Understanding social media discontinuance from social cognitive perspective: Evidence from Facebook users

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ABSTRACT

Based on social cognitive theory, this study proposes a research framework to investigate two different social media discontinuance behaviors: reduced-usage and abandoned-usage. Specifically, perceived technology overload, information overload, and social overload are the environmental factors that induce negative personal states, including dissatisfaction and social media fatigue, which lead to negative behavioral changes, such as reduced-usage and abandoned-usage of social media. The proposed research model was tested empirically with data collected among Facebook users. The research results indicate that impacts from perceived technology overload, information overload, and social overload on social network fatigue and dissatisfaction vary. Dissatisfaction exerts greater impacts on abandoned-usage behavior than social media fatigue, but similar impacts on reduced-usage behavior as social media fatigue. And reduced-usage behavior was found to lead to abandoned-usage behavior. Finally, we discuss the theoretical and practical contributions that can be gleaned from the proposed research model.

Keywords

Social media discontinuance; Social cognitive theory; Abandoned usage; Reduced usage; Overload, Social media fatigue; Dissatisfaction

1. Introduction

Social media discontinuance has attracted attention among information systems (IS) scholars in the past years. Given social media's technology affordances for individual users, many social media users have tried to discontinue their use of social media, even after social media service providers attempted to improve service quality, such as by adding new functions or encouraging more user interactions to retain users [1, 2]. These strategies apparently have been unsuccessful, as some social media users have been reported to have ceased or reduced their usage of social media [2]. An individual user might reduce social media usage before finally ceasing all social media usage. Thus, IS scholars have regarded both reduced IS usage and abandoned IS usage behaviors as IS discontinuance behaviors [3, 4]. However, prior research has mainly focused on investigating social media discontinuance without identifying the factors leading to distinct social media discontinuance behaviors, such as reduced-usage and abandoned-usage behaviors, and few studies have attempted to explain the differences and similarities between factors driving the two different social media discontinuance behaviors and the link between them [3, 4, 5].

Extant literature suggests that different factors drive social media discontinuance compared with social media continuance [2, 6]. Cho [7] stated that social media discontinuance decisions largely are associated with individual users coping with disturbances in their use of social media. For example, some scholars have attempted to explain social media discontinuance from a technostress perspective [8]. And a few studies have investigated the impacts of overload on social media discontinuance intentions, and found that overload can induce social media fatigue and user dissatisfaction with social media, which lead to users' intentions to discontinue social media usage [2, 9, 10]. These studies highlight social media's negative side, specifically how stressful experiences in using social media induce negative emotions which lead to social media discontinuance among users [2, 3, 11]. But little research has attempted to explain how the different negative personal emotions (e.g. social media fatigue and user dissatisfaction) induced from overload in social media use will affect different social media discontinuance behaviors, such as reduced-usage and abandoned-usage behaviors.

In response to the aforementioned research gap, this study endeavors to investigate the factors determining reduced-usage and abandoned-usage behaviors in social media use via answering the following research questions: i) What are the role of social media fatigue and user dissatisfaction in predicting users' reduced-usage behaviors and abandoned-usage behaviors in social media use? and ii) What is the relationship between reduced-usage behaviors and abandoned-usage behaviors in social media use?

Specifically, this study investigates the drivers of reduced social media usage and abandoned social media usage based on social cognitive theory. Social cognitive theory posits that environmental factors can induce users' behavioral responses by affecting their personal states dynamically, usually referring to emotional states [12]. Social cognitive theory provides a general framework for explaining the discontinuance of possibly harmful or unhealthy behaviors [12]. Thus, social cognitive theory has been selected as the theoretical basis in this study to investigate reduced social media usage

and abandoned social media usage. Following social cognitive theory's overarching framework, in this study, overload (information overload, technology overload, and social overload) is viewed as environmental factors, while social media fatigue and dissatisfaction are viewed as personal states that result from overload, and reduced- and abandoned-usage behaviors are viewed as behavioral responses that overload induces. Data collected from 412 Facebook users are used to test the proposed research model.

In this sense, this study contributes to extant IS discontinuance literature by providing a comprehensive understanding of the factors predicting distinct social media discontinuance behaviors via investigating the different roles of user dissatisfaction and social media fatigue in inducing reduced and abandoned social media use. This study also extends the IS discontinuance literature by exploring the link between the two different social media discontinuance behaviors.

The remainder of this paper is organized as follows. The subsequent section offers a literature review of previous studies on IS discontinuance, social cognitive theory, social media fatigue, and dissatisfaction. We also introduce social cognitive theory as our main theoretical foundation and elucidate our research model and hypotheses accordingly. We then describe our research methodology, followed by a discussion of our research findings. The paper concludes with a discussion of theoretical and managerial implications, together with this research's limitations.

2. Literature Review

2.1 IS Discontinuance

In extant IS literature, most studies on IS continuance have assumed that IS continuance and discontinuance are opposite extremes on a continuum [6, 13, 14]. However, recent studies on IS discontinuance postulate that it should not be viewed merely as the opposite of IS continuance, though they might be correlated [3, 4, 15].

Prior IS discontinuance research has examined different IS continuance-related behaviors, such as discontinuance intentions, short breaks in use, controlled use, suspended use, replacement intentions, and abandoned-usage behavior [3, 4, 15]. Some scholars mainly distinguish between discontinued-usage behavior and discontinued-usage intentions, and define IS discontinuance as abandoned-usage behavior [16, 17]. For example, Parthasarathy and Bhattacherjee [16] have defined IS discontinuance as users' decisions to abandon their use of an IS. York and Turcotte [17] have indicated that IS discontinuance comprises replacement discontinuance and disenchantment discontinuance, both of which are abandoned IS usage behaviors. Other scholars include two IS discontinued-situation behaviors: reduced IS usage (e.g., short breaks in IS usage behavior and controlled IS usage behavior) and abandoned IS usage [3, 4]. Shokouhyar et al. [15] stated that IS discontinuance refers to both reduced IS usage and abandonment of a previous IS. Considering the differences between reduced IS usage and abandoned IS usage behaviors, in our study, we refer to discontinuance as a user-level decision to reduce or abandon an IS.

