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Gaurav Bansal

University of Wisconsin - Green Bay, bansalg@uwgb.edu

Rebecca Davenport

University of Wisconsin - Green Bay, daverl29@uwgb.edu

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Moderating Role of Perceived Health Status on Privacy Concern Factors and Intentions to Transact with High versus Low Trustworthy Health Websites

Gaurav Bansal

University of Wisconsin - Green Bay
bansalg@uwgb.edu

Rebecca Davenport

University of Wisconsin - Green Bay
daver129@uwgb.edu

ABSTRACT

Prior research suggests four privacy concern factors namely 1) collection, 2) unauthorized secondary use, 3) improper access and 4) errors in handling one's information. This research investigates the moderating role of perceived health status on the relationship between health information privacy concern factors and one's intentions to transact with high trust websites (offering no discount) versus low trust websites (offering high discount). We use Utility Theory to argue that privacy concern factors and perceived health status impact one's preference of trust over discount. This is the first study, in our knowledge, to examine the impact of perceived health status in this setting. It is also an early attempt to investigate the relative role of the privacy concern factors. On theoretical side the study thus adds to the privacy-trust literature, and also contributes to the health information systems area. The study has practical implications by showing that the well known and lesser known health websites need to follow different strategies in order to win over their users' business. Moreover, their strategy needs to be different depending upon the perceived health status of their users.

Keywords

Health information privacy concern, privacy concern factors, trust, perceived health status

INTRODUCTION

Research suggests that people are concerned for the privacy of their health information (Westin 2006). Health information is generally considered more sensitive than demographics and contact information (Bansal et al. 2008; Malhotra et al. 2004). People are concerned that once the health information is out, it is out, and cannot be made secret again (Rindfleisch 1997). People "worry that the risk of sensitive medical information falling into the wrong hands — such as those at insurance companies, employers, drug companies and marketers — is too great" (USAToday.com 2008). Moreover, unhealthy people have more reasons to be wary of their health information privacy. Those who perceived their health to be "poor" are more sensitive about their health information (Bansal et al. 2010).

LITERATURE REVIEW AND THEORY

Privacy concern has been defined as the degree of control one has over one's information (Bansal et al. 2010). Smith et al. (1996) identified four dimensions of privacy concern namely: (a) collection, (b) unauthorized secondary use, (c) unauthorized access, and (d) errors. Stewart and Segars (2002) later established privacy concern as a second order construct with the four first order factors. Malhotra et al. (2004) have also analyzed the privacy - trust relationships modeling privacy as a second order construct. However, till date the individual examination of the privacy concern factors is rare. This paper attempts to fill that void by examining the relative role of privacy concern factors on preference of trust over discount. Table 1 briefly defines the privacy concern factors.

Collection Concern	Collecting too much information on the users
Secondary Use Concern	Usage of the user information for other purposes, without the users' approval
Improper Access Concern	Unauthorized access to the user information
Errors Concern	Errors in the user information

Table 1. Definition of the Privacy Concern Factors (Smith et al. 1996)

Utility Theory suggests that individuals tend to maximize overall utility of the transaction and that these decisions are a function of one’s personal dispositions. Relying on Utility Theory, Bansal et al. (2010) argued that disclosing health information online is a disutility. Privacy concerns enhance this disutility whereas trust in the website reduces this disutility. They showed that the perceived disutility is a function of one’s personal dispositions. In the same vein it could be argued that those who have high perceived disutility with disclosing health information online would be willing to pay premium in order to transact with a trustworthy website and those who have low perceived disutility would be willing to trade for discount over trust. Perceived poor health status would arguably heighten the disutility associated with the health information disclosure. Thus,

Hypothesis1. Concerns related to collection of private health information are positively associated with intention to transact with higher trust website.

Hypothesis2. Concerns related to unauthorized secondary use of private health information are positively associated with intention to transact with higher trust website.

Hypothesis3. Concerns related to improper access to private health information are positively associated with intention to transact with higher trust website.

Hypothesis4. Concerns related to errors in handling of private health information are positively associated with intention to transact with higher trust website.

Hypothesis5. Perceived poor health status will positively moderate the relationship between *collection* privacy concerns related to private health information and intention to transact with higher trust website, such that those with higher *poor health status* will have higher intentions to transact with trust websites.

Hypothesis6. Perceived poor health status will positively moderate the relationship between *unauthorized secondary use* privacy concerns related to private health information and intention to transact with higher trust website, such that those with higher *poor health status* will have higher intentions to transact with trust websites.

