User Interaction with Healthcare Information Systems: Do Healthcare Professionals Want to Comply with HIPAA?

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ABSTRACT

The Health Insurance Portability and Accountability Act (HIPAA) is US legislation aimed at protecting patient privacy, but it imposes a significant burden on healthcare employees, especially since healthcare system interfaces may not fully support the goals of HIPAA protections. A study of healthcare employees' attitudes and perceptions indicate that characteristics of their organization explain some of the differences in their intent to comply with this legislation. Public hospitals are more likely to foster compliance attitudes than private facilities. Further, administrative staff members are generally more likely than medical staff members to have attitudes leading to compliance. Implications and future research directions are presented.

Keywords

human-computer interaction, HIPAA, compliance, privacy.

INTRODUCTION

Throughout history, few legislative events have revolutionized the healthcare industry like the Health Insurance Portability and Accountability Act (HIPAA). Adopted into law to help ensure patient privacy and security, this legislation contains five provisions: Privacy, Security, Transactions, Code Sets, and Unique Health Identifiers. Training healthcare employees about privacy is a large piece of adherence to the privacy provisions.

The global healthcare industry is growing rapidly, and as western economies experience demographic maturity, the industry is expected to continue its exponential growth. By 2010, the healthcare industry is predicted to account for $2.6 trillion of the United States' Gross Domestic Product (GDP) (Wilson and Lankton, 2004). But the healthcare industry is often viewed as a laggard in terms of technology adoption. Information systems (IS) were not widely adopted in the healthcare community until the late 1980's (Kilroy, 2000). Dynamic environmental conditions for the healthcare industry have encouraged (or mandated) technology usage by healthcare employees. In October 2003, the statutory requirement mandated that claims for reimbursement to Medicare and Medicaid be submitted electronically. The dramatic business process redesign in the industry necessitated by HIPAA compliance has fostered an increased focus on the interface between individual healthcare workers and technology systems. As a result, HIPAA and other factors are driving an increased interest in Human-Computer Interaction (HCI) research and design.

HCI refers to the design, use, and assessment of users and their relationships with technological systems that interact with individuals, groups, and organizations. HCI research encompasses user interface design and usability studies. But it also transcends the design of screens and menus to include the logic for the system's functionality; the impact of technology on human perceptions; the cognitive processes of humans; the behavior of users; the interactions between technology, work and organizations; the way that human systems and technical systems mutually adapt to each other; and other aspects of the relationship between the humans and machines.

Within the field of information systems research, HCI-related research efforts have sought to study how the user interacted with applications. One goal of HCI research is to redesign the data input and output processes to be less likely to cause confusion, thereby enhancing the efficiency and efficacy of responsibilities that involve both humans and computers (Lim, Ward and Benbasat, 1997). More recently, the widespread application of HCI concepts to industries that demand large-scale

information systems has created universal system interfaces that are expandable and adaptable to a wide range of hardware, software, networks, and users. But the underlying philosophy between healthcare and information systems is different. Physicians are trained to look at servicing the individual, while the IT professional must serve the masses (Lankton and St. Louis, 2005).

This manuscript applies HCI to the user compliance aspect of healthcare management. Specifically, our study focuses on the required privacy initiatives facing employees as mandated by HIPAA. Because of numerous new compliance regulations, healthcare employees are forced to attend some type of training regarding privacy policies and procedures and to instantiate this knowledge in the form of processes involving human-computer interaction. Unfortunately, many of the newly required interfaces for privacy and security do not facilitate easy compliance (Smith, 2003), and attempts at creating systems that are robust in terms of privacy and security compliance have resulted in systems that are less open and user friendly.

Compliance issues are not the only factors that are driving the healthcare industry's new interest in IT. An increasing demand for healthcare workers, the aging of the population, and demands from clients, investors, and 3rd party associates have led to an industry upheaval and subsequent demands for information technology investment. The spectrum of individuals that require access to information systems is growing. As a result, the demand for intuitive systems will be immense (Wilson, 2003). As the demands for information systems in healthcare increase, the need for applicable HCI theories must also increase.