As a post-adoption behavior, discontinuance has been studied widely in IS research [4]. A summary of prior studies on IS discontinuance in IS research is provided in Table 1. For instance, from a technical perspective, technostress for end users can contribute to the development of IS discontinued-usage intentions [1, 2]. From an organizational perspective, organizational initiative, system performance shortcomings, and environmental change together determine organizational IS discontinued-usage intentions [18, 19]. From a personal perspective, negative impacts from IS usage on users' psychology and physiology, such as social network sites (SNS) exhaustion and regret, can facilitate IS discontinued-usage intentions [9, 20]. Moreover, different theories have been employed to explain how user cognition induces discontinued-usage intentions. For example, Cao et al. [9] employed protection-motivation theory and information-processing theory to explain how ubiquitous connectivity promotes SNS discontinuance intentions owing to raising protection motivation and privacy concerns. Lim et al. [21] applied reactance theory to investigate positive impacts from Facebook interactions on discontinued-usage intentions through a threat to freedom of usage and the existence of *personas non grata*. Luqman et al. [1] adopted stimuli-organism-response theory to illustrate how negative psychological and behavioral outcomes induced by Facebook overuse compel users to develop discontinued-usage intentions. Prior IS discontinuance research has mainly focused on examining users' discontinuance intentions and behavior [5], little research has attempted to compare the different roles of factors in predicting distinct IS discontinuance behaviors (e.g. reduced usage and abandoned usage) and the links between different IS discontinuance behaviors.

<Insert Table 1. Summary of prior studies on IS discontinuance in IS research here>

2.2 Social Cognitive Theory

Social cognitive theory, developed by Bandura [12], originally was applied to the field of environmental psychology, then to the field of IS research. The theory states that environmental factors exert impacts on personal states which lead to individuals' behavioral changes, such as the interactions between environmental factors and personal states can impact user behavior [12]. Under social cognitive theory, users are depicted as active self-regulators who evaluate environmental factors' impacts on their feelings, well-being, and experiences, then use this information to determine their behavioral changes [12]. Specifically, the process of self-regulation mainly is divided into three stages. First, environmental factors, always reflected by technology intervention, can trigger changes in individuals' mental and physical states [12]. Next,

individuals need to pay attention to the changes to form their own judgments and develop strategies to cope with changes [12]. Individuals then should evaluate changes in their mental and physical states. When such evaluations are unfavorable, behavioral-change intentions are spawned, and individuals can make behavioral changes [26]. Therefore, social cognitive theory provides a general framework for comprehending, forecasting, and regulating user behavior [27].

Social cognitive theory increasingly has been applied in online contexts to examine user behavior in different contexts. For example, Turel [6] found that Facebook overuse exerts positive effects on guilty feelings that, in turn, lead to discontinued-usage intentions. Through an empirical study of Facebook, Lin et al. [28] indicated that environmental factors (i.e., human-to-human interactions and human-to-information interactions) significantly affect personal cognition (i.e., outcome expectations concerning health self-management competence and outcome expectations concerning social relationships), which positively affects users' behavioral responses (i.e., health information exchanges). For university library websites, Kim [29] investigated users' IS usage intentions based on social cognitive theory and found that computer self-efficacy significantly influences users' subjective norms and perceived ease of use that, in turn, improve their behavioral engagement intentions. In the context of knowledge management systems, Lin and Huang [30] attested to the essential role of knowledge management system self-efficacy in facilitating personal-outcome expectations that, in turn, exert positive effects on knowledge-management system usage. For general virtual communities, Zhou [27] indicated that trust environments in virtual communities demonstrate positive effects on personal-outcome expectations, resulting in the improvement of user-knowledge sharing. In the context of fitness apps, Oyibo et al. [31] found that social support positively influences users' self-efficacy and outcome expectations that, in turn, promote exercise behavior.

Prior literature shows that social cognitive theory is a good theory to explain different user behaviors, such as information exchanges, online engagement, exercise behaviors, etc. Prior research mainly focuses on explaining how environmental factors induce individuals' positive behavioral responses via positive personal states. As Turel [6] suggested, social cognitive theory is a good theory to explain IS usage behavior, which is suitable for examining both positive and negative behavioral responses in the IS domain.

Thus, this study applies social cognitive theory to examine individuals' negative behavioral responses (e.g. reduced- and abandoned-usage behaviors) in the social media context. Social cognitive theory fits with our study for the following two reasons. First, according to the aforementioned extant literature, social cognitive theory is suitable for examining online user behavior. Second, social cognitive theory is a general framework that puts no restrictions on environmental factors and personal states that influence individuals' self-regulated behavior in specific situations [12]. When using social media, users constantly interact with system features and other users. The external environment exerts its effects on user cognition and emotions gradually in dynamic interactions. Previous research has found that social cognitive theory can be used to explain the impact of dynamic external environment on users' internal psychology [32]. In the context of social media, social cognitive theory can serve as a structured paradigm to explore the negative impact of the environmental factors on personal states, which in turn lead to the change in social media use, such as reduced- and abandoned-usage behaviors.

Following social cognitive theory, overload in social media use is set as an environmental factor that can induce users' negative psychological states in social media use. Overload describes an individual's subjective perception and evaluation of the number of people or objects that are beyond one's capability to process [33], which reflects the environmental factor in social media use for individuals. In prior literature, overload has been suggested to be a dominant factor predicting individuals' negative emotions in social media use and mainly consists of technology overload, information overload, and social overload [2, 10, 11]. Therefore, the three types of overload (i.e., technology overload, information overload, and social overload) are incorporated into this study as environmental factors.

In this study, social media fatigue and dissatisfaction are set as personal states that can induce users' behavioral responses. Social media fatigue refers to users' worries about whether immersive and universal experiences provided by social media—e.g., Facebook, Instagram, and WhatsApp—have led to them suffering from unavoidable after-effects [3]. However, social media fatigue nowadays gradually is being referred to as a feeling of weariness concerning social media usage. Prior studies have highlighted social media fatigue's adverse impacts on both individual users and social media service providers [34, 35]. Social media fatigue arguably has been said to weaken individual users' mental and physical well-being, and even transform into a series of unhealthy behaviors, e.g., social media addiction [36]. It also contributes to the development of discontinued-usage intentions and behavior among individual users, leading to reduced user activity on social media [2, 15].

Despite the existence of abundant adverse effects, studies on social media fatigue are in their early stages, with current research mainly focusing on social media fatigue antecedents, such as overload [11, 15], privacy concerns [14, 37], and fear of missing out [34, 38]. Few have studied social media fatigue's impacts on users' behavioral changes, such as different IS usage behavior, e.g., reduced-usage and abandoned-usage behaviors.

