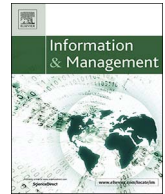




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Health information privacy concerns, antecedents, and information disclosure intention in online health communities

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ABSTRACT

This study explores the antecedents and consequences of health information privacy concerns in online health communities by integrating the dual calculus and protection motivation theories. On the basis of survey data from 337 users, health information privacy concerns, together with informational and emotional support, significantly influence personal health information (PHI) disclosure intention. Privacy concerns are negatively influenced by two coping appraisals (i.e., response efficacy and self-efficacy) and positively affected by two threat appraisals (i.e., perceived vulnerability and perceived severity). The perceived health status differentially moderates the effects of privacy concerns and informational support on the PHI disclosure intention.

1. Introduction

The Internet has become a useful channel for seeking and sharing health-related information in the past decade [1]. The Pew Research Center reported that 59% of American adults have searched for online health information, whereas 35% of American adults have searched for medical solutions online for themselves or someone else who might have a disease [2]. Online health communities (OHCs), which have been accelerated by advancements in Internet technology, have recently emerged as an alternative platform for people searching for health information and self-healthcare management [3]. An OHC refers to a series of virtual discussion groups consisting of members who share collective interests in health topics [4]. The advantages of OHCs include 24-h availability of information and support from people beyond the restrictions of geographic proximity, cost savings, lack of embarrassment, and access to more diverse support networks and information [4,5].

The OHC existence and development are largely driven by information sharing. However, once individuals opt to disclose their personal health information (PHI), they can face the risk of privacy invasions [6]. For example, people's PHI can be used for marketing purposes without authorization. People are also largely concerned about employers and insurance companies that can obtain access to

their PHI, which can lead to discrimination. Disclosure of sensitive PHI (e.g., genetics, mental health, domestic violence, reproductive care, substance abuse, and sexually transmitted diseases), can result in social stigma. An individual's choice of information disclosure can cause trouble to his or her family in several cases. For example, a physical examination report can leak information about genetic disorders that run in families. The Harris Interactive poll reported that many American adults have serious anxieties on how their health information are obtained and utilized [7]. Health information privacy concerns arise when individuals are required to provide sufficient PHI to obtain the benefits of utilizing OHCs. These concerns can even cause individuals to refuse providing information to OHCs and decline healthcare services from OHCs. Therefore, investigating the underlying drivers of OHC users' information disclosure intentions and privacy concerns is becoming more important.

However, prior studies on the information disclosure behavior in OHCs exhibit three gaps. First, although an impressive body of previous studies has examined information privacy and information disclosure behavior in different contexts [8–10], the health information privacy issues in the OHC field are rarely examined. The information privacy dilemmas in OHCs seem to be similar to those in other e-commerce websites, social networks, or virtual communities in appearance, but it has its uniqueness. Health information disclosed in OHCs is more

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sensitive than other information forms, such as demographic profiles, lifestyle interests, or purchase history information. Rohm and Milne suggested that individuals are more likely to be concerned with PHI use, such as medical history or medical records [11]. Considerable sensitive information can increase the risk beliefs and lower the intentions to disclose [12]. Unlike other online communities, people benefit from participating in OHCs by obtaining social support rather than monetary rewards or enjoyment [13–15]. Although many benefits of information disclosure have been identified in other communities, these benefits may not be the main drivers to self-disclosure in OHCs. Therefore, a further examination of the potential risks (i.e., privacy concerns), benefits, and their relationships with information disclosure in the OHC context is required.

Second, despite a large body of studies on the relationship between privacy concerns and information disclosure intentions [16] and a handful of studies that have proposed the antecedents of privacy concerns [6,8], few studies have integrated information disclosure, privacy concerns, and their antecedents. Phelps et al. argued that the causes of privacy concerns must be identified to investigate privacy issues [17]. Privacy concerns can be major obstacles for information disclosure. The benefits of releasing information to others can supplant an individual's privacy concerns to some degree. Identifying the antecedents of privacy concerns also helps to lower the anxiety of people and improve information disclosure intentions. Incorporating the antecedents of privacy concerns and building an integrative model to explain individuals' information disclosure intentions are essential to obtain a more comprehensive insight into information disclosure in OHCs.

