The Impact of Mere Exposure Effect on Smartphone Addiction

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Abstract

Compared with other information technologies (e.g., desk computers), smartphones are being used anytime anywhere, which shows the unique phenomenon of extensive exposure. However, to date, the information system literature still doesn’t fully understand the association between extensive exposure and information technology usage. The purpose of this paper is to investigate whether and how extensive exposure motivates users to use smartphone addictively from the lens of mere exposure effect. Particularly, we propose convenience, habit and enjoyment to describe the mere exposure effect, as well as incorporating concentration into our research model. Results of an online survey with 384 respondents suggest that convenience facilitates the formation of habit and drives higher degrees of concentration and enjoyment. Habit also generates users’ reactions of concentration and enjoyment, which further result in smartphone addiction. We believe that this study opens up new avenues for a better understanding of smartphone addiction. Implications and limitations are discussed.

1. Introduction

Smartphone addiction has emerged as a worldwide problem. Users with smartphone addiction may suffer from problems of time management, academic performance, conflicts with users’ lives and work [1, 2]. Given its serious consequences, information systems (IS) scholars pay growing attention to this dark side of usage. In spite of the rising concerns, theoretical understanding is still lacking in the IS literature. Most of the current work is found in the psychological discipline [e.g., 3]. IS research just starts to tap into this realm in recent years. Only a few existing studies attempt to develop concepts and measurements for smartphone addiction [e.g., 4], and some address its negative outcomes [e.g., 5]. In this respect, more theory-guided studies are needed to explain the formation of smartphone addiction in the mainstream IS literature. Revealing the formation of addiction can not only enrich the scared IS research, but also help to provide more effective treatments and preventions. Hence, research on IT addiction shows contributions of both rigor and relevance.

To bridge this gap, we examine the underlying mechanism of smartphone addiction, with a particular focus on the phenomenon of extensive exposure. Extensive exposure delineates the high degree of penetration, which explicitly shows the salient phenomenon of smartphone usage. Compared with other information technologies (e.g., desk computers), smartphone are being used anytime anywhere. In such case, people are highly exposed to the behavior of smartphone usage. On one hand, it can be regarded as a typical instance of IS success. On the other hand, it seems that people are surrounded by smartphones, which implies the potential risks of smartphone addiction. Given the relatively higher degrees of exposure in smartphone usage, it becomes important to examine whether this unique phenomenon further brings unexpected consequences. However, no efforts have been made to this point. The current study hence firstly assesses the influence of the exposure phenomenon on smartphone addiction from the perspective of mere exposure effect.

Mere exposure effect (MEE) is a well-known phenomenon in social psychological research. It describes that positive affection may automatically occur in the appearance of previously-presented stimuli.
2. Theoretical background

2.1. Smartphone addiction

Smartphone addiction is one prevalent form of information technology (IT) addiction. In line with the general definition of IT addiction [9], smartphone addiction captures the maladaptive dependency on smartphone devices at the expense of negative consequences. Although a few terminologies (e.g., problematic use of smartphones) have been employed to describe this issue, the current study adopts the concept of smartphone addiction and aims to provide insights to enrich the knowledge and theoretical research on IT addiction.

To date, research on smartphone addiction remains scarce, and most extant studies are conducted in psychology and pathology disciplines. Only a little IS research has been conducted and addressed the predicting roles of demographics and individual traits [e.g., 10]. Nevertheless, smartphone addiction is receiving growing attention among IS researchers. For instance, a more recent study from Chiu [1] revealed that life stress tends to generate smartphone addiction. As smartphone provides various functions or services, there exist two distinct foci of pathological use (i.e., specific and generalized types). Generalized type focuses on the smartphone itself, while the specific one means addiction to the activity of smartphones. Generalized one is considered to be more problematic, as this pathology would not exist without the IT platform [11]. In response to this call, we initially assess smartphone addiction in generalized foci.

2.2. Mere exposure effect

MEE denotes that favorable feelings may automatically arise in the appearance of exposure to repeated stimuli [12]. That is, stimuli which are easy to be observed and take place frequently are more likely to result in positive affection. A reasonable explanation may be that human beings prefer minimizing the cognitive load of processing information [13]. Familiar information is easier and more fluent for people to process. The acquisition of practiced skills specific to an activity via the repeated experience will reduce efforts. As such, people tend to hold positive feelings toward familiar things [14]. This effect has been well documented in both psychology and marketing disciplines [7]. For instance, research shows that when consumers are exposed to products repeatedly, MEE can facilitate their purchasing behaviors [12].

In the IS literature, it has been widely acknowledged that people are inclined to adopt ITs if they perceive relatively little cognitive effort in the usage [15]. Thereby, it may be appropriate and useful for scholars to consider MEE in IS phenomena. This effect is still new in the IS field. For instance, Serenko and Bontis [16] revealed that MEE tends to increase the perception of journal quality. They measure the exposure degree by using the overall familiarity degree, and the outcome of exposure by considering the contribution of the journal. More recently, researchers believe that mere exposure is a useful strategy to enhance a greater extent of social media participation [17]. They present MEE by demonstrating the positive impact of message posting on customer-firm relationship.