A user's all-around feelings about a service or platform can be reflected in his or her satisfaction and dissatisfaction. In line with expectancy disconfirmation theory [39], users have expectations of products or services before adoption, then assess products or services based on their actual experiences after using them. When assessments meet their expectations, satisfaction with products or services is generated. Thus, satisfaction is regarded widely as an affective or mental state stemming from confirmation of initial expectations [39]. Otherwise, dissatisfaction is generated [40]. Thus, dissatisfaction reflects individuals' negative sentiments—such as displeasure, frustration, disappointment, and bitterness—owing to the disconfirmation of initial expectations [41].

Recent studies have begun to show interest in unraveling satisfaction's antecedents and outcomes [4, 6, 10]. For instance, by proposing a post-acceptance model of IS continuance, Bhattacherjee [39] indicated that perceived usefulness

and confirmation exert positive impacts on user satisfaction, which, in turn, drive IS continuous-usage intentions. Lin, Fan, and Chau [42] found that three antecedents (system quality, connectedness, and pleasure) contribute to the development of satisfaction, which later promotes continuous-usage intentions on social media. Maier et al. [10] emphasize social overload's negative role in the formation of user satisfaction with social media. Previous research has provided robust empirical evidence that user satisfaction positively affects users' continuous-usage intentions toward social media. Few have investigated the different impacts of dissatisfaction on users' different behavioral changes in social media use, such as reduced-usage and abandoned-usage behaviors.

Reduced-usage and abandoned-usage behaviors are set as behavioral responses in social media use caused by negative personal states. Based on negative emotional strength caused by antecedents and users' endurance levels, users would adopt different IS discontinued-usage strategies [3]. Specifically, when negative emotional strength lies within the user's endurance limit, the user may just develop discontinued-usage intentions. When negative emotional strength reaches the user's endurance limit, the user may reduce social media usage. When negative emotional strength exceeds the user's endurance limit, the user may stop using social media. Particularly with abandoned-usage behavior, it reflects users' decision to stop using an IS and not return to it. It matters particularly in situations in which users are free to choose the IS [22]. In the context of social media, by following the grounded theory, Cho [7] found that, according to differences in users' ability to cope with disturbances, users may reduce usage time on Facebook, temporarily stop using Facebook, deactivate their Facebook accounts, and even delete their Facebook accounts, as well as the application. By employing social support theory, Maier et al. [10] indicated that users would reduce SNS usage intensity, or even delete accounts and quit the SNS platform, due to too much responsibility for providing social support. Thus, in this study, we focus on reduced- and abandoned-usage behaviors.

3. Hypotheses Formulation and Research Model

Following social cognitive theory and the above literature review, this paper's research hypotheses are structured and depicted in Figure 1. Specifically, three types of overload (i.e., technology overload, information overload, and social overload) are set as environmental factors in the model. Social media fatigue and dissatisfaction are incorporated into the model as personal states to examine their effects on users' behavioral responses. Therefore, we investigated impacts from technology overload, information overload, and social overload on reduced-usage and abandoned-usage behaviors by focusing on social media fatigue and dissatisfaction. And reduced-usage behavior is proposed to be positively associated with abandoned-usage behavior. Due to demographics' potential impact, we included demographic features (i.e., gender, age, Facebook-use experience, daily Facebook-use time, and Facebook-use frequency) as control variables in our study.

3.1 Environmental factors and personal states

Technology overload refers to device proliferation that induces physical and/or cognitive burdens on individuals owing to using diverse gadgets with diverse functions to complete diverse missions in daily life [43]. New features constantly are being updated to improve social media services. Social media platforms such as Facebook, Instagram, and WhatsApp update their app versions nearly once a week in both Android and iOS. New social media features require users to spend significant amounts of time learning how to use them, thereby leading to different fatigue levels among users [7]. Some new social media features may be complex for users, especially elderly and less-educated users, further increasing their learning burden and deepening their feelings of fatigue [44]. Thus, we propose:

H1a: Technology overload is positively associated with social media fatigue.

Technology overload closely parallels reduced perceived ease-of-use and usefulness that, in turn, causes dissatisfaction [2]. Specifically, as technology develops, it becomes more practical to equip social media with various functions, each of which separately can be regarded as necessary. Nevertheless, evidence from marketing research found that excessive product innovations can reduce user satisfaction [45]. Abundant features can make social media overwhelming for users and difficult to use [46]. Unnecessary features in updated systems are associated closely with user distractions [47]. Previous research also has confirmed an inverted U-shaped relationship between technology overload and marginal returns [47]. Therefore, technology overload induces dissatisfaction owing to diminishing marginal returns in using social media. Thus, we propose:

H1b: Technology overload is positively associated with dissatisfaction with social media.

Information overload arises when information that individuals assess exceeds their abilities to accommodate and handle it [48]. Based on Miller's Law [49], people can remember up to seven blocks of information in a short time. People may experience psychological and even physical discomfort when processing excessive amounts of information, also known as information fatigue syndrome [50]. Confronting too much information on social media that exceeds users' capabilities can elicit stress [37], anxiety [34], tiredness [2], boredom [3], and depression [34], which reflect social media fatigue. Extant literature is also replete with evidence of a positive effect from information overload on users' negative emotions on social media [9, 11]. Thus, we propose:

H2a: Information overload is positively associated with social media fatigue.

Information overload widely has been reported to cause user dissatisfaction in various aspects. Information overload can increase visual complexity and decrease usability, thereby resulting in a low-performance platform structure [51]. The same applies to social media; thereby increasing user dissatisfaction with social media. Meanwhile, excessive information leads to a weakened focus on necessary information [52]. Thus, information overload on social media increases users' uncertainty and perceived risk about platform information, both of which drive reduced user satisfaction [53]. Moreover, social media are integrated tightly with users' work nowadays, often acting as a communication tool. Information overload leads to an increase in a large amount of irrelevant information, which weakens users' decision-making ability at work. This further affects users' performance at work, resulting in negative emotions such as dissatisfaction [54, 55]. Thus, we propose:

H2b: Information overload is positively associated with dissatisfaction with social media.

Social overload describes a phenomenon in which users feel like they are giving excessive social support on social media to users embedded in their social networks due to the responsibility of responding to social support requests [10]. Researchers have alleged that users experience fatigue when they need to deal with excessive social communication [11], and Cao and Sun [9] found that too much social interaction exhausts users. Intensive social support for friends on social media contributes to antecedents of social media fatigue [3]. In other research, Dunbar [56] found that the cognitive threshold for maintaining stable interpersonal interactions is about 150. Additional friends beyond Dunbar's number may lead to users feeling overwhelmed [2]. Thus, we propose:

H3a: Social overload is positively associated with social media fatigue.

