healthcare costs (Glaser et al. 2008; HHS 2007; Mowry and Constantinou 2007). Less frequently cited benefits include improved tracking of drug safety, facilitated research and development of new drug treatments, contribution to public health research, and increased consumer control over healthcare.

Given that the social and individual benefits of collecting granular medical data are considerable and *it is important to gain a detailed understanding of exactly what constitutes consumer privacy concerns*. How can the issue of privacy be addressed through policy? Clearly, privacy legislation is one approach, and increasingly states are proposing new bills that will provide greater protection and stricter penalties for privacy breaches (McGreevy, 2008). However, a second and equally important aspect of addressing privacy concerns is to more fully understand the *contingencies* that affect them. An accurate assessment of consumer privacy concerns which incorporates the appropriate situational factors and

¹ "Nonpathologic" or "lifestyle" genetic testing looks for interactions between diet and genes to maximize quality of life and avoid disease. In contrast, "pathologic" genetic testing refers to traditional testing used for disease prediction or diagnosis.

emotion is essential to facilitate the development of appropriate programs and messages to effectively educate consumers on the benefits of electronic health records and other forms of digitized medicine. Moreover, armed with the knowledge of what influences consumer decision making with regard to health information disclosure, appropriate policies can be implemented to ensure rights are not violated when consumers are at their most vulnerable.

Acknowledging the importance of security and privacy of health information, the Department of Health and Human Services (HHS) created the Health Information Security and Privacy Collaboration (HISPC) in 2005. HISPC is a multi-disciplinary team of experts brought together in an effort designed to accelerate the adoption of health information technology (health IT) and the secure portability of health information across the U.S. (HHS 2005). One of the accomplishments of this initial effort reported in December 2007 was education and outreach to stakeholders including the formation of a multi-state collaborative group intended to continue the education of consumers about security and privacy issues surrounding health information exchange (Dimitropoulos 2007). The mission of this multi-state group acknowledges the education of consumers as an ongoing area of need in the future to ensure the success of electronic health information exchange. The collaborations have facilitated interactions between the states and provided each with a baseline for comparison (Dimitropoulos 2007). The resulting synergies and momentum can be leveraged for the success of future efforts. While a few states conducted interviews, focus groups or small scale surveys of consumers to gauge their concerns, the need for rigorous academic research on a national level remains.

We conducted a study aimed to address the following question: under what circumstances are individuals willing to allow their identified personal health information to be digitized? Using a nationally representative sample of over 500 consumers, we measured individual willingness to disclose personal information under 27 different scenarios created by varying the type of information, the intended purpose, and the requesting stakeholder. Further, we explored the impact of emotion linked to one's health condition on willingness to disclose.

The Importance of Unraveling Health Information Privacy Concerns

Our research is focused on understanding the nature of consumer health information privacy concerns in a detailed and systematic way that unravels the complex nature of these concerns. One limitation of the existing research on information privacy (e.g., Dinev and Hart 2006; Malhotra et al 2005; Pavlou and Gefen 2004; McKnight et al 2002) is that most researchers have treated the underlying decision process of weighing the costs and benefits individuals engage in when determining whether or not to disclose information as much the same across contexts. While it has been acknowledged that shopping habits, demographic, financial, and medical information vary in the degree of sensitivity (Beckerman et al. 2008; Culnan 1993), the healthcare context is arguably unique because of the variety of risks raised with the potential privacy loss of different types of health information (Kohlmeier 2007; Beckerman et al. 2008) as well as the *emotion* linked to one's medical state (Trumbo et al. 2007; Loewenstein 2005).

As part of the national collaborative movement to address privacy and security policy questions HISPC created scenarios designed to cover a wide range of types of information as well as the intended use of the information to ensure coverage of all types of procedures/policies pertaining to mental health, substance abuse, HIV, genetic information, communicable diseases and chronic conditions. In addition to varying the type and use of information involved, the HISPC scenarios cover a variety of requesting stakeholders including hospitals, clinics, law enforcement, pharmacies, labs, and manufacturers due to the fact that different policies/procedures apply to these stakeholders (Dimitropoulos 2007). These HISPC scenarios reinforce the importance of numerous contextual factors influencing privacy in the healthcare setting.