Hypothesis7. Perceived poor health status will positively moderate the relationship between *improper access* privacy concerns related to private health information and intention to transact with higher trust website, such that those with higher *poor health status* will have higher intentions to transact with trust websites.

Hypothesis8. Perceived poor health status will positively moderate the relationship between *errors* privacy concerns related to private health information and intention to transact with higher trust website, such that those with higher *poor health status* will have higher intentions to transact with trust websites.

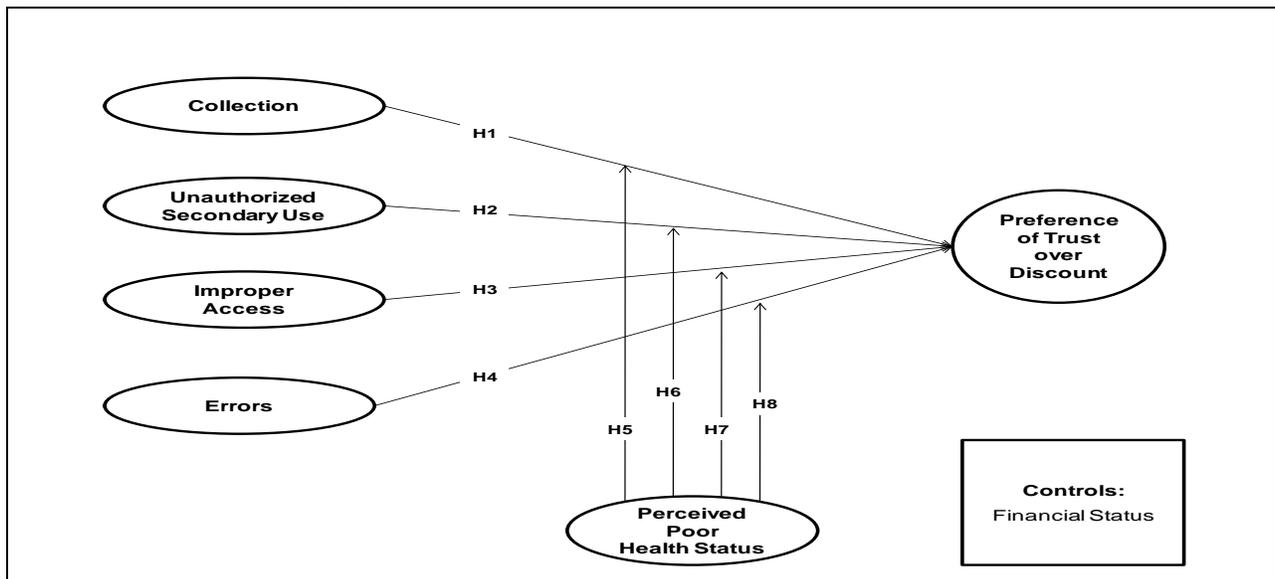


Figure 1. The Research Model

RESEARCH METHODOLOGY

Participants were students in a Midwestern university. The participants were asked to respond to a scenario description. The scenario asked the participants to assume that they want to buy vitamins which suit their medical

condition. There are 11 websites selling the vitamins. The participants were told the following. (1) The websites ranged from low trust (offering high discount) to high trust (offering no discount). (2) The websites have been evaluated for their level of trust by customers who have used them in the past. (3) All the vitamin websites have the same level of product and service quality and the differentiating points are trust and discount alone. (4) All the vitamin websites require that the user pay through an escrow service (e.g., PayPal). (5) They all need the user to provide them with one's health information such as medical history, health status, medications, health and fitness level, addictions etc., in order for them to customize the type of vitamin that would work for the user.

Next, the participants were quizzed on the scenario description to make sure that they understood the same. The scenario grid of 11 websites followed next. The participants were asked to choose the website they would intend to do transaction with. They then filled out the instrument online. The instrument was developed using existing items. Privacy concern items were adapted from Smith et al. (1996) and Malhotra et al. (2004). Perceived health status and financial status items were adapted from Bansal et al. (2010). A total of 245 observations were collected. 25 did not complete the survey. Another 30 were deleted because they failed the scenario quiz. A total of 190 usable observations were collected. There were 83 males, and 106 females. One participant chose not to disclose his/her gender. Average age was 21.73 years (std dev = 5.22). Minimum was 18 and highest was 52, all 190 responded to the age question. The participants had on average 10.11 (std dev = 3.41) years of internet experience.