Except for an increase in a user's feelings of social media fatigue, negative emotions that social overload triggers can be reflected in satisfaction levels [10]. Early research in sociology and psychology has established solidly that a positive connection exists between social overload and individual dissatisfaction [57, 58]. Specifically, social overload can lead to psychological anxiety derived from failure to handle social connections. With the expansion of social networks, users need to provide too much social support on a daily basis, which may exceed their cognitive abilities [59]. Unwanted social demands are expected to result in dissatisfaction with social media [2, 10]. Thus, we propose:

H3b: Social overload is positively associated with dissatisfaction with social media.

3.2 Personal states and behavioral responses

The impacts from social media fatigue are profound and far-reaching; they can alter people's attitudes and even behavior on social media. According to social media fatigue's intensity, caused by overload and tied to the corresponding user's tolerance level, users may react through reduced- and abandoned-usage behaviors on social media [2]. When social media fatigue does not exceed users' tolerance, they may control usage frequency and time spent on social media to alleviate fatigue symptoms. For instance, through an empirical study of Instagram, Shokouhyar et al. [15] showed that users tend to keep their social network activities under control in response to social media fatigue. Combining a qualitative, in-depth interview with a quantitative analysis of user activities on social media, Ravindran et al. [3] found that social media fatigue is reflected through reduced motivation/needs relating to social media interactions and use, which can induce reduced-usage behavior. Thus, we propose:

H4a: Social media fatigue is positively associated with reduced-usage behavior related to social media.

Satisfaction widely has been reported to be an essential construct in IS adoption and continued-usage behavior [60, 61]. Furthermore, satisfaction has been suggested as a prerequisite for system success [61]. Satisfaction with social media can be defined as users' entire emotional experience using social media [62]. Previous research on social media has found a positive relationship between satisfaction and continuous intentions [60]. Contrary to satisfaction, research focusing on dissatisfaction indicated that dissatisfaction showed adverse impacts on continued-usage behavior in the context of cellphone functions [63], telecommunications services [13], and social media [2]. Thus, we propose:

H4b: Dissatisfaction is positively associated with reduced-usage behavior related to social media.

Abandoned-usage behavior is the final termination phase in an IS life cycle. High-density social connections induced by social media fatigue can trigger social withdrawal [22]. Specifically, in the event that social media fatigue exceeds the user's endurance threshold, users will opt out of their social media accounts [3]. An extremely fatigued state that includes emotional exhaustion eventually can induce the user's decision to withdraw, rather than just reduce social media usage [64]. Previous studies have established a positive link between social media fatigue and abandoned-usage behavior [3, 15]. Thus, we propose:

H5a: Social media fatigue positively relates to abandoned-usage behavior related to social media.

IS research accentuated dissatisfaction's power to make users cease IS usage [2, 65, 66]. Lack of satisfaction is regarded as the influencing factor that pushes users to choose a new service provider [67]. When users are dissatisfied with a platform's services, they may abandon that platform and switch to other platforms in search of a better experience [66]. Early marketing research has provided clues to the positive relationship between dissatisfaction and abandoned-usage behavior. For example, Zeelenberg and Pieters [68] revealed that terminating a relationship with a current service provider is one of the main behavioral responses from user dissatisfaction. Loveman [69] found that dissatisfied users are more likely to stop using a service than satisfied users. Thus, we propose:

H5b: Dissatisfaction is positively associated with abandoned-usage behavior related to social media.

3.3 Behavioral response

The negative personal states can lead to individual users' reduction in social media use and maintain their social media use at a lower level [3]. Users will keep reducing their social media use due to their negative personal states in social media use. If the negative personal states are not relieved, their dependence on social media will continue to decrease [3, 6]. When a user's dependence on social media is reduced to a rather lower level, he/she may give up using social media [4, 6]. Thus, we propose:

H6: Reduced-usage behavior is positively associated with abandoned-usage behavior related to social media.

Gender, age, Facebook-use experience, daily Facebook-use time, and Facebook-use frequency are set as control variables in this study. The research framework is presented in Figure 1.

<INSERT Figure 1. Research model here>

4. Research Methodology

4.1 Constructs

An online survey was applied in this study to collect empirical data to test the proposed research model. This proposed research model comprises seven constructs: technology overload; information overload; social overload; dissatisfaction; social media fatigue; reduced-usage behavior; and abandoned-usage behavior. The measurement items for the constructs included in the proposed research model are adapted from existing literature. Some modification and rewording have been conducted to fit to the specific research context of Facebook. Technology overload and information overload are measured using items adapted from Zhang et al. [2]. The measures for social overload and social media fatigue are taken from Maier et al. [10]. The items for the dissatisfaction construct are adapted from Chang et al. [65]. The construct of abandoned-usage behavior is measured using items from Maier et al. [22]. A seven-point Likert scale, ranging from strongly disagree (1) to strongly agree (7), was used to measure each measurement item included in the research instrument. The list of measurement items for the constructs in our proposed research model is presented in Appendix A.

4.2 Sample and data collection

The research data were collected through an online survey questionnaire developed in English. To ascertain the proposed research instrument's reliability and validity, a pilot test was conducted among 15 doctoral candidates with experience using Facebook. The online survey was delivered on Amazon's Mechanical Turk (MTurk), an Internet-based crowdsourcing market. MTurk has become popular with scholars who need to recruit participants for research in different fields, e.g., marketing, IS, accounting, sociology, and psychology. Only Facebook account holders were recruited to participate in this research, and each respondent can fill out the online questionnaire only once. Participants received a moderate monetary incentive of 20 cents for participating in the study if they completed the survey questionnaire. As some scholars have suggested, the incentive is adequate in this crowdsourcing environment and can encourage valid responses [70, 71, 72]. The participants also are informed of the importance of paying attention when answering the online questionnaire to get paid. The average time needed to complete this online survey is approximately 15 minutes.

In the online survey questionnaire, the respondents are informed of this research project's importance and are asked to fill out a consent form before they proceed to the questionnaire. Survey respondents are asked to assess their perceptions and Facebook use based on their past Facebook-use experience. Altogether, 489 respondents participated in the online survey in one week. After removing duplicate answers and answers completed in less than five minutes (too far below the average of 15 minutes to complete the questionnaire), we ended up with 412 responses as a valid data set for analysis in this study. As shown in Table 2, among the respondents, appropriately 50.73% are men and 49.27% are women. Some participants have used at least two social network sites (28.88%), and only 5.34% have used more than five social network

sites. About half the participants (49.76%) have more than eight years of experience using Facebook. Most of the respondents (61.41%) use Facebook several times daily, and 76.94% use Facebook less than two hours daily.

