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Huigang Liang

East Carolina University, huigang.liang@gmail.com

Yajiong Xue

East Carolina University, xuey@ecu.edu

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Face Loss and Resistance to Clinical Decision Support Systems

Huigang Liang

East Carolina University
Huigang.liang@gmail.com

Yajiong Xue

East Carolina University
xuey@ecu.edu

ABSTRACT

From the face saving perspective, this paper attempts to investigate the factors influencing physicians' resistance of clinical decision support systems (CDSS) in outpatient settings. We develop a research model which posits that physician resistance of CDSS is determined not only by their rational perceptions of CDSS' usefulness, but also by their sociocultural perceptions of face loss. To contextualize theory development, we include a moderator – time pressure, which is unique for physicians' decision context. By proposing that time pressure can strengthen both the negative impact of perceived usefulness and the positive impact of face loss on CDSS resistance, we attempt to demonstrate that time pressure's effects are paradoxical: it plays dual roles in both facilitating and reducing resistance. This paper takes a unique perspective to understand physician resistance behavior, and we expect it to make an important contribution to HCI research and practice.

Keywords

Resistance, clinical decision support, face, time pressure

INTRODUCTION

While many studies have shown that clinical decision support systems (CDSS) can improve practitioner performance and patient outcomes (Garg et al., 2005, Bright et al., 2012), widespread CDSS use has not become available due to numerous technological, social, psychological, legal, financial, and organizational barriers (Ali et al., 2016, Boonstra and Broekhuis, 2010). Among social organizational factors, user resistance is identified as one of the main causes for the failure of CDSS (Coiera, 2015). User resistance is particularly serious in healthcare settings in which healthcare professionals are characterized by high professional autonomy and low propensity for being persuaded by people outside their profession (Liang et al., 2010, Lapointe and Rivard, 2005, Bhattacharjee and Hikmet, 2007).

Due to the importance of physician resistance, quite a few studies in the IS literature have explicitly investigated this problem (Xue et al., 2015, Lapointe and Rivard, 2005, Bhattacharjee and Hikmet, 2007). Yet, much is left unknown regarding why physicians engage in resistance

behavior. Moreover, little research has examined resistance to CDSS in particular. CDSS differ from other health information systems in that they require more than passive data entry and display. They actually act like a human expert to provide guidelines, recommendations, and alerts to physicians during clinical encounters to facilitate decision making (Osheroff et al., 2007). When physicians use CDSS, it appears as if they are taking advice from the system. This begs the question: Will physicians be willing to accept this submissive role in using CDSS?

In the traditional medical settings, there exists a power imbalance between patients and physicians. Physicians usually have more power due to their highly specialized education and expertise which enable them to conduct diagnosis and treatment. On the contrary, patients are powerless because they usually are not knowledgeable of their conditions and possible treatments and may not even have the intellectual capacity to access such specialized knowledge. Thus, the knowledge disparity and information asymmetry give rise to the typical power disparity between physicians and patients. Physicians are proud of their professional status and like to maintain their privileges (Grol, 2001). In fact, such pride is historically entrenched and its origin can be traced back to as early as the fourth century in Greece (Metraux, 1995). In modern societies, physicians continue to enjoy superior social status and rightfully maintain a high level of professional pride. While physicians are entitled to be proud, such pride could sometimes induces negative behaviors such as resistance of CDSS.

In this paper, we draw on the concept of face to explain why Chinese physicians' pride can make them resist CDSS. Leung and Chan (2003) define face as "the respect, pride and dignity of an individual as a consequence of his/her social achievement and the practice of it". Kim and Nam (1998) point out that face is a powerful concept that can help generate many insights of the distinctive context when studying individual behaviors in Asian cultures. Although face is developed as a general concept that is applicable in both Eastern and Western countries (Goffman 1978), it is believed to play a more salient role in the Chinese society to explain social interactions. As a part of the Chinese consciousness, people pay great attention to caring for one's face (Huang

et al., 2008). People try to maintain their face by gaining recognition and respect from others. Face is lost when the person fails to meet the basic requirements of her social position either through her own action or collective action of others in her social group. Although it is unnecessary for one to strive to gain face, losing face often leads to serious consequences which will put stigma on her name and undermine her effective functioning in society (Ho, 1976). Thus, face is an important social factor that individuals cannot avoid when deciding their behaviors that are visible to others.

