

PRIVACY-RELATED CONSUMER DECISION-MAKING

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EXTENDED ABSTRACT

Consumers typically decide whether to disclose personal information when choosing products or services. This privacy-related decision-making (PDM) is often explained using privacy calculus models (PCM). In PCM, PDM is described as a rational decision-making process that weighs the potential benefits of information disclosure against potential losses and risks (Culnan and Bies, 2003; Dinev and Hart, 2006). Many attempts have been made to enhance the explanatory power of PCM by incorporating various factors such as general privacy concerns, institutional trust, affective state, information transparency, and heuristic thinking (e.g., Awad and Krishnan, 2006; Kehr et al., 2015; Adjerdid et al., 2018).

However, there has been limited research on the contextual aspects of PDM, particularly how it operates within the broader framework of consumer decision-making (CDM). In CDM research, it is known that a wide range of benefits and costs are considered during the decision-making process (Glover and Benbasat, 2011). The positioning of PDM within CDM can be examined by investigating whether privacy-related factors are selected as considerations among these various benefits and costs. This study aims to investigate how PDM operates within the consumer decision-making process when choosing mobile apps. It does so through two separate investigations. The first investigation used a protocol method to collect and analyse verbal data regarding respondents' thoughts and actions during app selection. In the second investigation, the unaided recall set and aided recall set of factors considered in mobile app choice situations were identified, and the presence of privacy-related items within each set was examined.

In the first investigation, protocol data was collected in May 2022. The respondents of this survey consisted of 21 Japanese students at Meiji University, comprising 8 males and 13 females, with an age range of 19 to 21. They were asked to report their thoughts and observations during the selection process of mobile apps (in particular, diary apps) using a voice recorder. Due to technical issues such as difficulty in discerning the audio, data from four participants were excluded from the analysis. As a result, the analysis was conducted on oral data related to the selection process of 17 cases. The results are described in Table 1.

In all 17 cases, official sites such as the App Store and Google Play were used to select the apps, and within the sequence of actions, the detailed pages of each app were checked a total of 65 times. Checking the detailed pages provides an opportunity for information gathering related to the disclosure of personal information. Therefore, in this survey, it can be interpreted that there were up to 65 instances of privacy-related considerations. Out of these 65 instances, personal information disclosure and privacy-related considerations, such as checking what information the app collects and reviewing privacy policies, occurred only 2 times, specifically in the case of the user 'Saku89ut.' This represented only 3.1% of the total consideration opportunities. The remaining 63 instances (approximately 97% of the total) were dedicated to considerations such as app features, usability, design, or the frequency of technical issues.

Table 1. Action flow during app selection.

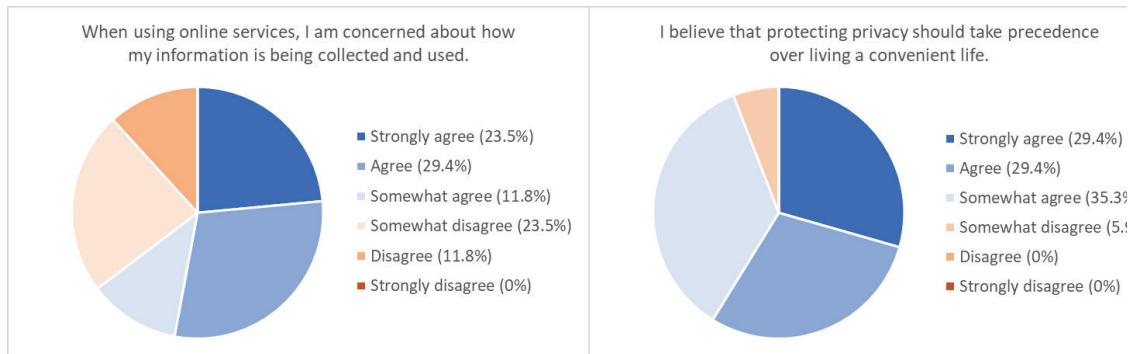
Handle	Action flow during app selection	Required Time	handle	Action flow during app selection	Required Time
516uihas	○→■1→□→■2→☆→■3→✓	3:50	Miutan23	○→■1→■2→■3→□→✓	3:50
10100907	○→■1→■2→□→✓	2:45	Msaler11	○→■1→?→✓	2:45
Bunbabab	○→■1→?→✓	1:05	Mutsuki	○→■1→■2→■3→■4→■5→■6→■1R→■2R→■3R→■4R→■2R→✓	5:15
Celaptnn	○→■1→□→■2→■3→□→■1R→■2R→✓	4:20	Saku89ut	○→■1→■2→■3→✓	4:20
Chongkan	○→■1→■2→?→✓	2:30	Syousin3	○→■1→■2→■3→■1R→✓	2:30
Cotton73	○→☆→■1→☆→■2→■3→☆→✓	3:10	Uniiqwow	○→■1→□→■2→■3→□→■1R→■3R→✓	3:10
Dorachan	○→■1→■2→✓	2:50	Wanpiz37	○→?→■1→✓	2:50
Dtco4869	○→☆→□→■1→■2→■3→✓	6:10	Y6u11a2r	○→■1→■2→■3→■4→■5→■6→■7→■8→□→✓	6:10
Jist0909	○→■1→■2→✓	1:50			

