

# Revealing the Black Box of Privacy Concern: Understanding How Self-disclosure Affects Privacy Concern in the Context of On-Demand Services Through Two Competing Models

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Abstract. As a prevalent economic paradigm, on-demand services match service providers and consumers with respective needs through the on-demand service platform. Consumers have to express their needs through self-disclosure, which inevitably raises privacy concern. However, how consumers' selfdisclosure influences their privacy concern has not been well studied and remains as a black box. In this study, we would like to investigate how consumers' prior self-disclosure affects their privacy concern through two competing models derived from two theories in the literature: prominence interpretation theory and information processing theory. Based on prominence interpretation theory, the first model explains how the amount of consumers' prior self-disclosure in the past use affects the prominence and interpretation of requests for self-disclosure, thus finally influences consumers' privacy concern about their information. Based on information processing theory, the second model proposes a two-step approach that the amount of consumers' prior selfdisclosure in the past use affects consumers' beliefs in the first step, and in the second step consumers' beliefs impact their evaluation of the on-demand service platform, thus finally influence their privacy concern. The models will be tested based on survey data collected from on-demand service consumers. The potential theoretical contributions and practical implications for consumers, service providers, and platforms are discussed.

**Keywords:** Privacy concern · Self-disclosure · Prominence interpretation theory · Information processing theory · On-demand services

### 1 Introduction

With the popularization of the Internet and the development of information technologies, people's names, ages, photos and consumption habits are becoming huge amounts of data stored in various forms. This trend of data into an important information resource makes consumers' privacy face a great risk. In-depth research on privacy concern needs to be conducted to help consumers relieve their privacy concern and share personal data. Scholars have long been interested in explaining the impact of

privacy concern on consumers' behaviors from a rational perspective with privacy calculus theory as the main theoretical basis [1–3], positing that individuals are more likely to act if they consider the benefits are high enough to outweigh the costs [4, 5]. Among various antecedences of privacy concern, the request for self-disclosure may have a place. However, how consumers' self-disclosure influences their privacy concern has not been well studied and remains as a black box. Thus, we want to push this issue one step further in this study.

On-demand services have sprung up to match service providers and consumers with respective needs through the on-demand service platform. Examples include Airbnb, Uber, Amazon Mechanic Turk, Lyft, Homeaway, Mobike, etc. Meanwhile, driven by new information technologies, self-disclosure is closely associated with providing accurate and efficient services for consumers. Inevitably, it has also raised issues about the privacy and security of personal data. Much research has examined consumers' privacy concern in the context of social networking [6, 7], online transactions [8], and mobile applications [9, 10]. However, little attention has been paid to the privacy concerns in the on-demand services.

This study aims to investigate how consumers' self-disclosure influences their privacy concern in the context of on-demand services. We propose two competing models derived from two theories in the literature: prominence interpretation theory and information processing theory. Based on prominence interpretation theory, the first model explains the amount of consumers' prior self-disclosure in the past use affects the prominence and interpretation of requests for self-disclosure, thus finally influences their privacy concern. Based on information processing theory, the second model proposes a two-step approach that the amount of consumers' prior self-disclosure in the past use affects consumers' beliefs in the first step, and in the second step consumers' beliefs impact their evaluation of the on-demand service platform, thus finally influence their privacy concern.

The rest of the paper is structured as follows. Section 2 reviews previous literature on privacy concern and self-disclosure. Section 3 presents the theoretical foundation of the study, followed by Sect. 4, which presents the research models and corresponding hypotheses. Section 5 details the proposed methodology. Section 6 concludes with a discussion of potential contributions, implications and possible future directions.

### 2 Literature Review

### 2.1 Privacy Concern

Privacy concerns are worries about opportunistic use of personal information disclosed, which represent the degree to which individuals consider a privacy loss through the disclosure of personal information [11].

Prior studies on privacy concern mainly concentrate on the exploration of its influencing factors. Smith et al. [12] provided an interdisciplinary review of privacy research and concluded that consumers' personality differences will impact consumers' privacy concern. Other demographic differences, such as gender, age and education, have also been examined [8, 13–15]. Dinev and Hart [1] offered an understanding of privacy concern through the balance between privacy risk beliefs and privacy benefit

beliefs, followed by other scholars [4, 16–18], such as personalization versus privacy intrusiveness, trust versus risks, media richness versus anonymity. Xu et al. [19] and Mousavizadeh et al. [20] studied the effects of privacy assurance approaches on information privacy concern. Platform reputation and platform familiarity were also documented [13].