HIPAA Privacy Requirements

The Health Insurance Portability and Accountability Act, originally signed by President Clinton in 1996, is a US regulation designed to protect the privacy and confidentiality of medical patients. This legislation includes both security and privacy provisions (Fedorowicz and Ray, 2004; Robinson, 2005). The privacy provisions, the focus of our investigation, took effect on April 14, 2003, at time at which all payers and providers were expected to be compliant. The privacy provisions require covered entities to protect Private Health Information (PHI), also defined as Individually Identifiable Health Information (IIHI). Although HIPAA pertains to all forms of PHI (verbal, paper, and electronic), currently only the electronic formats are addressed in the Security Standards Final Rule published in February, 2003 (Mercuri, 2004). These provisions result in managerial and behavioral modifications that transcend mere technical controls – they impact the day-to-day routine of every US healthcare organization. In fact, the changes required in business processes may exceed the technical challenges associated with HIPAA's standards. The implications of the provisions are that all healthcare employees must alter the processes they have employed to create, handle, store, manipulate, and convey all data about patients.

HIPAA provides for severe criminal and civil penalties for individuals and organizations that are in violation of the legislation. Compliance with the regulations prescribed by the HIPAA legislation is mandatory, with non-compliance resulting in fines and individual penalties of up to 10 years in prison as the maximum sentence. As a result, most organizations have instituted policies and procedures to ensure compliance. Despite this, violations and privacy-related problems have been reported at numerous healthcare provider facilities in the US (Mercuri, 2004; Thomas, 2005). Perhaps what is lacking at these facilities is a clear understanding of the organizational and individual characteristics that promote compliance behavior.

This study seeks to illuminate these characteristics and their relevant influence on compliance behavior by leveraging theories from the domains of Social-Psychology, Management, and Information Systems. What follows is a description of the conceptual framework for this study and the research hypotheses to be tested. Next, the methods used for testing the hypotheses are discussed. This discussion includes a description of the study's context, data sample, and construct operationalization. Finally, the results are discussed and conclusions of this research are presented for both the academic and professional communities.

CONCEPTUAL BACKGROUND AND RESEARCH HYPOTHESES

The conceptual framework for this research is formed from an amalgamation of several research foundations, including the Theory of Planned Behavior (TPB), the Technology Acceptance Model (TAM), the Unified Theory of the Acceptance and Use of Technology (UTAUT), models of self-efficacy (SE), perceived organizational support (POS), and Human Computer Interaction (HCI) literature. The primary dependent variables of interest are perceived organizational support, self-efficacy and behavioral intent. These outcomes are the focus of numerous previous research efforts (as indicated below); however, when considered within the context of legislative requirements to protect information privacy, a unique perspective is warranted. Perceived organizational support (POS) measures an employee's belief "concerning the extent to which the organization values their contributions and cares about their well-being" (Rhoades and Eisenberger, 2002, p. 701). POS is also viewed as "assurance that aid will be available from the organization … to carry out one's job effectively." (Rhoades and Eisenberger, 2002, p. 698). Self-efficacy expectations (Bandura, 1977) refer to one's beliefs in one's capabilities to

successfully perform an explicit area of behavior (or attitude). Behavioral intent to perform some specific behavior (Ajzen, 1980) is partially determined by attitude toward performing the behavior, which is influenced by believes and motivations.