Building on the privacy calculus process of weighing costs and benefits of disclosure (Phelps, Nowak and Ferrell 2000; Culnan 1993), we use privacy boundary theory (Petronio 2002; Stanton 2003) and the HISPC scenarios to explore the role played by the type of health information requested, the intended purpose for which the information will be used and the requesting stakeholder (e.g. pharmaceutical company, hospital, public health agency) on individual willingness to provide access to health information. In addition, we apply recent developments in the literature related to *risk-as-affect* (Loewenstein 2001).

To test our conceptual model, we conducted a national survey of 545 respondents. We describe briefly our research framework and supporting theoretical background followed by our methodology. We then present our results. We conclude with a discussion of the insights and implications of this study.

BACKGROUND AND RESEARCH FRAMEWORK

The focal dependent variable in our study is the willingness to provide access to a specific type of personal health information in electronic format to a particular stakeholder for a specified purpose. Types of personal health

information can include mental health, general health or genetic information. Healthcare stakeholders could include hospitals, pharmacies or governmental agencies each of whom have their own interests in obtaining access to consumer health information. Personal health information may be required in the provision of patient care or be beneficial in facilitating research and marketing products and services.

Boundary Management/Privacy Calculus

An individual's choice behavior and persuasive propensity differs depending on the domain of risk (Rettinger and Hastie 2001; Mandel 2003). Factors found to influence decision processes across different risk domains such as legal, academic and financial include the personal importance of the outcome, the familiarity with the decision context and moral relevance (Rettinger and Hastie 2001). The type of loss perceived as most salient to the individual may vary the degree of influence that risk has on their willingness to engage in the behavior. In a healthcare context, each individual's health status is unique. Two factors such as the specific type of health information requested and the intended use of that information may invoke different risk types and levels for the individual, thus influencing their willingness to disclose personal information.

Type of Information. A handful of prior studies have examined the main effect that type of information, such as financial versus purchase preferences (Malhotra et al 2004) and demographic versus lifestyle (Phelps et al 2000), exerts on willingness to disclose, but the more nuanced interaction effect has not been proposed. The notion that some health information is more sensitive than others is supported by the existence of greater legal protection for certain types of health information records (Beckerman et al. 2008; Dimitropoulos 2007). Disclosure of information related to mental illness, substance abuse and even genetic traits can result in negative consequences including, for example, social stigma, discrimination, criminal prosecution, and job loss (Beckerman et al. 2008). It follows that the degree of influence an individual's privacy concerns regarding the electronic storage of health information in general has on willingness to disclose could vary based on the type of information requested. For example, if the request involves general health information such as height, weight, blood pressure, cholesterol level, and chronic illnesses, unauthorized disclosure of that information could jeopardize one's financial future in terms of employability and insurability, but social risks associated with unauthorized disclosure of this type of information may not be particularly salient. In contrast, if the request involves information about one's substance abuse history, this could have financial, legal and social risks if the information somehow becomes available to unauthorized individuals or organizations. The social stigma may be more enhanced when the request involves information such as HIV status, for example. The increasing sensitivity of the information may increase the domains of risk that become salient to the individual, thus enhancing the negative influence of concern on willingness to provide access.

Purpose. An important distinctive characteristic of the healthcare context is the multiplicity of stakeholders in the system, each with different domains of activity, organizational goals, and performance criteria. Physicians, hospitals, insurance companies, pharmaceutical companies all stand to benefit from access to electronic health information for a variety of purposes, including new drug research, trend analysis, marketing, disease outbreak control, and patient care. Thus, in a theory aimed at understanding an individual's health information privacy concerns, it is necessary to consider each of these potential uses of the information to determine if the concerns vary based on the intended use to which the information will be applied.

In much the same way as the perception of the type of risk varies based on the type of information involved in the risk, the perception of risk type likely varies with the purpose for which the information is to be used. For example, if the request for information is in the context of provision of care or disease management, the individual may believe that her health is at risk if the information is not provided. This would have to be weighed against any financial and social risks associated with potential unauthorized disclosure of private health information which may also apply to the situation. In this scenario, the perceived risks to one's health associated with not disclosing the information may negate any potential financial or social risks associated with a loss of privacy. On the other hand, if the purpose of the request is to use the information for marketing activities, the health benefits may be less obvious. In this situation, the potential financial and social risks may become more salient, serving to enhance the negative influence of concern on willingness to provide information.