Privacy calculus theory has dominated the analysis of privacy concern. For instance, Min and Kim [21] adopted the calculus of a cost-benefit framework and suggested privacy concerns as cost factors. When privacy risks were too pressing to offset potential benefits, users would limit their self-disclosure [22]. Privacy calculus theory could admittedly help understand user desire and user behavior if we treat them as rational consumers [4, 5]. However, not all users are rational, and a user cannot be rational all the time [22]. Seldomly, there was research examining consumers' privacy concern from a cognitive perspective of how it is perceived and formed. In this study, we propose two competing models derived from two theories in the literature, prominence interpretation theory and information processing theory, to study consumers' privacy concern in the context of on-demand services.

## 2.2 Self-disclosure

Self-disclosure refers to the act of voluntarily and intentionally disclosing any kind of information, such as addresses, hobbies and photos, to others when registering or using websites or mobile applications [3]. Prior research has demonstrated that users' self-disclosure may significantly influence users' self-disclosure through affecting their privacy concern. For instance, with the increase of the amount of information requested, individuals' privacy trade-off went negatively and intention to disclose their information decreased rapidly [23]. Anderson et al. [24] adopted privacy boundary theory to explain that the types of information requested and requesting stakeholders would alter individuals' privacy concern about disclosing themselves in healthcare settings. Individuals tended to have greater privacy concerns when sensitive information (e.g. financial, medical, demographic information) was requested [25].

Although researchers have spent effort in examining self-disclosure, the mechanism about how consumers' self-disclosure influences their privacy concern still remains as a black box. In this study, we would like to investigate how consumers' prior self-disclosure influences their privacy concern in the context of on-demand services. In particular, we would like to use two competing theories, namely prominence interpretation theory and information processing theory, to investigate how the amount of consumers' prior self-disclosure in the past use affects their privacy concern about using their information.

# 3 Theoretical Foundation

#### 3.1 Prominence Interpretation Theory (PIT)

Prominence interpretation theory was developed as a way to understand how people make credibility assessments of websites [26]. The basic idea is that the success of website depends on whether users perceive the website to be credible. Given an

external cue, two things happen when people assess the credibility of a website: they need to notice something (*prominence*); meanwhile, they make a judgment about what they notice (*interpretation*) [27].

Despite the various dimensions to access credibility [28–30], Fogg et al. [31] summarized two main components: *expertise* and *trustworthiness* when developing prominence interpretation theory. Following paper [31], credibility has been defined as "the extent to which the source is perceived as possessing expertise relevant and can be trusted to give opinion on the subject" [32], which indicates that expertise and trustworthiness are considered as antecedents of credibility. Therefore, we plan to adopt perceived expertise of requests for self-disclosure as a measure for the prominence of the requests, and consumers' perceived trustworthiness of on-demand service platform as a measure for the interpretation of the requests.

# 3.2 Information Processing Theory (IPT)

Information processing theory [33] was formulated to explain consumers' information processing of service delivered cues during the interactions between service consumers and service providers. Information processing theory suggests that consumers' information processing could be decomposed into four stages: *involvement experienced by consumers*, which varies with the amount and equivocality of information that the service platform requires from customers for service production, and the planned social interactions between service consumers and service providers; *consumers'* expectation *of involvement*, where consumers rely on the attributes of the service delivery process to generate expectation of the service; *confirmation or disconfirmation of consumers' beliefs*, where involvement experienced by customers is compared against consumers' expectation of involvement; and finally, an *evaluation* stage, where shows the consequences of information processing of the service delivered cues and consumers' evaluation towards the service.

In the on-demand services, involvement experienced by customers can be reflected by the amount of their self-disclosure in the past use. Consumers' perceived expertise is adopted to capture the consistency between requested self-disclosure and their past experience. Perceived trustworthiness is adopted to reflect consumers' evaluation of the service platform when the requests for self-disclosure are delivered during the service process.