From the face saving perspective, this paper attempts to investigate the factors influencing physicians' resistance of CDSS in outpatient settings. We believe that the new insights gained from this perspective can contribute significantly to both research and practice in terms of how to reduce physician resistance to CDSS use. The next section will propose the research model and hypotheses. It is followed by the description of a longitudinal survey study conducted in a large Chinese hospital. Then we present results and discussions.

RESEARCH MODEL AND HYPOTHESES

Based on a synthesis of a variety of literature, we develop a research model (Figure 1) which posits that physician resistance of CDSS is determined not only by their rational perceptions of CDSS' usefulness, but also by their sociocultural perceptions of face saving. To contextualize this model, we include time pressure as a contextual factor that is unique for physicians' decision context. Next we discuss detailed theoretical rationales behind each hypothesis.

Perceived usefulness refers to the extent to which users believe that system usage will enhance their job performance (Davis, 1989, Davis et al., 1989). CDSS can provide relevant knowledge and person-specific information, intelligently filtered and timely presented, to assist physicians and other health professionals with their clinical decision making tasks for improved healthcare (Osheroff et al., 2007). A plethora of studies have shown that CDSS are effective in improving healthcare processes as well as clinical and economic outcomes (Bright et al., 2012). When physicians realize the benefits of using CDSS to improve performance and care quality, they are likely to actively integrate CDSS into their clinical practice and unlikely to resist CDSS. Thus:

H1: Physicians' perceived usefulness of CDSS is negatively associated with resistance to CDSS

Face is important for individuals embedded in social interactions, especially for physicians who take a great deal of pride in what they do to save lives. The effect of face can be explained through the lens of self-presentation. As the dramaturgical view of Goffman (Goffman, 1978) posits, humans' social interactions are similar to theatrical plays and all individuals are actors who try to control or guide how others make an

impression of them by engaging in self-presentation behaviors. In a similar vein, we suggest that the patient encounter can be seen as a play in which physicians perform the provision of medical services in front of a group of audience, possibly including the patient, the patient's family members, nurses, physician assistants, and physician interns (John, 1996). Physicians would like to deliver a performance that can represent their role of being an expert. Our interviews with physicians show that many physicians felt embarrassed if they had to use CDSS to help them make clinical decisions during the encounter with a patient. They worried that patient might think they were incompetent and lack necessary medical knowledge if they used CDSS for reference in front of the patient. Thus, CDSS use could lead to a reputational threat and face loss. Research has shown that physicians can develop threat perceptions toward IT and subsequently resist IT use (Bhattacharjee and Hikmet, 2007, Xue et al., 2015). Therefore, we propose that the concern of losing face will impel physicians to resist the use of CDSS.

H2: Physicians' face loss belief is positively associated with their resistance to CDSS

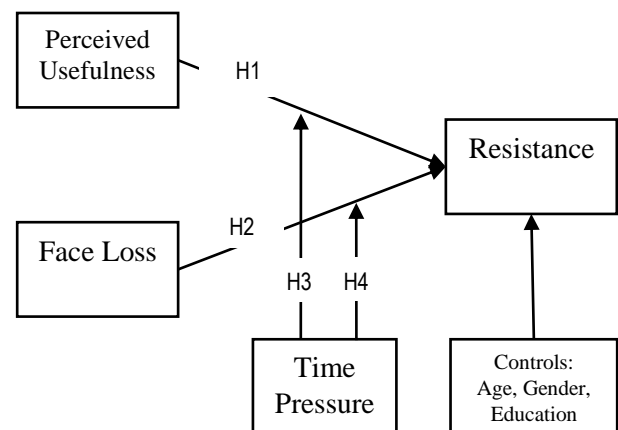


Figure 1. Research model

Time is a critical resource in human judgment and decision making. High quality decisions depend on activities that take time to complete and time pressure has been found to lower decision quality (Svenson and Maule, 1993). However, lack of time is a common feature of professional decision situations. This is particularly true for outpatient doctors in China who have only a few minutes for a patient during an encounter (Bai, 2014, Jin and Chen, 2016). Most doctors in large Chinese hospital are extremely overloaded. Although the government requires doctors to spend at least eight minutes for each patient, it is difficult to comply with this policy due to overwhelming patient demands (Jin and Chen, 2016).