Illustrated in Figure 1, this theoretical framework, based on existing literature, suggests that an organization's status and size directly impact an individual employee's POS and self-efficacy regarding their interaction with information systems under the auspices of HIPAA privacy regulations. Occupational type effects self-efficacy and POS; and self-efficacy, in turn, impacts the user's behavioral intent (BI) to engage in system use behavior consistent with HIPAA privacy requirements (referred to as HIPAA compliance behavior). Further, POS, self-efficacy, and BI are posited to be antecedents of HIPAA compliance behavior. This study does not include a direct measure of actual HIPAA compliance behavior; rather, the authors attempt to relate the influence of perceptions of a firm's status, size, and an employee's occupational type on those antecedents of compliance behavior.
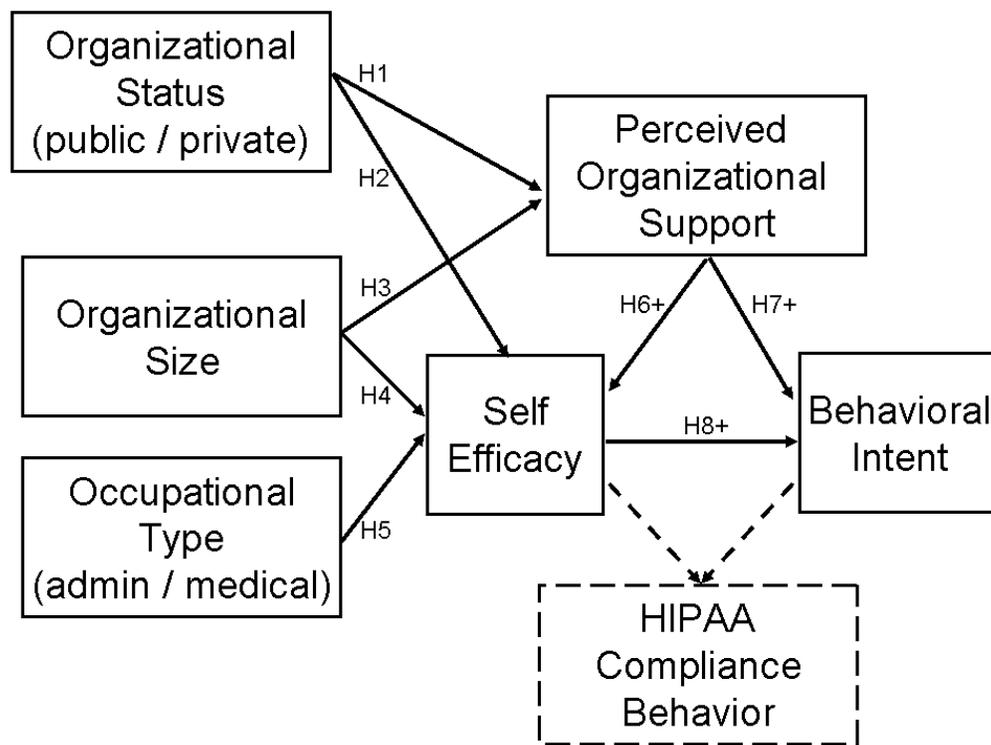

Figure 1: HIPAA Compliance Model (*a priori*)

The unit of analysis for this research project is the individual employee of a healthcare organization, termed a "healthcare professional." Such individuals include nearly all staff (employees) of organizations that provide healthcare services to individuals (patients). They may include medical personnel (physicians, physician's assistants, nurses, lab technicians, specialists, and other medical personnel) and administrative (non-medical) staff members (managers, clerks, insurance specialists, administrative assistants, and other non-medical personnel).

Organizational Status

According to Myer (1979), public healthcare administrators are more likely than their private sector peers to be familiar with the impacts of compliance issues on their organization. Stated another way, public healthcare managers are accustomed to bureaucratic red tape (Bretschneider, 1990). A study by Rainey (1979, 1983) showed that the large number of rules and regulations facing public sector employees made them perceive a high level of organizational control, thereby raising their perceptions of organizational support. Moreover, high levels of perceived organizational support have been shown to be related to organizational commitment (Setoon, Muldrow, Buckley, and Schay, 1996). Employees are likely to be committed and act accordingly to organizations that they perceive are committed to them. Based on the above argument, the following hypothesis is offered:

H1: In comparison to private healthcare professionals, public healthcare professionals will report significantly higher levels of perceived organizational support.

Compared with their private sector peers, public healthcare professionals have been shown to have a higher level of job security (Smith and Nock, 1980). Job security was listed as one of the most important aspects of job satisfaction and, in turn, self-efficacy (Karl and Sutton, 1998). An employee who feels secure in his job believes he has high self-efficacy (Holzer, 1986; Richardson, Tailby, Danford, Stewart, and Upchurch, 2005). Based on this logic, it could be expected that public healthcare employees would have higher perceptions of self-efficacy their private sector counterparts. Therefore, the following hypothesis is posited:

H2: In comparison to private healthcare professionals, public healthcare professionals will report significantly higher levels of self-efficacy regarding the protection of patient medical information privacy.

Organizational Size

The literature of organizational and professional commitment suggests that phenomena influencing organizational commitment are job meaningfulness, gender, and other factors that have a positive relationship with perceived organizational support, while organization size has a negative influence on organizational POS (Kwan and Banks, 2004). In his survey of nurses Burke found that as the hospital grew, the nurses felt they had less organizational support (Burke, 2005). Another study conducted in a large hospital showed that as the organization grew, employee perception of organizational support went down (Han et. al, 1996). Based on this insight, the following hypothesis is offered:

H3: Organizational size will influence healthcare professionals' perceptions of organizational support such that employees of large facilities will perceive lower organizational support than employees of smaller firms.