<center><INSERT Table 2. Demographic statistics for the sample (N = 412) here></center>

5. Data Analysis and Results

5.1 Measurement model

Structural equation modeling was used to test the proposed hypotheses and research model via Smart PLS 3.0. Partial least squares (PLS) path modeling was applied in this study as PLS is able to deal with complicated models, such as multiple dependent variables and mediators included in a research model [73]. The research model in this study predicts two distinct social media discontinuance behaviors with three dependent variables and two mediators. In this sense, PLS as a data analytical technique in SEM is appropriate for this study. Following the suggested steps from Hulland [77], an algorithm procedure was conducted to evaluate the measurement model's reliability and validity, as well as the proposed model's structural parameters.

Convergent validity can be assessed by checking estimates of the measurement items' factor loadings on the respective construct, Cronbach's alpha (Cronbach's α), composite reliability (CR), and average variance extracted (AVE) from each construct included in a research model [78]. As shown in Tables 3 and 4, all the measures' factor loadings for the seven constructs were above the cut-off value of 0.7, and the values for CR, AVE, and Cronbach's alpha satisfy the recommended threshold values of 0.8, 0.7, and 0.5, respectively [75, 78], indicating good convergent validity within the research.

All latent constructs' discriminant validity can be assessed by checking the square root of each construct's AVE [78]. The measurement model's discriminant validity in this study is confirmed, as the square root of each construct's AVE is larger than its correlation with any other constructs. The test results imply that each construct included in the proposed research instrument possesses more distinctive variance compared with its shared variance with other constructs included in the research model [78], thereby supporting the research's discriminant validity.

Given that the data set used in this research was collected using a cross-sectional survey, we performed a Harman's single-factor test, a widely applied method used to evaluate common method bias (CMB) [79]. The largest variance explained by the individual factor is 36.58%, indicating that CMB is not a significant problem in this study. Meanwhile, we also assessed the Variance Inflation Factors (VIFs) for all focal constructs included in our study. The test results show that all focal constructs' VIF values fall below 10, eliminating the potential multicollinearity issue in this study [80].

<center><INSERT Table 3. Variable reliability, correlations, and AVE here>
<INSERT Table 4. Loading and cross-loading matrix here></center>

5.2 Structural model

We tested the structural model using a bootstrapping procedure in PLS. As shown in Figure 2, consistent with our expectations, technology overload ($\beta = 0.173$; $p < 0.01$), information overload ($\beta = 0.399$; $p < 0.001$), and social overload ($\beta = 0.138$; $p < 0.01$) demonstrate a positive impact on social media fatigue. The variance explained by social media fatigue was 36.3%. Technology overload ($\beta = 0.088$; $p = 0.175$) and information overload ($\beta = 0.397$; $p < 0.001$) demonstrate a positive impact on dissatisfaction. Unexpectedly, social overload ($\beta = -0.167$; $p < 0.01$) demonstrates a negative impact on dissatisfaction. Social media fatigue has a positive impact on reduced-usage behavior ($\beta = 0.275$; $p < 0.001$) and abandoned-usage behavior ($\beta = 0.160$; $p < 0.01$). Dissatisfaction also exerts a positive impact on reduced-usage behavior ($\beta = 0.256$; $p < 0.001$) and abandoned-usage behavior ($\beta = 0.287$; $p < 0.001$). Reduced-usage behavior was found to be associated with abandoned-usage behavior positively ($\beta = 0.342$; $p < 0.001$). The proposed research model explains 30.3% and 52.1% of the variance in reduced-usage behavior and abandoned-usage behavior, respectively.

The test results on control variables indicate that participants' Facebook-use experience ($\beta = 0.112$, $p < 0.01$), Facebook-usage frequency ($\beta = 0.130$, $p < 0.05$), and daily Facebook-use time ($\beta = -0.128$, $p < 0.01$) exert significant impacts on reduced-usage behavior. Conversely, participants' age ($\beta = -0.088$; $p = 0.058$) and genders ($\beta = -0.031$; $p = 0.485$) exert no significant impact on reduced-usage behavior. Meanwhile, participants' age ($\beta = -0.117$; $p < 0.01$), Facebook-use experience ($\beta = -0.150$, $p < 0.001$), Facebook-use frequency ($\beta = 0.106$, $p < 0.05$), and daily Facebook-use time ($\beta = 0.087$, $p < 0.05$) exert significant impacts on abandoned-usage behavior. Conversely, participants' gender ($\beta = 0.051$; $p = 0.163$) exerts no significant impact on abandoned-usage behavior.

<center><INSERT Figure 2. Research model results here></center>

6. Discussion

Built on social cognitive theory, our findings unveiled how technology overload, information overload, and social overload (environmental factors) drive reduced- and abandoned-usage behaviors (behavioral responses) by inducing social media fatigue and dissatisfaction (personal states).

In this study, as expected, technology overload, information overload, and social overload were found to exert positive effects on social media fatigue, lending support to hypotheses H1a, H2a, and H3a, which confirmed recent studies' research findings that the source of social media fatigue includes information overload, technology overload, and social overload [2, 11].

Moreover, information overload exerts the greatest impact on social media fatigue in our study, followed by technology overload and social overload. This is inconsistent with results from Zhang et al. [2], who indicated that social overload exerts greater impacts on social media fatigue than information overload and system feature overload. Consistent with previous studies, excessive information on social media quickly can push users to their cognitive thresholds for processing information, leaving them feeling overwhelmed [15, 81]. This might be due to different research contexts. Zhang et al. [2] investigated social media fatigue in the context of QZone, a social media platform in China that resembles a blog. Individual users can share their stories, music, and pictures in their own QZone and even set up personalized homepages. The finding of a positive influence from social overload on social media fatigue contrasts with results from Shokouhyar et al. [15], who found that social overload's impact on social media fatigue is insignificant in the Instagram context. This may be associated with the differences between Facebook and Instagram. Instagram mainly provides a medium for sharing pictures among users. Compared with Facebook's heavy social interaction function, social overload on Instagram might elicit less fatigue.

Only information overload was found to influence dissatisfaction toward social media positively. Our findings contradict those of Zhang et al. [2], who reported that information overload exerts no impact on dissatisfaction. One possible reason for information overload's significant impact on dissatisfaction might be that in the context of Facebook, users actually view Facebook as a channel for receiving important and updated information related to their daily lives, and they cannot fully control the information targeted at them. Thus, information overload perceived from Facebook use will make them dissatisfied with Facebook.