Construct	Code	Items
Privacy Concern - Collection	Col1	My level of concern when online companies:
	Col2	Ask me for my health information is (very low / very high) Collect too much health information is (very low / very high)
Privacy Concern - Secondary use	Sec1	My level of concern that online companies may: Share my health information, without prior authorization with other companies is (very low / very high)
	Sec2	Sell my health information to other companies is (very low / very high)
	Sec3	Misuse my health information for other reasons without prior authorization is (very low / very high)
Privacy Concern - Unauthorized access	UA1	I am concerned that when it comes to preventing unauthorized access to my health information, the online companies: (have sufficient controls / do not have sufficient controls)
	UA2	(devote sufficient time and effort / do not devote sufficient time and effort at all)
Privacy Concern - Errors	Err1	I am concerned that when it comes to correcting and verifying the accuracy of my health information, the online companies: (have excellent procedures / have poor procedures)
	Err2	(devote a great deal of time and effort / do not devote any time and effort at all)

Table 1. Instrument (All items were measured on a continuous 11-point semantic differential scale)

DATA ANALYSIS

We performed the data analysis as suggested by Ray et al. (2005). All the multivariate variables were estimated by

Variable type	Variable Name	Number of items	Mean	Standard deviation	Cronbach alpha
Dependent variable (0: low trust & high discount to 10: high trust & low discount)	Health: Trust over discount	1	7.841	2.590	-
	Collection	2	7.324	2.702	0.912
	Secondary use	3	7.948	2.687	0.959
Independent variable (1 to 11)	Improper access	2	6.115	2.381	0.868
	Errors	2	5.710	2.220	0.943
	Health status	2	9.071	1.390	0.728
Control variable (1 to 11)	Fin. status	1	6.660	1.821	-

Table 2. Variable Mean, Standard Deviation and Reliability

averaging the item scores for the variable. We first examined the reliability of the items using Cronbach alpha (table 2). The values were greater than 0.70 and indicate adequate reliability. We next examined the convergent and discriminant validity using the exploratory factor analysis. The items had high loadings greater than 0.83 on the intended factors. No cross loadings greater than 0.40 were found. This suggests that the items possess adequate discriminant and convergent validity.

Ordinary least squares (OLS) regression analysis was used to test the hypotheses. The data were analyzed with the help of 6 separate models as shown in Table 3. Model 1 tests the direct effects of privacy concern factors on preference of transacting with trust websites over discount websites. The contingency hypotheses were tested in several different models (Model 2 - Model 6) to alienate the possible effect of multicollinearity which could arise due to the presence of several interaction terms (Ray et al. 2005). Interaction terms were formed by first centering the main variables which were obtained by subtracting the sample mean value from each observation, and then multiplying the centered moderator variable (health status) with centered variables for the 4 privacy concern factors. Ray et al. (2005) suggested that centering reduces multicollinearity without affecting the coefficient of the interaction term itself. We deleted one observation which was disturbing the normality of the residuals. We compared models with full 190 and 189 observations, and found that the model with 190 observations was providing us with weak support (at $p < .10$) for H5 (related to moderating role of health status on collection and trust) in the full model (model 6) but not in the model 2 (as shown in table 5 below). We also carried out subgroup analysis for collection and health status by binning them into high (factor scores > 0.5) and low (factor scores < -0.5) groups. The analysis is summarized in the Results section. The results with remaining 189 observations are given in the Table 3 and average coefficients across all models (with 189 observations) are summarized in Figure 3. The residuals for all of the models (with 189 observations) satisfied distributional assumptions. Variance inflation factors (VIF) were also consistently low as reported in table 3.

RESULTS

The 6 models on average explained 24.52% of the variance in the trust-over discount variable. In terms of direct hypotheses, H1 related to *collection* and H4 related to *error* were supported and H2 related to *secondary usage* was not supported. Interestingly, H3 related to *improper access* was found to have negative impact implying the preference of discount over trust. In terms of contingency hypothesis, H6 related to the moderating impact of poor health status on secondary use concern and trust-over-discount was significant but with negative sign. Other contingency hypotheses H5, H7 and H8 were not significant. The control variable financial status was significant in all the models.

The subgroup analysis of collection concerns and poor health status reveals an interesting story as well (Figure 2). Even though the hypothesis was not supported in any of the models with 189 observations, the subgroup analysis reveals that the poor health status indeed impacts the collection concerns differently. Poor health status positively moderates the impact of high collection concerns on preference of trust over discount; and it negatively moderates the impact of low collection concerns on preference of trust over discount.