# 4 Research Models and Hypotheses

#### 4.1 Research Model Based on PIT

In Fig. 1, we present the research model overarched by prominence interpretation theory. It proposes that the amount of consumers' prior self-disclosure in the past use affects influences consumers' privacy concern through two routes: perceived expertise of requests for self-disclosure and perceived trustworthiness of on-demand service platform.

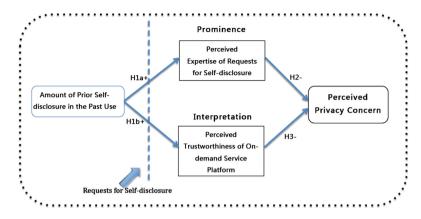


Fig. 1. Research model based on prominence interpretation theory

Effects of Amount of Prior Self-disclosure on Perceived Expertise Prominence is related with the experience of consumers, i.e., whether they are novice or expert [27]. For example, the aspects of a system that get noticed by an experienced individual will differ from what gets noticed by a novice user [34]. Consumers who have experience in the past use could better understand the purpose of the requests, and there is less possibility that requests for self-disclosure are perceived as deviated with their expectation. Therefore, those requests are less likely to be reviewed as obtrusive and task-irrelevant. Thus, we hypothesize that:

**Hypothesis 1a**: Amount of consumers' prior self-disclosure in the past use is positively related with consumers' perceived expertise of requests for self-disclosure.

Effects of Amount of Prior Self-disclosure on Perceived Trustworthiness Every individual has a certain basic level of skepticism toward a new request for personal information when insufficient information is involved [35], and they generally tend to remain skeptical thus degrade their initial trust level unless new information is entered [36]. Sufficient information provision for decision-making could greatly reduce consumers' level of skepticism and enhance trustworthiness [37]. When individuals have more experience of the service concerned, they are more likely to form positive beliefs towards the service, which seems to be more reliable and dependable to them [38]. Thus, we hypothesize that:

**Hypothesis 1b**: Amount of consumers' prior self-disclosure in the past use is positively related with consumers' perceived trustworthiness of on-demand service platform.

Effects of Perceived Expertise on Perceived Privacy Concern Expertise was proved to successfully drive social confidence [39]. When expertise is higher, competence perceptions tend to be stronger, individuals tend to have more confidence of control in their information [40], and worry less about their expectation would be violated. If a self-disclosure request is perceived as expertised, consumers will feel confident enough to trust its good intention thus won't concern about their privacy. Meanwhile, expertise could help enhance credibility [41]. A specialized technology would be perceived as

more credible than a general one, and users feel more relieved to use the specialized one [42]. Likewise, an expertised request for self-disclosure is more likely to be credible and be accepted. Thus, we hypothesize that:

**Hypothesis 2**: Perceived expertise of request for self-disclosure is negatively related with consumers' perceived privacy concern about their information.

Effects of Perceived Trustworthiness on Perceived Privacy Concern Trustworthiness has been reported in the literature to hold a negative relationship with privacy concern [43]. When the source of information is highly trustworthy, individuals are more likely to attribute the piece of information to be beneficial and favorable [44]. Reasonably, individuals would develop greater affective regard and worry less about their perceived concern than those low in trustworthiness [45]. If consumers perceive the on-demand service platform as trustworthy, they will form beliefs that the platform is competent to manage their information, act properly and avoid opportunism use of their information. Thus, we hypothesize that:

Hypothesis 3: Perceived trustworthiness of on-demand service platform is negatively related with consumers' perceived privacy concern about their information.

#### 4.2 Research Model Based on IPT

In Fig. 2, we present the research model overarched by information processing theory. It depicts that amount of consumers' prior self-disclosure in the past use is associated with perceived expertise of requests for self-disclosure that consumers believe, and then it affects consumers' perceived trustworthiness of the on-demand service platform, thus finally influences their privacy concern.