However, no support was found for a positive impact from technology overload on dissatisfaction, thereby rejecting hypothesis H1b. Two reasons might explain this. First, Facebook users might think that the benefits from updated features on Facebook outweigh the costs with respect to the complexity of use or learning efforts for Facebook users. Second, in the context of Facebook, users actually can decide what system features they would like to use. Thus, Facebook users might feel that technology overload from Facebook use is due to their inability to control their use of different system features, rather than continuous Facebook updates made to system features. We conducted a post hoc analysis and found that social media fatigue exerts a positive impact on dissatisfaction ($\beta = 0.598$; $p < 0.001$), indicating that technology overload exerts an indirect effect on dissatisfaction via social media fatigue.

It is interesting that we found a negative relationship between social overload and dissatisfaction, thereby rejecting hypothesis H3b. This research finding contradicts Zhang et al. [2], who reported that social overload's impact on dissatisfaction was insignificant. One possible explanation is that most Facebook users need Facebook's social interaction function to help them with daily social interactions with others, as well as to extend their social networks. Users can provide social support to others and receive the social support that they need from others on Facebook. Although Facebook users feel social overload from their Facebook use, they will not feel dissatisfied with Facebook when they feel social overload, as social interaction is one of the main goals for them in using Facebook. However, when they feel lower social overload from Facebook use, they might feel that Facebook's social interaction function is inefficient, leading to their higher dissatisfaction with Facebook, and vice versa.

The positive effect from technology overload, information overload, and social overload can explain 36.3 percent of the variance in social media fatigue. The explanation for the variance in dissatisfaction is only 16.7 percent. The findings indicate that overload can increase users' feelings of fatigue, but it does not necessarily lead to user dissatisfaction, as technology overload exerts no impact on dissatisfaction.

Meanwhile, we found that the development of dissatisfaction leads to reduced- and abandoned-usage behaviors as well, thereby corroborating H5a and H5b. Consistent with previous studies [3, 10, 22], negative psychological states can lead to negative behavioral responses to the platforms. Most previous research on social media focuses mainly on reduced- and abandoned-usage intentions, with less emphasis on actual reduced- and abandoned-usage behaviors [1, 9, 10]. We extend the behavioral response to the IS cycle's final stage (i.e., reduced- and abandoned-usage behaviors).

While social media fatigue and dissatisfaction exert almost the same effect on reduced-usage behavior, dissatisfaction's impact on abandoned-usage behavior is stronger than social media fatigue. This finding indicates that compared with the experience of fatigue, users are more likely to decide to quit corresponding social media due to dissatisfaction. This confirms, from the opposite side, that satisfaction is a vital factor in determining whether individual users will continue or quit using their IS during the post-adoption stage [39]. Considering H4a, H4b, H5a, and H5b, our findings also confirmed negative personal psychological states' essential role in inducing negative behavioral responses.

Moreover, reduced-usage behavior was found to exert a positive effect on abandoned-usage behavior in social media use, thereby corroborating H6. The finding indicates that reduced-usage behavior can act as a signal that users may abandon their usage of social media in the next step.

7. Implications and Limitations

The study reported upon here contributes important insights by applying social cognitive theory to understand how overload contributes to the emergence of the final termination phase in the IS life cycle, involving both reduced- and abandoned-usage behaviors by causing negative states, such as negative emotions, among users.

This study's findings contribute to the research stream of social media discontinuance in three ways.

First, on the theoretical front, while studies on the adoption and usage phases in the life cycle of an IS abound, determinants of the final termination phase in an IS life cycle (i.e., reduced- and abandoned-usage behaviors) have received relatively limited attention [6]. Therefore, our study advances the existing understanding of IS discontinuance behaviors by investigating two different social media discontinuance behaviors—reduced- and abandoned-usage behaviors—from a social cognitive perspective and the link between the two different social media discontinuance behaviors.

Second, by extending social cognitive theory to the IS discontinuance research, this study provides a theoretical instrument to explain reduced- and abandoned-usage behaviors by shedding light on fatigue and dissatisfaction that undergird overload. The findings on the roles of social media fatigue and dissatisfaction in explaining the two different social media discontinuance behaviors complement previous studies that highlight only fatigue or dissatisfaction, but have not taken both into consideration when examining social media discontinuance behaviors. Meanwhile, this research also provides an understanding on the different roles of negative personal states (e.g. social media fatigue and dissatisfaction) induced from environmental factors (overload) in social media use in triggering different behavior changes in social media use from the social cognitive perspective.

Third, empirical evidence concerning the influence of technology overload, information overload, and social overload on social media fatigue and dissatisfaction in social media contexts is highly mixed. Our study offers a possible interpretation for such inconsistency in research findings by emphasizing differences in various social media contexts and research groups.

On the practical front, our research provides important insights for both users and platform developers in social media. Our research can offer actionable guidelines to social media users on how to reduce negative emotions by controlling the number of system features in use, the amount of information received per day, and daily social connections. Technology overload can induce social media fatigue among social media users. Thus, to avoid technology overload in social media use, social media users should use the system features of social media best fit to their needs, but not all the system features. In addition, information overload and social overload can lead to social media fatigue and user dissatisfaction with social media. To avoid receiving excessive information, users should control their contacts as well as the people and organizations to follow on Facebook, which will reduce information disseminating to the users. Moreover, to avoid social overload in social media use, users should keep a reasonable number of stable interpersonal interactions in social media in daily life, such as below 150 persons as suggested by Dunbar [56].

Our study also offers practical guidance on social media platform development (e.g., Facebook) with regard to optimizing system feature settings and offering suggestions to users on how to use social media reasonably. For instance, social media developers always seek to update system features to improve user satisfaction with ongoing services. The updated functions' cognitive complexity should be considered for social media developers to avoid social media fatigue. Furthermore, social media developers actively should filter out irrelevant information—such as gossip, spam, and rumors—that propagate within the platform. Meanwhile, social media platforms can give users more control over the provision and acceptance of social support, such as providing options to turn off comments, block group information, and hide others' posts. Professional psychological relief services on social media platforms should also be encouraged [82] to help social media users relieve their negative emotions. Moreover, our study reveals that reduced-usage behavior can lead to abandoned-usage behavior. To prevent users from withdrawing social media, social media platforms should take the above-recommended measures to mitigate the negative states of users which can lead to both reduced- and abandoned-usage of social media.