The decision literature suggests that individuals have three major approaches to adapt to time pressed decision situations: acceleration, filtration, and change of strategies (Payne et al., 1993, Svenson and Maule, 1993). First, they can speed up information processing. Second, they can choose to process only the most important information. And finally, they can change their decision strategy from alternative-based to attribute-based so that less information is processed (Payne et al., 1993). When time is limited, physicians have to make quick diagnostic and treatment decisions, and they are also likely to take these adaptive approaches. CDSS, if useful, could facilitate all three approaches. First, the clinical guidelines and order sets embedded in CDSS can help physicians accelerate decision speed. Second, CDSS can provide critical information such as drug allergy and drug-drug interactions which could lead to serious harm if ignored. Hence, the more important physicians think the CDSS information is, the less likely they will neglect it if they have to use filtration. Finally, when physicians apply attribute-based decision strategies, they need to compare specific features of different decisions. CDSS allow them to make quick searches and complete the comparison in a short time. Therefore, when time is limited, CDSS can streamline physicians' information processing for quick decisions. Research shows that time pressure has a negative impact on physicians' diagnostic accuracy (Alqahtani et al., 2016). If physicians perceive that CDSS can help them make better decisions when time pressure is high, they are unlikely to refuse the use of CDSS. In contrast, when time pressure is low, even if physicians perceive CDSS to be useful, they may still resist using it because they have plenty of time to seek help from other sources. As a result, the perception of usefulness will have an increasingly stronger effect on resistance as time pressure increases

H3: Time pressure strengthens the negative relationship between perceived usefulness and resistance to CDSS, so that it is stronger when time pressure is high than when it is low.

While physicians try to maintain pride and create an image of competence, the use of CDSS could reveal their weaknesses to the audience, posing a reputational threat. Thus, physicians could interpret the use of CDSS as intrusive and threatening in their medical practice. Decision research shows that under time pressure individuals will selectively process information and assign higher weight to negative information (Svenson and Maule, 1993). Thus, time pressure will amplify the negative perception of CDSS. Compared with the no time pressure condition, physicians' judgment of CDSS under time pressure will be more heavily influenced by the potential that CDSS could make them lose face. As a result, to save face, physicians are more likely to resist the use of CDSS. Furthermore, while the face-losing effect of CDSS can be stressful for physicians, time pressure will make it even worse because physicians have to make decisions within limited time (Babbott et al., 2014). To

alleviate the intensified stress, physicians can avoid the stressors. While they cannot generate more time for themselves, they can decide whether to use CDSS or not. Hence, they are more motivated to resist CDSS. This is consistent with Liang and Xue (2009) who articulate that when technology threat causes a stressful situation, a major coping behavior that individuals will undertake is to remove the stressor. Hence, we hypothesize that:

H4: Time pressure strengthens the positive relationship between face loss and resistance to CDSS, so that it is stronger when time pressure is high than when it is low.

DISCUSSION

We expect this research to make two major contributions to IS research. First, it is an early attempt, if not the first, to integrate sociocultural beliefs and cognitive perceptions to understand physicians' technology resistance behavior. While some studies have examined how physician resistance to IT is influenced by personal, technological, cognitive, and organizational factors (Liang et al., 2010, Lapointe and Rivard, 2005, Bhattacharjee and Hikmet, 2007), few have taken a sociocultural perspective. Specifically, we propose and find that face loss is a significant concern for physicians who use CDSS during patient encounters. Face is not only a salient cultural belief in China, but also a general social factor that exist in Western societies and has received extensive attention from academics (Goffman, 1978). Given the high levels of autonomy and pride associated with the medical profession, face is a particularly interesting concept that provides a nuanced understanding of physician behavior.

Second, we try to build contextualized theory by taking time pressure into consideration. As Hong et al. (Hong et al., 2013) suggest, theories should address the unique features of the context within which the focal phenomena take place. This research answers their call by stressing the moderating role of time pressure. Despite the importance of time pressure in healthcare (Babbott et al., 2014), surprisingly no research has investigated how it can affect physicians' IT usage behavior. We fill this blank in the literature by showing that time pressure can strengthen both the negative impact of perceived usefulness and the positive impact of face loss on CDSS resistance. We attempt to demonstrate that time pressure's moderating effects are paradoxical: it plays dual roles in both facilitating and reducing resistance. Past research suggests that physicians' reluctance to adopt IT is partially due to their busy schedule and lack of time (Boonstra and Broekhuis, 2010). Our research suggests that time pressure might have been used as a guilty goat and its role is much more complicated than the literature has suggested. In this research, we try to unveil the complexity of how time pressure affects physician behavior.

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