Requesting Stakeholder. Individuals are likely to have varied levels of interaction with the numerous stakeholders involved in the healthcare arena. While many individuals may see their primary care physician frequently, they likely visit the hospital less often and even less frequently correspond directly with pharmaceutical companies. This variation in interaction yields different levels of familiarity with each stakeholder. Familiarity has been associated with trust (McKnight et al. 2002). As part of the HISPC initiative, the state of West Virginia conducted a survey of over 500 citizens and validated findings by conducting focus groups (Global Strategy Group 2007). The findings suggest

consumers trust doctors and hospitals the most to own electronically stored health information and trust for-profit companies (e.g. insurance companies) the least.

Emotion

An individual's health can be closely tied to emotions, particularly when one is diagnosed with an illness such as cancer or lung disease (Koyalli 2005; Trumbo et al. 2007). These types of medical outcomes can result in depression (Koyalli 2005) and increased anxiety (Trumbo et al. 2007). While much of the work on decision making under risk and uncertainty involves cognitive evaluation of the severity and likelihood of available alternatives, the influence of emotion in this context has also been documented (e.g. Lowenstein et al. 2001; Lowenstein 2005). People make choices in "the heat of the moment" that they might not have made if they had "counted to 10" which suggests the often dominant influence of affect over cognitive evaluation. The *risk-as-feelings* perspective provides an explanation for individual behaviors that incorporates allowances for emotional influences such as worry, fear, dread or anxiety (Lowenstein et al. 2001). Thus, we apply the *risk-as-feelings* perspective to the healthcare privacy context by incorporating health condition feelings and its influence on willingness to disclose personal health information (Loewenstein et al. 2001).

Individuals who currently have a serious medical condition are likely to experience negative emotions related to their health condition (Koyalli 2005; Trumbo et al. 2007; Lowenstein et al. 2001). They have more vivid mental images of the illness and its effects on their day-to-day functioning, which may disproportionately weigh on decisions related to their health (Damasio 1994; Lowenstein et al. 2001). Emotions can induce a state of insensitivity to probability variations, which can lead individuals to focus more on the desire to improve their health and feel better when choosing to disclose information, even though the probability of realizing a health improvement is actually lower than the potential privacy risk in disclosing health information (Lowenstein et al. 2001). In other words, in a state of illness, the overriding emotion one experiences is to get better, and everything else becomes less salient in decision making. Finally, people tend to experience increased fear as an outcome is closer to realization and behaviors can change as a result (Lowenstein et al. 2001). People in a negative mood often make judgments that tend to continue the negativity (Raghunathan and Pham 1999). In the context of one's health, if an individual is sick it is likely that she will believe she may become sicker and soon need increased care or benefit from research. An otherwise healthy person sees these outcomes (i.e. the necessity for healthcare or research) as far off in the future. Therefore, the healthy person is likely to be less influenced by emotion related to his health condition.

In summary, our research framework asserts that individuals undergo a privacy calculus when deciding whether or not to disclose health information in an electronic storage format. This calculus is influenced by situational risk factors including the type of information requested, the intended purpose and requesting stakeholder. In addition, due to the highly sensitive nature of one's health, the decision to disclose health information is influenced by affect.