Self-efficacy can be promoted within an organization by empowerment (Zimmerman, 1995). Studies on organizational decline have shown that as the size of an organization increases, individual employee self-efficacy decreases (Mueller, McKinley, Mone, and Barker III, 2001; Mone, McKinley, and Barker III, 1998). Organizational size diminishes self-efficacy because, generally, the employees feel as though they are not being empowered and valued in their jobs (Wiley, 1997).

H4: Organizational size will influence healthcare professionals' self-efficacy such that employees of large facilities will report lower self-efficacy than employees of smaller firms.

Occupational Type

Medical staff are defined as personnel who are educated to serve in patient care by providing direct medical services. These include physicians, nurses, therapists, and certain technicians. Most of these professionals hold Masters degrees or MDs in the biological health sciences. A medical staff member's self-efficacy hinges on several factors; some of these factors are beyond the organization's control. The aspects an organization can control include empowerment, job satisfaction, adequate training, and others. However a medical staffer also bases self-efficacy on patient care, outcome expectancy, patient response to treatment, addiction recovery, and other medical factors (McCaughan, 2000). Alternatively, administrative staff provide managerial, clerical, and support services to the healthcare organization -- they do not directly interact with patients by providing medical services. These include managers, clerks, secretaries, and other office support individuals who manage records, accounts, finances, and other nonmedical resources. An administrative employee bases self-efficacy on principles similar to other employees outside of the healthcare industry (Spil, Katsma, Ligt, and Wassenaar, 2005). As such, federal guidelines for patient medical information privacy may be perceived by administrative staff as consistent with other federal, state, or local mandates that govern other industries. It is with this expectation that the following hypothesis is offered:

H5: Regarding the protection of medical patient information privacy, administrative staff will report significantly higher levels of self-efficacy than medical staff.

Perceived Organizational Support

Logically it would make sense that as POS increased, self-efficacy would also increase. Perceived organizational support has been shown in the literature to determine the organization's readiness to compensate an increased effort with greater rewards. Employees form a general perception concerning the extent to which the organization values their assistance and are concerned about their well-being and happiness (Eisenberger, Stinglhamer, Vandenberghe, and Sucharski, 1990). Because self-efficacy depends on individual perceptions, one can infer that as employees perceive a higher level of organizational support (Rhoades, Eisenberger, and Armeli, 2001), their self-efficacy will increase. Therefore, the following hypothesis is presented:

H6: Healthcare professionals' perceptions of organizational support are positively related to their perceptions of self-efficacy regarding the protection of patient medical information privacy.

Koslowsky, Kluger, and Yinon (1998) conducted a study that showed that perceived organizational support is directly linked with behavioral intent. In terms of perceived organizational support – the more that employees feel the organization is providing a supportive environment, the higher their compliance behaviors and attitudes become (Bruning, DeMiglio, and Embry, 2006). Additionally, the types of leadership, training and support employees are provided with all involve organizational support, and eventually lead to increased positive behavioral intent (Jago and Vroom, 1978).

H7: Healthcare professionals' perceptions of organizational support are positively related to their perceptions of behavioral intent to protect patient medical information privacy.

Self-efficacy and Behavioral Intent

Higher levels of self-efficacy are postulated to lead to approach versus avoidance behavior. Self-efficacy expectations are behaviorally specific (rather than general), so each type of self-efficacy must be discussed in reference to a specific behavioral domain (a "behavioral referent") in order to be meaningful. The concept has been applied to computer skills, learning skills, social skills, and others, such as mathematics, science, healthcare, repair, computers, and investing (Marakas, Yi, and Johnson, 1998; Mathieu, Martineau, and Tannenbaum, 1993; Torkzadeh and Van Dyke, 2002). Within the context of this study, self-efficacy (or "HIPAA compliance self-efficacy") is defined as "individual judgment of one's capability to safeguard and protect patient information privacy."

High levels of self-efficacy have been shown to be associated with high levels of empowerment or achievement. But behavioral intent (this study's other dependent variable) has also been shown to be an antecedent of actual behavior, given the right facilitating conditions. We posit that high levels of self-efficacy actually lead the employee to have higher levels of behavioral intent to comply.