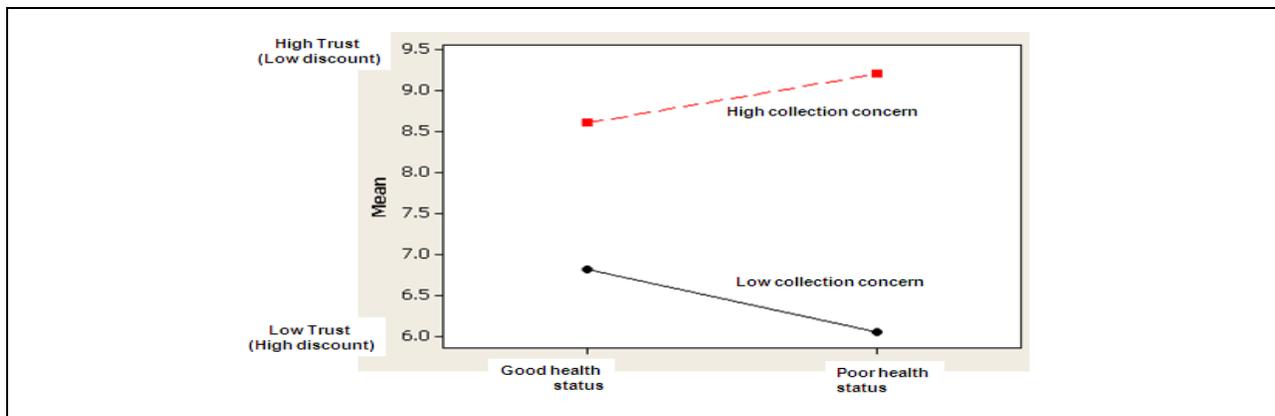


Figure 2. Post hoc analysis of the moderating impact of health status on collection concerns

Hypothesis /variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Intercept	3.008***	3.067***	2.877***	3.034***	2.941***	3.008***
Collection (H1)	0.355***	0.352***	0.360***	0.354***	0.352***	0.342***
Secondary Use (H2)	0.065	0.067	0.053	0.07	0.064	0.060
Improper Access (H3)	-0.192*	-0.191*	-0.177*	-0.193*	-0.195*	-0.173*
Error (H4)	0.175*	0.174*	0.170*	0.175*	0.180*	0.175*
Financial Status (Control)	0.289***	0.282**	0.306***	0.283**	0.299***	0.290**
Health status x Collection (H5)		0.011				0.053
Health status x Secondary Use (H6)			-0.074*			-0.104*
HealthStatus x Improper Access (H7)				-0.032		-0.027
HealthStatus x Errors (H8)					0.039	0.070
R ²	0.238	0.238	0.251	0.24	0.24	0.264
Adjusted R ²	0.216	0.212	0.225	0.214	0.214	0.226
F - Model	10.97	9.11	9.78	9.19	9.21	6.87
p - value	0.000	0.000	0.000	0.000	0.000	0.000
Max VIF	1.990	1.992	2.005	1.990	1.993	2.563