METHODOLOGY

The Sample

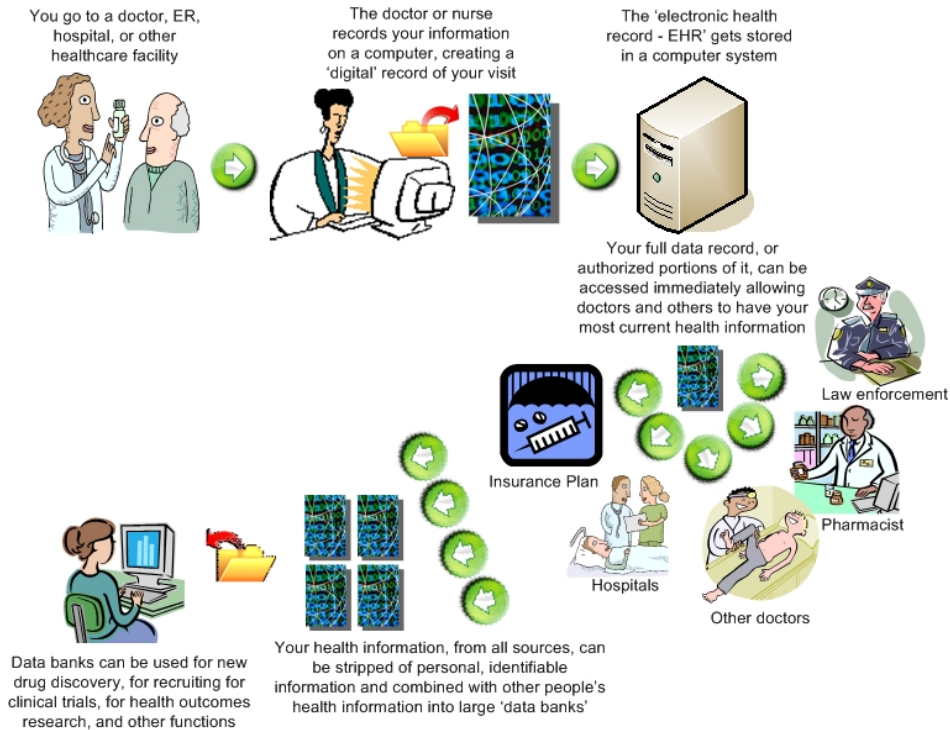
As the target population for this a study is the general adult public², we utilized a survey-based approach and secured a sample of 545 respondents from a professional survey respondent service. The demographics of our sample closely resemble that of the U.S. population (U.S. Census 2006) in terms of age, education, gender and income distribution. Fifty-four percent are female. One third hold a bachelor's degree or above (33.8%) and approximately one fifth (21.8%) have a high school diploma or equivalent. Almost half (48.2 percent) of respondents rate their computer skills as quite extensive or very extensive which indicates a familiarity with technology. In terms of health, almost one third of respondents rate their own health as very good or excellent, another third rates it good while the remaining third rates their own health as fair or poor which suggests a broad range of perceived health status. However, over three fourths of the sample (76.3 percent) indicated that they have some form of chronic illness (e.g. heart disease, diabetes, asthma, cancer, high blood pressure) suggesting they interact with a healthcare provider on a regular basis.

The Survey

The survey provided contextual information on what the digital health exchange of information could look like to ensure that each respondent completed the survey with a common understanding of the nature of the study issue (see

² The adult population includes everyone 18 years and older. The provision of health information about minors requires parental consent (OCR 2003)

Figure below). Through a variety of scenarios, each respondent indicated his/her willingness to disclose personal health information for three types of information (general health, genetic, and mental health), three purposes (marketing, research, and patient care) and three requesting stakeholders (hospital, pharmaceutical company and government/public health agency). This resulted in 27 scenarios. Finally, the respondent answered questions related to concern, trust, emotion, controls and demographics. Measures were adapted from prior studies where available and multi-item scales were used to improve reliability and validity of measurement.