H8: Healthcare professionals' perceptions of self-efficacy regarding the protection of patient medical information privacy have a significant positive influence on their reported behavioral intent to protect patient medical information privacy.

METHODOLOGY

The following section describes the research methodology involved in this study, including the sampling procedure, the development of our constructs and scales, and the analytical procedures.

Study Context and Sample

The focus of this study is on the employee of any organization faced with compliance with personal information privacy maintenance. As such, we surveyed employees at various healthcare facilities located in Texas, Alaska, Louisiana, Mississippi, Virginia, Alabama, Arizona, Michigan, Pennsylvania, and Florida. The facilities included a large public hospital, a large private hospital, a mental healthcare facility, a physical therapy facility, two large military hospitals, and a few small- to medium-sized physician clinics. All facilities were HIPAA covered entities and were required by legislation to provide HIPAA privacy training for their employees. Demographic descriptions of the sample dataset appear below.

Construct Operationalization

This study involves the measurement of three constructs: perceived organizational support (POS), self-efficacy, and behavioral intent. Each of these constructs are measured using multi-item scales drawn from rigorously validated measures previously published in IS and social psychology, and articulated to relate specifically to the context of HIPAA compliance. In addition to the constructs mentioned above, the survey instrument also contained items to differentiate respondents on the basis of organizational status, organizational size, and occupational type. Organizational status refers to the status of the respondent's facility as either public or private, while organizational size refers to the number of employees of the firm. Occupational type refers to the role of the employee as either administrative (non-medical) or medical staff. The instrument was pilot tested on a total of 12 healthcare employees from six different hospitals and healthcare clinics over a period of one week. Based on the results of the pilot test, the instrument was revised, producing a final survey consisting of 29 items, including descriptive demographic information such as gender, age, and experience.

The eight-item scale used to measure an individual's self-efficacy regarding the protection of patient medical information privacy was adapted from (Bandura, 1977) to reflect the context of this study. Similarly, the five-item scale used to capture behavioral intent to protect patient medical information privacy was adapted from the Venkatesh and Davis' (2000) behavioral intention scale for measuring intent for technology adoption. Perceived organizational support is measured via an

eight-item scale derived from the work of Eisenberger, Huntington, Hutchison, and Sowa (1986). Construct validity and reliability tests of this scale, as well as self-efficacy and behavioral intent, are described in the following section.

RESULTS AND FINDINGS

A total of 234 healthcare professionals located at healthcare facilities throughout the US completed an online survey for this study, of which 202 responses were valid and usable for analysis. A majority (57%) of the respondents were female, while 72 (36%) were between the ages of 26 and 39. The majority of the respondents were employed in either public hospitals (37%) or private hospitals (28%), with 70% of them employed at facilities with 250 or more employees. Also, 46% of the respondents have been healthcare professionals for at least 10 years.

To ensure that the instrument items were a reasonable operationalization of their respective constructs, construct validity tests were conducted. In doing so, the psychometric properties of the scales were assessed through factor loadings, convergent validity and discriminant validity. Using Principle Components Analysis (PCA), factor loadings will be examined to ensure that items load cleanly on those constructs to which they are intended to load, and do not cross-load on constructs to which they should not load (Straub, Boudreau, & Gefen, 2004). Generally, convergent validity is demonstrated if the item loadings are in excess of 0.70 on their respective factors, and discriminant validity is demonstrated if the factor loadings are less than 0.40 on unintended factors (Gefen, Straub, & Boudreau, 2000).

The results of the PCA (Table 1) indicated the scales used in this study largely met the requirements for convergent and discriminant validity. Initial analysis revealed the presence of cross-loadings for BINT3, POS2, POS3, POS5, and POS7. Once these items were removed from the analysis, the results were much improved. Only the fourth item of self-efficacy loaded above 0.40 on an unintended factor; however, given its relatively low cross-loading (0.401) and its relatively high loading within its intended construct (0.799), it was included in the final instrument. Additionally, composite reliability scores for each of the multi-item scales are provided in Table 2. These scores, ranging from 0.897 for behavioral intent to 0.969 for self-efficacy indicated good internal consistency.