*** p < .001, ** p < .01, * p < .05

Table 3. Results of Regression Analysis

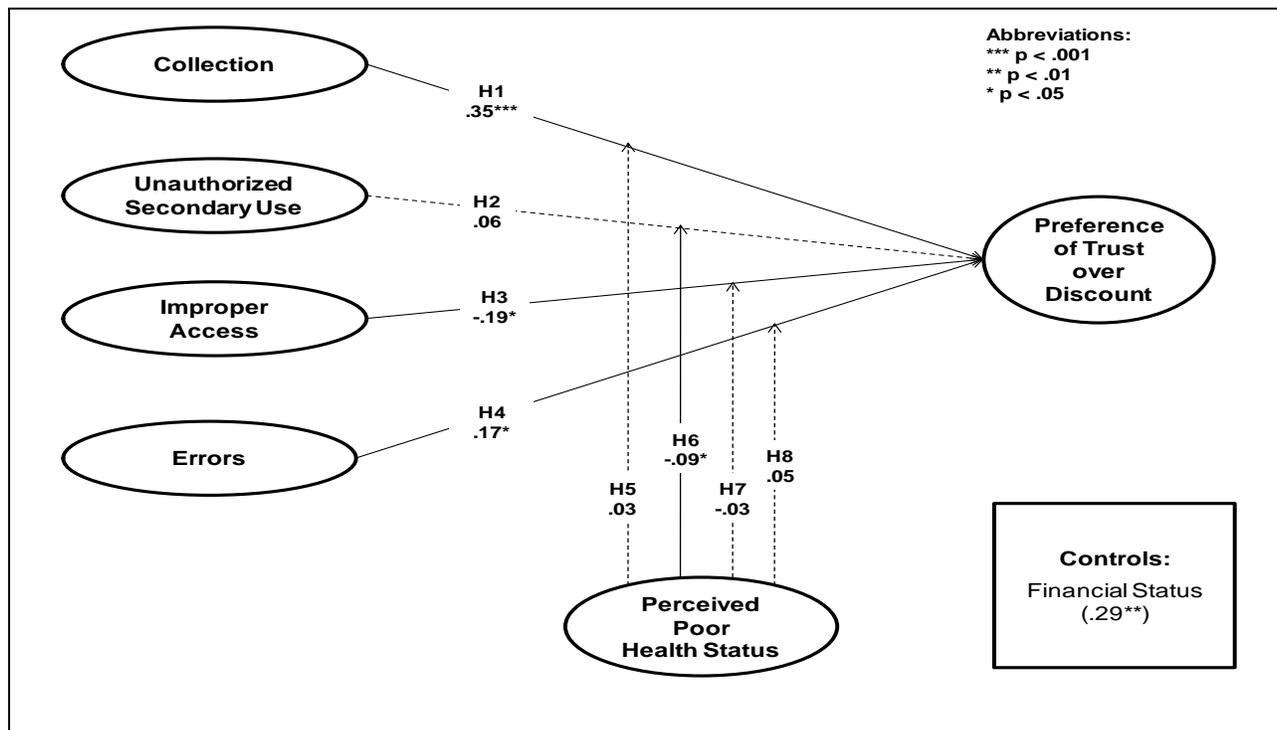


Figure 3. Results

DISCUSSION AND CONCLUSION

There are a couple of interesting findings from this paper. In the direct hypotheses, we found that secondary use concern played no significant role and that improper access had negative impact on the choice between trust over discount. These two findings could be attributed to the privacy protection provided to the users' health information by HIPAA. Other reason for the negative role of improper access could be higher perceived likelihood of improper access of the user's health information stored with the trustworthy companies than with the lesser known companies. With the news about hacking of Google, Citibank, Pentagon, and many other well known entities, people in general have become nervous about the increased interests of the hackers in attacking the known and reputable companies and the companies' limited ability to safeguard the users' information.

It appears that people are looking for protection in lieu of their concerns. Tying back to the HIPAA protection, we can now group these concerns into explicitly protected and implicitly protected. People probably feel that HIPAA explicitly protects them from secondary use and improper access. Due to this explicit protection by HIPAA, people do not feel the urge to spend more money than they have to in order to overcome their secondary use and improper access concerns. But they still feel unprotected for collection and error concerns for which they probably rely on the implicit protection via trust in the company's website.

The posthoc subgroup finding that health status impacts the relationship between collection and trust is different for individuals with high versus low collection concerns. This observation signals that their joint impact was probably nullified and hence no overall significant result was observed. However, the separate group analysis reflects that the poor health status pushes high collection concern people more towards trust, and pushes the low collection concern people towards discount. This again is an interesting finding and should be further analyzed.

In terms of theoretical contribution of this study, it is the first study, in our knowledge, to examine the relative impact of the privacy concern factors on intentions of transacting with high versus low -trustworthy health websites. It is also amongst the first to examine the role of health status in such setting. It suggests that not all privacy factors behave in the same way when it comes to choice between high and low- trustworthy health websites.

This paper gives birth to another question. Is the negative impact of improper access due to HIPAA protection or due to the higher perceived likelihood of improper access of the user's health information stored with the well known companies than with the lesser known companies? Future research should examine this question as well as the role of privacy concern factors in different contexts and with different population sets to enhance the generalizability of the findings.

This paper suggests that the well known and lesser known health websites need to follow different strategies in order to win over their clients' business. Moreover, their strategy needs to be different depending upon the perceived health status of their users. One impression is that companies need to assure their users about collection and error concerns, in particular, because findings of this study suggest that the users are willing to pay a premium in lieu of protection against these two concerns.

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