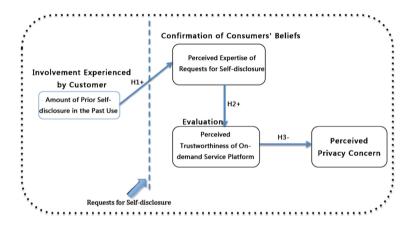


Fig. 2. Research model based on information processing theory

Effects of Amount of Prior Self-disclosure on Perceived Expertise Involvement experienced by customers is mainly embodied at the amount of consumers' prior self-disclosure in the past use [27]. The more involvement consumers experience in their encounters with service platform, the more motivated they are to attend to and

comprehend the service delivered cues, and increase their tendency to perceive the goodwill of requested self-disclosure [33]. Meanwhile, under higher motivation, consumers are more competent and confident to accept the rationality of the requests [46], and perceived the requests as reasonable and professional. In other words, the likelihood for consumers to perceive a self-disclosure request as expertised will rise as their involvement level increases with their past self-disclosure. Thus, we hypothesize that:

**Hypothesis 1**: Amount of consumers' prior self-disclosure in the past use is positively related with consumers' perceived expertise of requests for self-disclosure.

Effects of Perceived Expertise on Perceived Trustworthiness Perceived expertise reflects consumers' confirmation of self-disclosure requests. When messages are expertised, receivers will consider them to be more constructive and persuasive [45]. Vincent and Webster [45] suggest that consumers' trust increases if they perceive a high level of expertise, because they will have more confidence of control and worry less about potential risks [39]. Meanwhile, beliefs of confirmation with requested self-disclosure help consumers form an expression that they can cooperate with the service platform [33]. When the requests are perceived as expertised, consumers' trust towards the platform will increase and they tend to give more credit to it. Thus, the perceived trustworthiness of on-demand service platform is enhanced. Thus, we hypothesize that:

**Hypothesis 2**: Perceived expertise of request for self-disclosure is positively related with consumers' perceived trustworthiness of on-demand service platform.

Effects of Perceived Trustworthiness on Perceived Privacy Concern Trustworthiness has been reported in the literature to hold a negative relationship with privacy concern [43]. Privacy concern can be viewed as consumers' worry about the chance that the service platforms use their confidential information without their permission [47]. When trustworthiness is higher, people are more likely to believe that a certain behavior is beneficial, and to evaluate the relevant parties more favorably [45], which may show less possibility to abuse their information. If an on-demand service platform is trustworthy, consumers will deem the platform as reliable, which won't abuse their confidential information without permission. Thus, we hypothesize that:

**Hypothesis 3**: Perceived trustworthiness of on-demand service platform is negatively related with consumers' perceived privacy concern.

# 5 Research Methodology

We target on-demand service consumers as our respondents. The selection criteria include previous experiences with on-demand services and current active use at the time of conducting survey. In the survey, respondents are required to indicate which pieces of information they have disclosed in the past use. We have listed several pieces of information that consumers may run into in their past use based on the general design of on-demand services, such as phone numbers, e-mail address, photos, real time locations, etc. After that, they need to report their perceptions about expertise, trustworthiness and privacy concern through seven-point Likert scales. Finally, demographic statistics including age, gender, education level, frequency of use and registration date will also be collected [48].

The amount of consumers' prior self-disclosure is measured by the total amount of information consumers have disclosed in the past when they were using the on-demand service app. Other items used to measure perceived expertise, perceived trustworthiness and perceived privacy concern are adapted from prior studies [8, 31]. They are based on seven-point Likert scales anchored from "strongly disagree" to "strongly agree" where 1 = strongly disagree and 7 = strongly agree.

# 6 Potential Contributions and Implications

This research is expected to contribute to the existing literature in several aspects. First, different with previous literature relying on privacy calculus theory to illustrate privacy concern, we offer a cognitive approach to assist in understanding how consumers' self-disclosure influences their privacy concern. Second, we extend previous literature about self-disclosure by considering how the requests for self-disclosure are received and interpreted by consumers as external service delivered cues, and the effect of prior self-disclosure on consumers' privacy concern. Third, we add to the body of prominence interpretation theory literature by contextualizing requests for self-disclosure as external cue and adapting it to investigate the relationship between privacy concern and its antecedents. We also add to the body of information processing theory literature by contextualizing requests for self-disclosure as service delivered cue and adapting it to investigate how the requests are processed to influence privacy concern.

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