	Component		
	Self-Efficacy α = .969	Perceived Organizational Support α = .912	Behavioral Intent α = .897
BINT1	.123	.047	.910
BINT2	.065	.000	.912
BINT4	.117	.231	.831
BITN5	.156	.203	.784
SEFF1	.908	.178	.130
SEFF2	.899	.184	.130
SEFF3	.852	.262	.080
SEFF4	.799	.401	.065
SEFF5	.867	.217	.198
SEFF6	.912	.197	.136
SEFF7	.862	.213	.134
SEFF8	.835	.360	.023
POS1	.398	.755	.150
POS4	.225	.869	.137
POS6	.267	.836	.158
POS8	.294	.843	.092

Table 1. Results of Principle Components Analysis

BINT = Behavioral Intent; SEFF = Self-Efficacy;
POS = Perceived Organizational Support

To test whether public healthcare professionals report higher levels of perceived organizational support than do their private sector peers, a between subjects analysis of variance (ANOVA) was conducted. As depicted in Table 3, the ANOVA results revealed public healthcare employees report a higher level of POS (5.94) than their privately employed counterparts (5.22). The difference in perceptions among the two groups is significant ($p < 0.05$), thereby indicating support for H1.

ANOVA tests also revealed the two groups differ significantly ($p < 0.001$) in terms of reported self-efficacy regarding the protection of patient medical information privacy, which public healthcare professionals (4.40) reporting a higher level of self-efficacy than the private sector healthcare professionals (3.58). These results indicate support for H2.

For tests involving organizational size, ANOVA results indicate that there is no difference among employees of small (less than 50 employees), medium (51 to 249 employees), or large (more than 250 employees) facilities in terms of how they perceive organizational support. As a result, H3 is not supported. ANOVA results indicate that while employees of larger facilities reported lower levels of self-efficacy than those of both small- and medium-sized facilities, the difference was not statistically significant. Therefore, H4 is not supported.

Also demonstrated in Table 2, ANOVA tests indicate that administrative staff (4.08) report significantly ($p < 0.05$) higher levels of self-efficacy regarding the protection of patient medical information privacy than medical staff (3.59). This suggests support for H5. Interestingly, physicians report the highest level of perceived self-efficacy (4.54), significantly different than both medical staff ($p < 0.001$) and administrative staff ($p < 0.05$).

Hypothesis	Dependent Variable	Comparison (mean value)	Test Result (significance)
H1: In comparison to private healthcare professionals, public healthcare professionals will report significantly higher levels of perceived organizational support.	POS	Organizational Status public (5.94) private (5.22)	supported ($p < 0.05$)
H2: In comparison to private healthcare professionals, public healthcare professionals will report significantly higher levels of self-efficacy regarding the protection of patient medical information privacy.	Self-Efficacy	Organizational Status - pubic (4.40) - private (3.58)	supported ($p < 0.001$)
H3: Organizational size will influence healthcare professionals' perceptions of organizational support such that employees of large facilities will perceive lower organizational support than employees of smaller facilities.	POS	Organizational Size - small (5.13) - medium (5.84) - large (5.46)	not supported
H4: Organizational size will influence healthcare professionals' level of self-efficacy (to comply with HIPAA requirements) such that employees of large facilities will report lower levels of self-efficacy than those of smaller facilities.	Self-Efficacy	Organizational Size - small (4.18) - medium (4.26) - large (3.77)	not supported
H5: Regarding the protection of medical patient information privacy, administrative staff will report significantly higher levels of self-efficacy than medical staff.	Self-Efficacy	Occupational Type - administrative staff (4.08) - medical staff (3.59)	supported ($p < 0.05$)
Table 2. ANOVA Results			