RESULTS

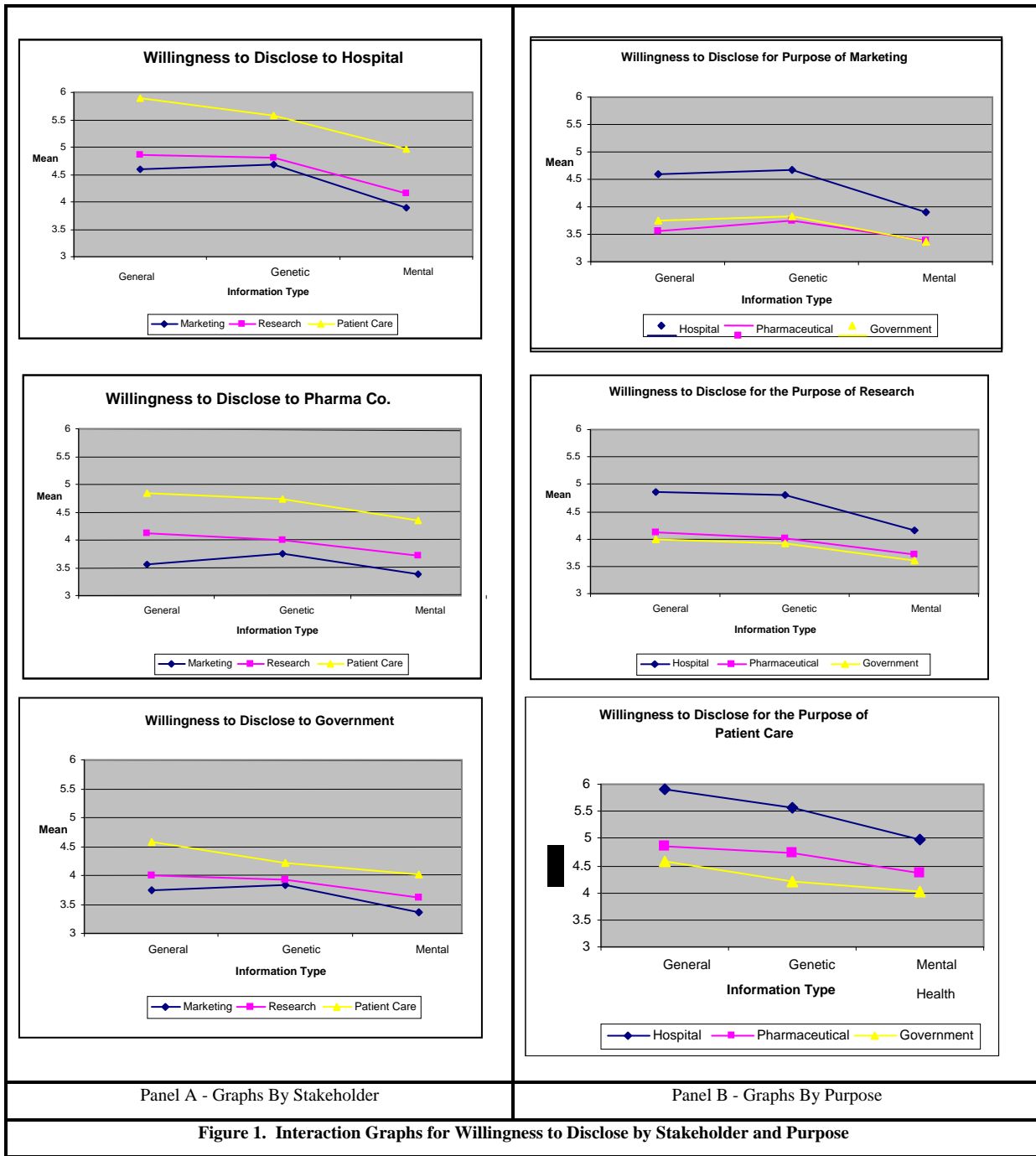
Privacy Calculus and Boundary/Contextual Considerations

To test the influence of type of information, purpose and requesting stakeholder, we conducted a repeated measures ANCOVA. This is an appropriate test for assessing differences in judgments of the same individuals over a variety of conditions. A repeated measures design reduces the unsystematic variability in the design by controlling for individual differences which provides greater power to detect effects. Thus, we compare an individual's within subject willingness to provide access to the three types of personal health information (general, genetic and mental health) for three purposes (marketing, research and patient care) to three different stakeholders (hospitals, pharmaceutical companies and government/public agencies). We included age, race/ethnicity, income, education, experience with past privacy violations, general concern about the electronic storage of health information, and trust in electronic storage as a medium as covariates in the model. For the analysis, we tested for violations of sphericity with Mauchly's test of sphericity. With repeated measures ANCOVA it is important to make adjustments if the variance-covariance matrix of the dependent variables indicates significant differences in variances between conditions (Field 2000). We utilized the Greenhouse and Geisser (1959) estimates to obtain a correction factor that assesses the observed F -ratio.