This study has certain limitations. First, while acknowledging that reduced- and abandoned-usage behaviors on social media are subjected to other psychological mechanisms and users' personal dispositions, we try to ensure the parsimony of our research model by adhering to the theoretical lens of social cognitive theory and focusing on the joint impact of social media fatigue and dissatisfaction. Future studies can explore further how negative behavioral responses potentially can be shaped by other psychological states, such as regret, self-regulation, habit, and annoyance. Second, our empirical examination is contextualized in social media in the form of Facebook. Our findings may not be applicable to certain forms of social media, such as photo-sharing social media platforms like Instagram. Future research can examine our findings' boundary conditions by investigating reduced- and abandoned-usage behaviors on social media through unique contextual flavors.

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<INSERT Appendix A: Measurement items here>

Table 1. Summary of prior studies on IS discontinuance in IS research

Reference	Unit of analysis	Theory frame	Dependent variables	Findings
Furneaux and Wade [19]	Organizational information system	/	Discontinued-usage intention	System performance, system suitability, and system supportability negatively affect discontinued-usage intentions, which, in turn, negatively affect system investment, system embeddedness, and isomorphism.
Furneaux and Wade [18]	Organizational information system	Technology-organization-environment paradigm	Replacement intention	System reliability, system-support availability, system-support cost, system investment, and technical integration exert negative effects on replacement intentions, while system-capability shortcomings exert positive effects on replacement intentions.
Ravindran et al. [3]	Social media	/	Short breaks; controlled and suspended social network activities	Factors relating to platform, community, and self can elicit negative emotions, which result in short breaks in social network activities, controlled social network activities, and suspended social network activities.
Maier et al. [22]	Social networking services	IS discontinuance; technostress	Discontinued-usage intention; discontinued-usage behavior	SNS-exhaustion and SNS-stress creators positively affect discontinued-usage intentions, while switching-exhaustion and switching-stress creators negatively affect these intentions. Discontinued-usage intentions positively affect discontinued-usage behavior.
Turel [6]	Social media	Social cognitive theory	Discontinued-usage intention	Satisfaction directly and indirectly can decrease discontinued-usage intentions via habit development, while guilty feelings and self-efficacy facilitate discontinued-usage intentions.
Turel [23]	Hedonic information system	Theory of planned behavior	Discontinued-usage intention	Subjective norms concerning discontinuance, attitudes toward discontinuance, and guilty feelings indicate positive effects on discontinued-usage intentions, while perceived behavioral control regarding discontinuance indicates insignificant effects on discontinued-usage intentions.
Furneaux and Wade [24]	Information system	Protection motivation theory	Replacement intention	System-capability shortcomings positively influence replacement intentions, while system-support availability and

				replacement risks negatively influence replacement intentions.
Chen, Tran, and Nguyen [5]	Shopping application	Stress-coping theory	Discontinued-usage behavior	Disturbance-handling strategies exert negative impacts on users' discontinued-usage behavior, while self-preservation strategies exert positive impacts on users' discontinued-usage behavior.
Tang, Chen, and Gillenson [25]	Brand fan page	Technology acceptance model; Expectation confirmation theory	Discontinued motivation	Individuals' dissatisfaction with service quality, dissatisfaction with information quality, interest shifts, expectation disconfirmation, and person-brand unfit exert positive impacts on discontinued motivation.

Table 2. Demographic statistics for the sample (N = 412)

Measurement	Item values	Total count per item	Percentage (%)
Gender	Male	209	50.73
	Female	203	49.27
Age	18 or less	0	0.00
	19-24	34	8.25
	25-34	184	44.66
	35-44	108	26.21
	45-54	44	10.68
	Above 54	42	10.20
Number of social network sites in use	1	49	11.89
	2	119	28.88
	3	109	26.46
	4	87	21.12
	5	26	6.31
	More than 5	22	5.34
Experience using Facebook	Less than 1 year	0	0.00
	1-2 years	3	0.73
	2-4 years	34	8.25
	4-6 years	81	19.66
	6-8 years	89	21.60
	More than 8 years	205	49.76
Daily Facebook-use time	Less than 1 hour	140	33.98
	1-2 hours	177	42.96
	2-5 hours	76	18.45
	More than 5 hours	19	4.61
Frequency using Facebook	Hourly	48	11.65
	Several times per day	253	61.41
	Once per day	63	15.29
	Several times per week	32	7.77
	Once per week	16	3.88

Table 3. Variable reliability, correlations, and AVE

	Cronbach's α	CR	AVE	TO	IO	SO	DS	SMF	RUB	AUB
TO	0.816	0.889	0.728	**0.854**						
IO	0.868	0.911	0.720	0.624	**0.849**					
SO	0.930	0.950	0.826	0.466	0.431	**0.909**				
DS	0.963	0.973	0.900	0.258	0.382	0.044	**0.949**			
SMF	0.958	0.969	0.888	0.483	0.566	0.387	0.511	**0.942**		
RUB	0.865	0.908	0.711	0.244	0.289	0.016	0.462	0.425	**0.843**	
AUB	0.922	0.943	0.769	0.236	0.285	0.170	0.589	0.513	0.543	**0.877**

Notes: Technology Overload, TO; Information Overload, IO; Social Overload, SO; Dissatisfaction, DS; Social Media Fatigue, SMF; Reduced-Usage Behavior, RUB; Abandoned-Usage Behavior, AUB; Composite Reliability, CR; and Average Variance Extracted, AVE.

Table 4. Loading and cross-loading matrix

Constructs Items	TO	IO	SO	SMF	DS	RUB	AUB
TO1	0.887	0.606	0.366	0.483	0.284	0.270	0.239
TO2	0.801	0.471	0.384	0.348	0.143	0.156	0.131
TO3	0.869	0.493	0.455	0.388	0.208	0.178	0.218
IO1	0.587	0.898	0.373	0.491	0.308	0.232	0.214
IO2	0.571	0.888	0.445	0.492	0.298	0.224	0.198
IO3	0.587	0.878	0.469	0.551	0.345	0.249	0.313
IO4	0.337	0.717	0.106	0.364	0.350	0.282	0.228
SO1	0.409	0.370	0.911	0.315	0.023	-0.005	0.164
SO2	0.434	0.417	0.933	0.396	0.079	0.033	0.183
SO3	0.438	0.368	0.931	0.377	0.064	0.041	0.168
SO4	0.410	0.386	0.860	0.305	-0.023	-0.023	0.102
SMF1	0.478	0.552	0.370	0.933	0.485	0.391	0.439
SMF2	0.479	0.532	0.369	0.938	0.524	0.405	0.432
SMF3	0.438	0.524	0.354	0.946	0.589	0.388	0.514
SMF4	0.435	0.522	0.368	0.951	0.598	0.416	0.538
DS1	0.258	0.373	0.079	0.557	0.949	0.428	0.559
DS2	0.244	0.363	0.059	0.556	0.956	0.432	0.571
DS3	0.243	0.369	0.042	0.558	0.954	0.468	0.577
DS4	0.233	0.343	-0.012	0.542	0.936	0.426	0.528
RUB1	0.149	0.193	-0.096	0.331	0.422	0.854	0.412
RUB2	0.178	0.240	-0.084	0.375	0.464	0.875	0.467
RUB3	0.279	0.260	0.147	0.355	0.300	0.818	0.437
RUB4	0.238	0.292	0.130	0.375	0.352	0.825	0.524
AUB1	0.224	0.317	0.084	0.424	0.442	0.662	0.716
AUB2	0.184	0.224	0.145	0.456	0.508	0.478	0.893
AUB3	0.215	0.261	0.161	0.465	0.515	0.463	0.929