Figure 2 illustrates the results of linear regression tests of hypotheses H6, H7 and H8. Multiple regression analysis was used to test the independent variables, POS and self-efficacy, on the dependent variable behavioral intent. Additionally, regression analysis was used to test the relationship between POS and self-efficacy. The results of the analyses indicate support for all hypothesized paths in the model at a 95% level of significance. With regard to their relationship with behavioral intent, both POS and self-efficacy had a path coefficient of 0.126, while the path coefficient for the relationship between POS and self-efficacy was 0.420. POS and self-efficacy combine to explain 11% of the variance in behavioral intent, while POS explains 31% of the variance in self-efficacy (see Table 3).
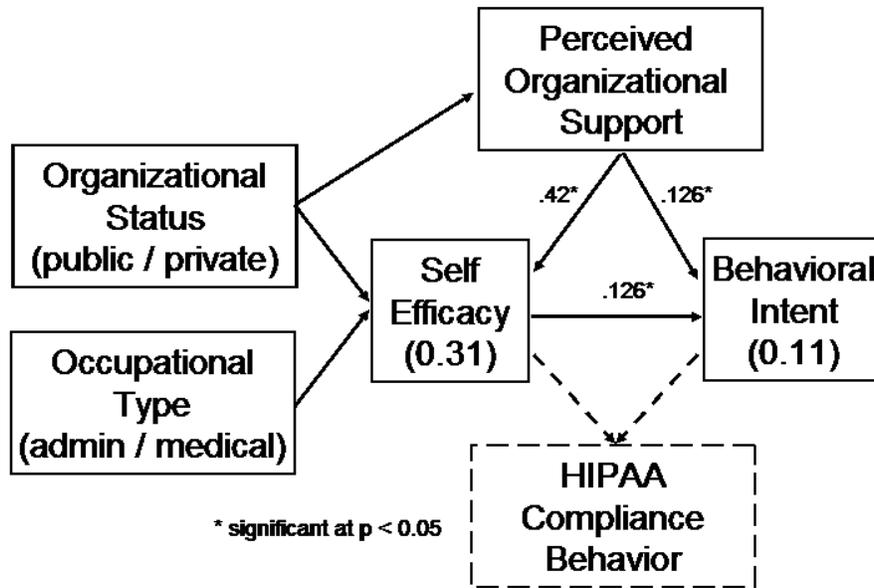

Figure 2. Research Model (as tested)

Hypothesis (p-value) Independent	Dependent	Path Coefficient	Explained Variance
H6 (supported, p-value < 0.05) perceived organizational support	self-efficacy	0.42	31%
H7 (supported, p-value < 0.05) perceived organizational support	behavioral intent	0.13	11% [*]
H8 (supported, p-value < 0.05) self-efficacy	behavioral intent	0.13	11% [*]
[*] shared explained variance			
Table 3. Regression Analysis Results			

SUMMARY AND CONCLUSIONS

Previous literature has established a strong link between behavioral intent and actual behaviors, provided that facilitating conditions are present. Therefore, actual compliance with HIPAA regulations is presumed to convey from higher levels of employee behavioral intent. Our findings indicate that POS and self-efficacy are considerable influences on behavioral intent, and also that POS is a strong precursor to self-efficacy. In this light, it is illustrative to identify antecedents of POS and self-efficacy. Doing so may indicate conditions under which patient privacy is being safeguarded more effectively, and could lead to improved compliance in the future.

Employees of public healthcare facilities report higher levels of perceived organization support than those of private facilities. Further, public healthcare professionals reported higher level of self-efficacy than private sector healthcare professionals. The results suggest that administrative and medical staff members at the nation's public hospitals, clinics, and other facilities will be more capable at protecting private health information.

The findings of this study did not indicate any statistically significant differences between employees of small, medium, or large facilities with regard to their perceived organizational support or self efficacy, so no conclusions can be drawn. The theoretical evidence suggests a relational effect, so further research is warranted to establish or counter this study's finding.

This study indicated that administrative staff members report significantly higher levels of self-efficacy regarding the protection of patient medical information privacy than medical staff members, perhaps because they are not exposed to medical factors that may influence the medical staff perceptions. An exception is the self-efficacy of the physicians themselves, which was the highest of all groups. This may be a reflection of the status of the physician within the medical environment and of biases resulting from the selection process for physicians. Given that self-efficacy is presumed to be a strong antecedent of compliance behavior, this may mean that administrative staff members feel more capable of defending patient privacy than most medical staff members do. Perhaps hospitals and other facilities should entrust the data to the administrative staff more than the medical staff, where possible. Patient backgrounds could be screened and non-essential data could be encrypted so that routine medical personnel do not have access to information not germane to the current medical event.

This study was based on a cross-section of healthcare employees from a variety of organizations in the US. An improvement would be to sample a larger number of individuals from a larger number of facilities drawn from a statistically stratified cross-section of organization types from the entire nation. Another weakness of the study is the lack of any measure for inherent self-efficacy, inherent intent to comply with rules, and other inherent attitudes and beliefs that may impact those that are specific to this study.

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