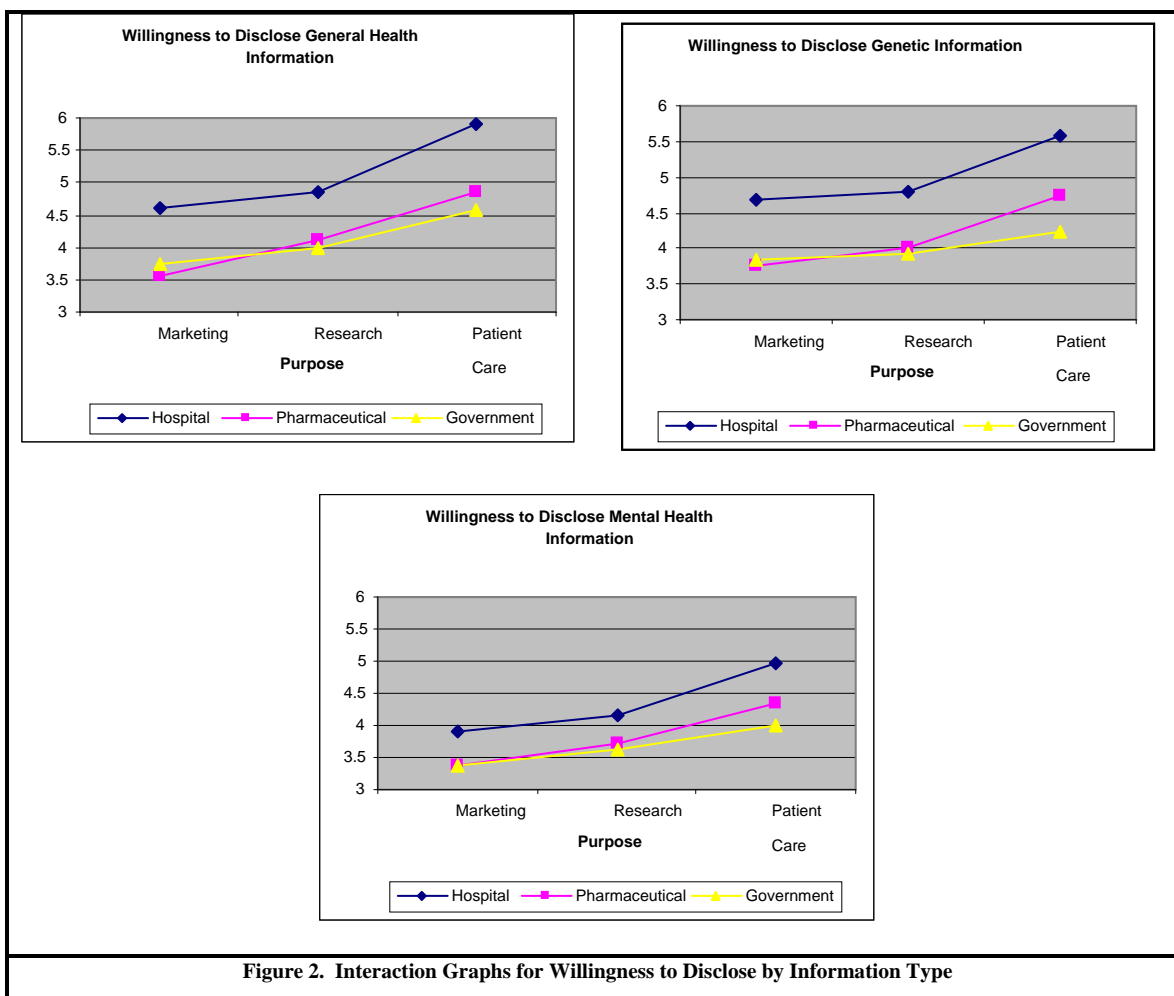
The data supports a three way interaction between type of information, purpose and requesting stakeholder on willingness to disclose personal health information. Since the F -statistic violated the sphericity assumption ($p < .001$), the Greenhouse and Geisser (1959) estimate was applied to make conservative corrections to the F -ratio. This estimate was significant ($F=2.090$; $p=.039$).

The interactions are depicted in a series of graphs in Figures 1 and 2. Across all three stakeholders, the data suggests consumers are most willing to disclose for the purpose of patient care and least willing to disclose for marketing purposes with research falling in between the two (see Panel A of Figure 1). Certainly, the personal stakes are highest in the instance of patient care. Perhaps these results indicate a high level of trust in hospitals resulting from the familiarity

consumers may have with this stakeholder. Respondents appear most willing to disclose to hospitals for all purposes and type of information (see Panel B of Figure 1 and Figure 2).



In terms of types of information, respondents were most willing to disclose their general information (M=5.892) and genetic information (M=5.578) to hospitals for patient care (see Figure 2). Finally, the data suggests respondents were least willing to disclose to government for the purposes of patient care (general health M=4.576, genetic M=4.221, mental health M=4.011) which may suggest a feeling that patient care is not a task perceived to be mission relevant for the government as compared to hospitals or pharmaceutical companies (see Figure 2). Mission relevance has been associated with privacy concerns in organizational settings (Culnan and Armstrong 1999; Stanton 2003).