The meanings of the symbols used in the action flow:

- : Search on official app store
- : Consideration on search result list
- : Detailed consideration of individual apps on their respective pages
- ☆: Consideration on web pages (outside the official app store)
- ✓: App decision
- with a number: App considered in the nth position
- with an R: Reconsideration of the individual page
- ?: Unintelligible/Unclear

However, it is worth mentioning that respondents expressed significant concerns about privacy, as illustrated in Figure 1. 64.7% of respondents expressed an interest in privacy, while 94.1% of respondents believed that privacy should take precedence over convenience in their daily lives.

Figure 1. Level of privacy concerns.



In the second investigation, the extent to which personal information disclosure and privacy-related concerns were recalled when selecting mobile apps was examined. Recall can be categorized into two types. Unaided recall refers to the mental state where the target object can be recalled without any specific clues about a particular category. Aided recall represents the mental state in which the target object can be recalled when provided with cues such as a list of relevant items. The survey was conducted in June 2023. A total of 420 participants were included, with 42 individuals assigned to each of the 10 demographic groups. These groups consisted of 5 age categories, ranging from individuals in their 20s to those over 60, and included both males and females. The participants were then randomly divided into two groups (Group A and Group B) while maintaining the same allocation ratio. This division aimed to measure the recall sets of different app categories, specifically diary apps and health management apps. The list of considerations for measuring the aided recall set consists of a total of 11 items, including

"functionality," "design," "price," "download history," and others, which were extracted through a pretest. Among them, the items 'developer' and 'privacy compliance' were considered factors related to personal information disclosure and privacy. The responses collected in a free-answer format, which were gathered to understand the unaided recall set, were assigned to this list for comparison with the aided recall set (the assignment process was carried out by three authors with mutual confirmation).

In the case of unaided recall for the diary app, out of the 210 respondents in Group A, 161 individuals (76.7%) mentioned at least one consideration such as functionality or design, while only 8 individuals (3.8%) mentioned at least one consideration related to developer or privacy compliance. The results were almost identical in the case of the health management app. Out of the 210 respondents in Group B, 153 individuals (72.9%) mentioned at least one consideration such as functionality or design, while only 8 individuals (3.8%) mentioned at least one consideration related to developer or privacy compliance.

In the aided recall set, there was a notable increase in the consideration of privacy-related factors, as demonstrated in Table 2. For diary apps, 94 respondents (44.8%) and for health management apps, 81 respondents (38.6%) directed their attention towards "developers" and "privacy compliance". Naturally, aided recall sets are generally larger than unaided recall sets. Therefore, a comparison was made based on the overall increase rate of consideration factors. In the case of diary apps, the number of responses obtained through aided recall (759) was 2.9 times higher than the number obtained through unaided recall (266) in the entire item list. Additionally, the number of responses related to privacy considerations through aided recall (109) was 13.6 times higher than the number of responses through unaided recall (8), and this difference was also found to be statistically significant according to the chi-square test ($\chi^2(1)=21.037, p<0.001$). For health management apps, the overall increase rate was about 3.0 times (765/252), while the increase rate for privacy-related items was 10.0 times (100/10), and this difference was also found to be statistically significant in the chi-square test ($\chi^2(1)=13.691, p<0.001$).

Table 2. Difference between unaided recall set and aided recall set (all factors and privacy-related factors).

In the case of diary apps				
	No. of responses in Unaided	No. of responses in Aided	Changes in quantity	Percentage change
All factors	266	759	493	285.3% increase
Privacy-related factors	8	109	101	1362.5% increase
In the case of healthcare apps				
	No. of responses in Unaided	No. of responses in Aided	Changes in quantity	Percentage change
All factors	252	765	513	303.6% increase
Privacy-related factors	10	100	90	1000% increase

In summary, the results indicate that privacy-related decisions are infrequent within the CDM process. CDM is primarily influenced by considerations related to functionality and design, with privacy-related information playing a limited role. However, the significance of PDM within CDM increases notably when explicitly prompted or provided with aids, such as lists. In our full paper, we will examine the contextual nature of such PDM and discuss the issues of privacy management based on consumer consent.

KEYWORDS: Privacy-related decision making, consumer decision-making, contextual characteristics of privacy-related decision-making in consumer decision-making, protocol method, recall set.

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