Third, prior research suggests that several personal characteristics (i.e., previous privacy invasion) and situational risk factors (i.e., information type, intended purpose, and requesting stakeholder) can moderate the relationships between the information disclosure intention and its antecedents [18,19]. However, no prior study directly included personal health factors as moderating variables. Considering that health information disclosure is a health behavior, we propose that several health factors can have moderating effects on the relationships of privacy concerns and benefits with intentions to disclose information. The perceived health status, which reflects an individual's overall health, is a commonly studied health factor [20]. Previous research reports a direct or indirect effect of perceived health status on information disclosure intentions [6,18]. Nevertheless, no prior work has explored the moderating effect of perceived health status on information privacy research. Therefore, how the perceived health status strengthens or suppresses the effects of perceived benefits and health information privacy concerns on information disclosure intentions must be investigated.

The current study attempts to build a framework that integrates the dual calculus theory and protection motivation theory (PMT) to examine the aforementioned issues. The integrated framework can provide a holistic view of individuals' PHI disclosure intentions in the OHC context. We analyze information privacy concerns and their antecedents and consequences (i.e., PHI disclosure intention) simultaneously by using the dual calculus theory. The dual calculus theory assumes that the intention to disclose information is influenced by two interrelated trade-offs: privacy calculus and risk calculus [21]. In the privacy calculus theory, the intentions of individuals to disclose PHI are based on the trade-off between the perceived benefits and perceived risks (e.g., privacy concerns) of information disclosure in OHCs. In the risk calculus model, privacy concerns are regarded as the net risks, which are based on threat and coping appraisals, perceived by an individual. Privacy concerns will increase when privacy threats outweigh the coping ability to protect privacy. The risk calculus model, however, does not specify the variables for threat and coping appraisals [21]. In contrast, the PMT identifies the specific variables for threat and coping appraisals and is widely used to examine individuals' fear appeal on their attitudes and behaviors [38]. Therefore, we adopt four specific variables (i.e., perceived vulnerability, severity, self-efficacy, and

response efficacy) from the PMT and investigate their effects on privacy concerns using the risk calculus model. We integrate these two theories in a complementary manner to assess the privacy concerns and PHI disclosure intention of OHC users.

2. Literature review

2.1. Information disclosure and privacy concerns

Information disclosure refers to “the personal information individuals intentionally and voluntarily reveal about themselves to others in an interpersonal relationship” [22,p. 166]. Thus, information disclosure has an immense impact on different online environments, which involve personal information sharing such as e-commerce, social network services, and location-based services [8,10,23,24]. Among these online environments, OHC is a community-driven service under Web 2.0 and allows people to satisfy their health-related information requirements. OHCs benefit users by providing them support when they reveal their PHI [6]. OHC users can disclose their PHI in exchange for health advice for their health risk evaluation, disease prevention, or treatment suggestions from doctors [6,25]. They can also share their medical histories, experiences, and feelings with patients who have experienced similar health problems [1].

Nevertheless, users are hesitant to reveal their PHI because their personal information is private. Privacy concerns related to disclosing personal information are considered the central issue in information privacy literature [16,21]. Privacy concern is the “individual's subjective views of fairness within the context of information privacy” [26,p. 337]. OHC users, who are concerned about their privacy, are afraid of exceeding the baseline of consumers' individual rights, committing privacy infringement because of the collection and other applications of providers, and threatening the confidentiality of their individual information. Given these issues, the development of health information services has been hindered by the struggle between users' attention to privacy and their active disclosure of health information.

2.2. Dual calculus perspectives

Previous studies were conducted from different perspectives to investigate the nature of privacy concerns and information disclosure behavior. Prior research adopts different theories, such as the theory of reasoned action, privacy calculus theory, and social contract theory [6,8,12,27]. Among them, the privacy calculus theory is widely adopted to investigate consumer privacy concerns because it integrates both the risks and benefits of privacy concerns [28,29]. This privacy calculus model assumes that individuals must perform a risk-benefit analysis before they can decide whether to disclose their personal information [30]. Individuals are often willing to disclose information if the expected benefits are more considerable than the perceived risks that result from such disclosure [28].

Despite the empirical support for the privacy calculus model in previous studies (e.g., Ref. [24,29]), several limitations must still be addressed. First, although this model has highlighted the critical effects of expected risks and benefits on information disclosure, they can differ in different contexts [23,31]. The current study further tailors privacy calculus to the OHC context and reexamines the specific benefits and risks of disclosing PHI. Second, the privacy calculus model only examines the relationship between privacy concerns and information disclosing intentions but neglects the antecedents of privacy concerns. Several previous studies recommend that researchers must explore the relationship between privacy concerns and their antecedents [16,21,32]. Although previous studies have recognized several antecedents [33–35], how they affect privacy concerns remain unknown [32].

Li suggested a dual calculus model to fill this gap, with the assumption that privacy calculus, which is affected by risk calculus,

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