Emotion

To determine if there is an influence of emotion on willingness to grant access to personal health information across our conditions, we divided our respondents into two groups based on their responses to 12 items intended to measure negative emotions such as anger, disgust, fear and sadness related to their health status (Bowman et al. 2006). Reliability testing yielded satisfactory results (cronbach's alpha = .948) and confirmatory factor analysis yielded a single factor. Therefore, we created an index to be used for further analysis. Respondents above the mean on the negative emotion index, were placed into the negative emotion group. We conducted ANCOVA tests to compare the mean levels of willingness to provide access between the respondents indicating negative emotion related to their current health status and those reflecting positive feelings about their health condition. We included age, race/ethnicity, income, education, experience with past privacy violations, general concern about the electronic storage of health information, and trust in electronic storage as a medium as covariates in the model. In total, we conducted 27 separate tests to cover all combinations of type of information requested (3), purpose (3) and requesting stakeholder (3).

Nineteen of the 27 ANCOVA tests (70%) were significant which suggests that emotion plays a key role in the consumer privacy decision process. Specifically, consumers with negative feelings about their health status indicate a greater willingness to disclose information in 18 of the 27 scenarios. Intriguingly, this same group of respondents is significantly *less* willing to disclose their general health information for the purposes of receiving patient care in a hospital setting.

An examination of the significant results for each category of situational factors shows that the majority of differences between consumers who feel negatively about their health status and those who feel positively exists for requests made by pharmaceutical companies (8), requests made for the purpose of research (8) and requests made for mental health information (8). In other words, people feeling sad or angry about their health are more likely to disclose private health information to pharmaceutical companies and to disclose such information for research purposes and to grant access to their personal mental health information. This arguably more vulnerable group was less willing to disclose information

in only the scenario involving providing access to general health information for the purposes of receiving patient care in a hospital setting.

For illustrative purposes, we depict 4 of the 19 significant differences in means in the graphs in Figure 3. Respondents with negative emotions about their health are significantly ($F = 4.385; p=.037$) more likely to provide access to their genetic information ($M=4.997$) for research purposes to hospitals than respondents with positive emotions about their health ($M=4.639$). Similarly, respondents with negative emotions about their health are significantly ($F = 8.331; p=.004$) more likely to provide access to their mental health information ($M=4.304$) for patient care purposes to governmental agencies than respondents with positive emotions about their health ($M=3.771$). Respondents with negative emotions about their health are significantly ($F = 7.907; p=.005$) more likely to provide access to their genetic information ($M=4.286$) for research purposes to pharmaceutical companies than respondents with positive emotions about their health ($M=3.776$). Finally, respondents with negative emotions about their health are significantly ($F = 5.713; p=.017$) less likely to provide access to their general information ($M=5.718$) for patient care purposes to hospitals than respondents with positive emotions about their health ($M=6.034$).