AUB4	0.203	0.231	0.125	0.444	0.542	0.446	0.930
AUB5	0.213	0.223	0.226	0.454	0.566	0.374	0.898

Notes: Technology Overload, TO; Information Overload, IO; Social Overload, SO; Dissatisfaction, DS; Social Media Fatigue, SMF; Reduced-Usage Behavior, RUB; Abandoned-Usage Behavior, AUB; Composite Reliability, CR; and Average Variance Extracted, AVE.

Appendix A. Measurement items

Construct	Item	Source
Technology overload (TO)	(TO1) I am often distracted by features that are included in Facebook, but are not related to my main purpose in using Facebook.	Zhang et al. [5]
	(TO2) Facebook tends to try to be too helpful by adding features, which makes social performance even harder.	
	(TO3) The Facebook features I use are often more complex than the tasks I have to complete using these features.	
Information overload (IO)	(IO1) I am often distracted by an excessive amount of information available to me on Facebook.	Zhang et al. [5]
	(IO2) I find that I am overwhelmed by the amount of information I have to process on a daily basis on Facebook.	
	(IO3) There is too much information about my friends on Facebook, so I find it a burden to handle.	
	(IO4) I find that only a small part of the information on Facebook is relevant to my needs.	
Social overload (SO)	(SO1) I take too much care of my friends' well-being on Facebook.	Maier et al. [3]
	(SO2) I deal too much with my friends' problems on Facebook.	
	(SO3) I am too often caring for my friends on Facebook.	
	(SO4) I pay too much attention to posts from my friends on Facebook.	
Social media fatigue (SMF)	(SMF1) I feel tired from my Facebook activities.	Maier et al. [3]
	(SMF2) I feel drained from activities that require me to use Facebook.	
	(SMF3) Using Facebook is a strain for me.	
	(SMF4) I feel burned out from my Facebook activities.	
Dissatisfaction (DS)	(DS1) I feel dissatisfied about my overall experience using Facebook.	Shen, Li and Sun [15]
	(DS2) I feel displeased about my overall experience using Facebook.	
	(DS3) I felt discontented about my overall experience using Facebook.	
	(DS4) I am not delighted about my overall experience using Facebook.	
Reduced usage behavior (RUB)	(RUB1) I use Facebook far less than before.	Shen, Li and Sun [15]
	(RUB2) I cut down on my time spent on Facebook.	
	(RUB3) I sometimes take a short break from using Facebook, then return to it.	
	(RUB4) I stay away from Facebook for a while, then return to it.	
Abandoned usage behavior (AUB)	(AUB1) I discontinue using Facebook, but it does not mean that I will completely abandon it.	Maier et al. [6]; Shen, Li and Sun [15]
	(AUB2) I suspend use of Facebook.	
	(AUB3) I discontinue use of Facebook.	

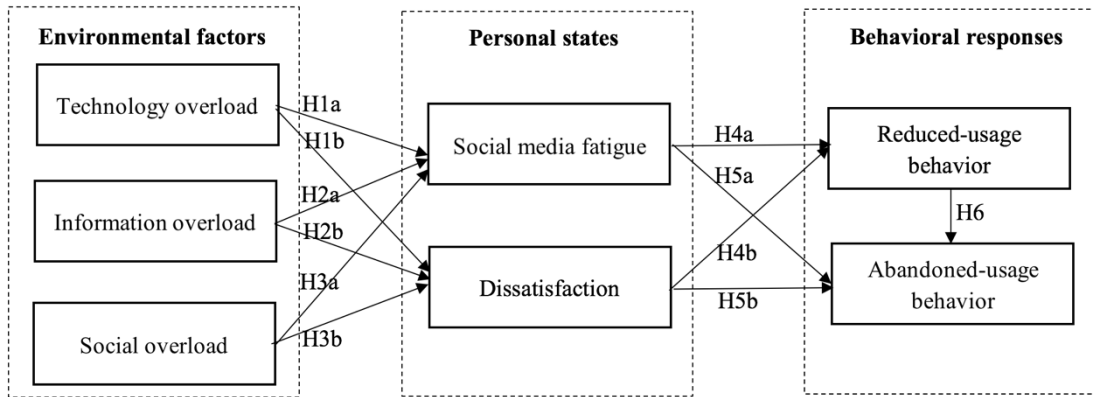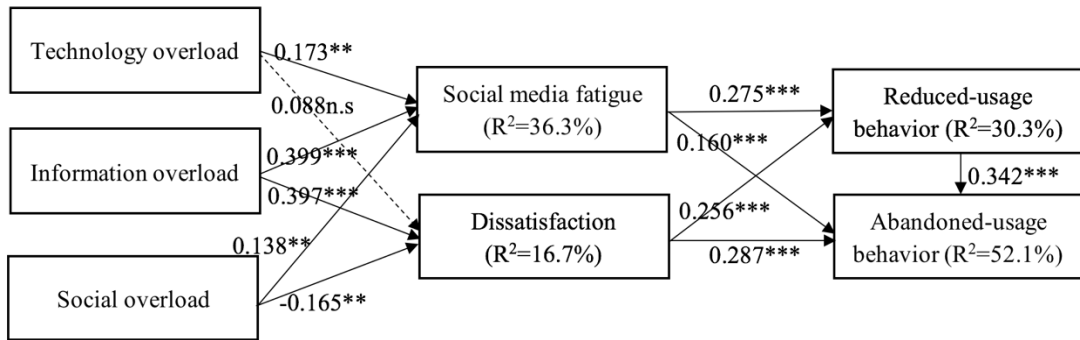|	(AUB4) I stop using Facebook.	
	(AUB5) I quit Facebook.	

Figure 1. Research model

n.s. = "not significant"; *: P <0.05, **: P <0.01, ***: P <0.001.

Figure 2. Research model with results