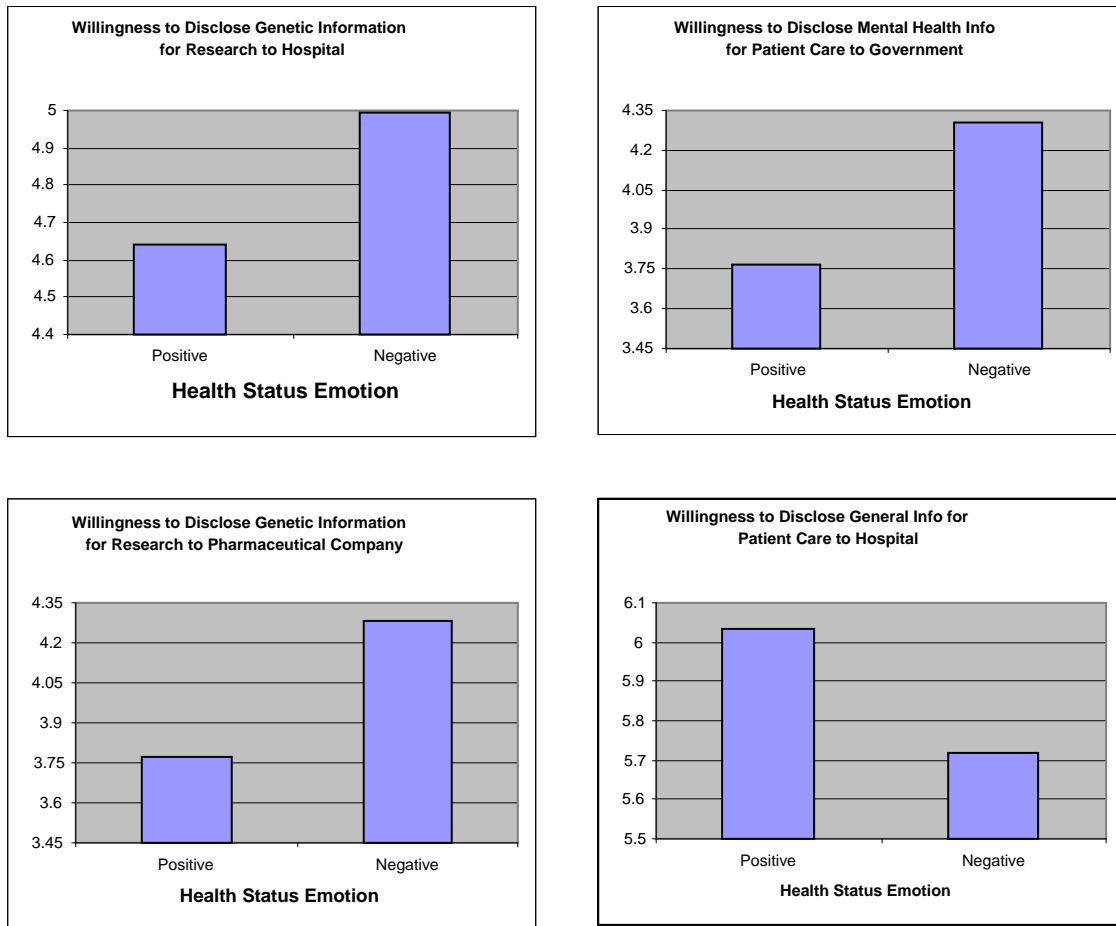


Figure 3. Graphs Depicting Means for Willingness to Disclose by Respondent Emotional Group

CONCLUSION

There is little else that is as consequential to an individual as his or her own health. As healthcare becomes increasingly digitized, the promise of improved healthcare enabled by technological advances must inevitably be traded off against any unintended negative consequences. In this context, the privacy of one's personal health information has escalated as a matter of significant concern for the public. Although there is much value to be realized in drug discovery, medical research, and public health policy, this will only occur if consumers are willing to allow their health information to be electronically stored and manipulated. Under what circumstances will individuals be willing to disclose personal health information and allow it to be digitized? This question must be answered in order to craft appropriate policy and encourage usage of healthcare technology in the future.

In this study we noted that healthcare is a unique setting for multiple reasons including the highly sensitive nature of different components of health information and the number of stakeholders with a vested interest in gaining access to consumer health information for a variety of purposes. The nature of risks related to the disclosure of health information is diverse (Beckerman et al. 2008). In addition, unlike retail or financial settings in which much prior privacy research has been conducted (e.g., Dinev and Hart 2006), an individual's health status involves emotion (Trumbo et al. 2007) which can influence decision making (Loewenstein 2005).

It is unsurprising that our findings indicate consumers are most willing to share information with hospitals in patient care settings. However, significant benefits stand to be gained from the digitization of health information for research and it is unlikely that all of that research can be conducted by hospitals. Our findings suggest that there may need to be more assurance of privacy and trust built in governmental agencies and pharmaceutical companies before consumers become comfortable with sharing information with such stakeholders.

The results of the comparisons of willingness to disclose between respondents with negative feelings about their health status and respondents with positive feelings show that the former group is more susceptible to potential violations of their privacy. These findings raise important questions about the timing of privacy decisions about the disclosure of health information. If people's judgments may vary with their emotions related to their health at a given point in time, should consent be sought at every interaction with a healthcare professional? If an individual is unduly influenced by emotion, they may make a decision which they may regret at a later point in time at which point the damage could already be done if private information has already been disclosed to an unintended entity (Loewenstein 2005).

As we move forward toward a goal of electronic health records for all U.S. citizens by 2014, it is essential to understand what roadblocks stand in the way of our progress and to understand the ramifications of such progress. The practical implications of this study include an improved understanding of consumer concerns and potential impacts regarding the electronic storage of health information. Policy makers can use this information to craft policies tailored to meet consumer needs. In addition, consumers can be segmented into groups for targeted marketing campaigns designed to, for example, either recruit consumers who are particularly open to sharing information for potential participation in clinical trials or educate particularly resistant consumers on the benefits and safety of electronic health records.

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