2.3. Convenience, habit, enjoyment, concentration

To examine MEE in this study, we translate it into several factors, namely convenience, habit, and enjoyment. Operationalizing this effect into these factors allows us to move toward prevention and treatment of smartphone addiction with practitioners.

In the current context, convenience is an important smartphone feature that shows the perceived costs of effort and time required to perform smartphone usage [18]. Compared to desktop computers, smartphones are much more convenient as they offer similar functions with fewer constraints of time and space. Hence, people can be highly surrounded by smartphones. This convenience attribute of smartphones makes the
devices highly easy to be observed. In other words, it may provide a situation where people are easily exposed to the behaviors of smartphone usage. In addition, convenience implies people’s perceptions about low effort and few constraints of using smartphones. This is theoretically in line with MEE’s descriptions regarding people’s preference of minimizing cognitive effort in information processing [13]. Bearing these in mind, convenience is used as a factor to characterize MEE in the context of smartphones.

In a similar, this study also uses habit as another factor to characterize MEE. A habit of using smartphones suggests that the usage of the devices takes place frequently. In addition, habit reflects that people are cognitive misers who are prone to minimize cognitive effort when facing tasks. The neurology of habit is to protect users from being overwhelmed during information processing [19]. Thus, this mechanism is likely to activate MEE with the exposure of repeated stimuli. As a result, when the stimuli emerge, people may automatically perform habitual behaviors [20, 21].

According to previous discussions, MEE is likely to be triggered with high levels of convenience and habit. In the context of this study, we then use enjoyment to demonstrate the resulting affective reaction of MEE. Enjoyment is defined as the extent to which users experience positive feelings when using smartphones. Prior research also contends that smartphone users experience fun and playfulness during adopting the devices [10]. In addition, we extend the MEE perspective by incorporating another resulting factor besides enjoyment: concentration. As mere exposure influences reactions toward stimuli, it may have implications for how perceivers direct their attention. Concentration is thus more prone to follow MEE, and be an important non-affective outcome. It describes the extent to which attention is absorbed during the smartphone usage. It highlights the disposition or allocation of attention towards stimuli [22]. Hence, the inclusion of concentration can enable us to examine how much attention users may allocate to the stimuli in MEE [7].

3. Research model and hypotheses

To explore the formation of smartphone addiction, we develop our research model (as depicted in Figure 1) by following the MEE perspective. We propose that smartphone addiction can be influenced by convenience, habit, enjoyment, and concentration.

Convenience is a major technological attribute of smartphones. We expect that this attribute may result in the habit development of smartphone usage. Marketing research has demonstrated that convenience can promote the formation of consumers’ purchasing habits [23]. IS research also indicates that habit can be strengthened by incentivizing the feature-based usage [24]. In the present context, convenience may provide a situation in which users are able to use smartphones frequently. We thus propose that convenience may affect the habit of using smartphones. The following hypothesis is provided:

**H1:** Convenience positively affects habit.

Prior research has shown the significant association between purchasing convenience provided by firms and attracted market attention from consumers [25]. This is because that convenience is a non-price competitive advantage, which lowers consumers’ purchasing or transaction costs. In this study, the convenience of smartphones implies that users have low costs or constraints in terms of time or space. They are then more like to focus on the usage of smartphones instead of being distracted or bothered by such concerns. In consistent, prior research also shows that an easy-to-use IT can influence individuals’ concentration level [e.g., 15, 26, 27]. We then expect that convenience can promote users to concentrate on smartphone usage. We offer this hypothesis:

**H2:** Convenience positively affects concentration.

Moreover, research shows that IT features also influence users’ affectation. For instance, Hwang and Kim [28] stated that in self-service technologies, web quality is significantly associated with enjoyment. Positive technological attributes are likely to influence users achieve intrinsic motives [29, 30]. Based on these concerns, we infer that the more convenience smartphones offer, the more likely users will enjoy the experience of using smartphones. We provide following hypothesis:

**H3:** Convenience positively affects enjoyment.
Once a habit forms, it implies a well-practiced behavior [31]. People may be attracted by habitual behaviors. As prior research noted, the more people perform and know about an activity, the easier it may be to concentrate on it [32]. In this respect, habitual smartphone users are more likely to concentrate on their familiar behavior, while not on inexperienced ones. Similarly, Papinski et al. [33] also pointed out that people are easier to focus their attention after developing their habits. Based on these findings, we infer that habit may motivate smartphone users to concentrate on their familiar smartphone usage. We propose the below hypothesis:

**H4: Habit positively affects concentration.**

According to MEE, the more familiar with an object, the more positive affection is likely to be formed [34]. In the IS literature, Wang et al. [35] showed that habit can significantly increase the enjoyment of using microblogs. We thus expect that habitual users may be easier to experience enjoyment during using smartphones. The following hypothesis is offered:

**H5: Habit positively affects enjoyment.**

We expect that a high degree of concentration tends to induce the possibility of IT addiction. A study carried out by Ghani and Deshpande [36] suggests a direct association between concentration and the diminished sense of time during the usage of ITs. Research also shows that IT addicts have established a symptom of high concentration even at the cost of negative consequences [30]. Thus, we propose that if users highly concentrate on using smartphones, they are in the risks of becoming addicts. The following hypothesis is provided:

**H6: Concentration positively affects smartphone addiction.**

Enjoyment pertains to the positive experience developed during using smartphones. It may motivate people to continue the usage, which may further result in addictive behavior. Recent IS research provides evidence to demonstrate that enjoyment may play an important role in the development of IT addiction [e.g., 21]. This is in line with the findings in other fields. For instance, enjoyment has been shown to have a correlation with substance addiction such as alcohol abuse [37]. Research on pathological gambling also explicates the dark side of pleasurable affection [38]. In the current research context, we further propose that if smartphone users experience a high level of enjoyment, they are more likely to continue the usage and become addicted. We propose the following hypothesis:

**H7: Enjoyment positively affects smartphone addiction.**

4. Research method

This study intends to understand the role of MEE in the development of smartphone addiction. To achieve this research objective, we employed survey method to collect data and validate our research model. Details of the data collection and measurements are presented as following.

4.1. Data collection

We conducted an online survey and recruited subjects from two large universities in China. Prior research posits that university students are shown to be more vulnerable to ITs than other groups due to the easy access to ITs, the flexible time schedule, and psychological characteristics [39, 40]. In this regard, they may show higher risks to have smartphone addiction and can be deemed to be an appropriate sample.

We distributed invitation messages and flyers with the URL of our survey. To encourage participations, incentives of cinema tickets were provided as lucky draw prizes. Finally, we obtained 384 valid responses. Among these respondents, 54.4% were male and 45.6% were female. A majority of the respondents (91.1%) aged 18-30. Most of them spent 15 min to 3 hours per day on using smartphones.

4.2. Measures

The measurements were adapted from existing and validated scales in the literature. Minor modifications were made to fit the smartphone addiction context. All items used seven-point Likert scales (1=strongly disagree to 7=strongly agree). Table 1 presents the detailed measurements.

<table>
<thead>
<tr>
<th>Table 1. Measurement items</th>
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<tbody>
<tr>
<td><strong>Smartphone addiction</strong> (SA) [21]</td>
<td>Using my smartphone sometimes interferes with other (e.g., work or study). My social life has sometimes suffered because of using my smartphone. When I am not using my smartphone, I often feel agitated. I have made unsuccessful attempts to reduce the time using my smartphone. I find it difficult to control my smartphone use.</td>
</tr>
<tr>
<td><strong>Habit</strong> (HB) [21]</td>
<td>Using my smartphone has become automatic to me. Using my smartphone is natural to me. When I want to interact with friends</td>
</tr>
</tbody>
</table>
and relatives, using my smartphone is an obvious choice for me.

**Enjoyment** (EJ) [21]
Using my smartphone is enjoyable. Using my smartphone is fun. Using my smartphone is interesting.

**Convenience** (CV) [41]
I can use my smartphone whenever I want. I can use my smartphone wherever I am. Using my smartphone is effortless for me. I find it convenient to use my smartphone.

**Concentration** (CT) [42]
When using my smartphone, I am deeply engrossed. When using my smartphone, I am absorbed intensely. When using my smartphone, I concentrate fully on it.

5. Data analysis and results

In this study, we adopted structural equation modeling (SEM) to analyze our data. SEM is widely used in the IS literature to ensure the results of a structural model are achieved from a validated measurement model [43]. Particularly, we used Partial Least Squares (PLS) to analyze our model. The analysis process had two stages: the measurement and structural model.

5.1. Measurement model

Convergent validity is measured by composition reliability (CR) and the average variance extracted (AVE). If CR values are above 0.7, and AVE values are more than 0.5, then the convergent validity can be regarded as sufficient. After deleting the item of CV1 for its low factor loading, Table 2 shows adequate convergent validity for this study. In addition, discriminant validity indicates the degree of difference between constructs. The square root of AVE for each construct should be above its correlations with any other constructs (in Table 3). Meanwhile, all items should have higher loadings on their corresponding constructs than on others (see Table 4). In sum, our results indicated that this study had sufficient discriminate validity.

**Table 2. Descriptive statistics**

<table>
<thead>
<tr>
<th></th>
<th>CR</th>
<th>AVE</th>
<th>Mean</th>
<th>SD</th>
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<tbody>
<tr>
<td>SA</td>
<td>0.918</td>
<td>0.693</td>
<td>3.894</td>
<td>1.339</td>
</tr>
<tr>
<td>CV</td>
<td>0.873</td>
<td>0.700</td>
<td>5.451</td>
<td>1.087</td>
</tr>
</tbody>
</table>

**Table 3. Correlations between constructs**

<table>
<thead>
<tr>
<th></th>
<th>SA</th>
<th>CV</th>
<th>HB</th>
<th>CT</th>
<th>EJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA</td>
<td>0.832</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CV</td>
<td>0.215</td>
<td>0.837</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HB</td>
<td>0.056</td>
<td>0.456</td>
<td>0.883</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT</td>
<td>0.269</td>
<td>0.343</td>
<td>0.142</td>
<td>0.959</td>
<td></td>
</tr>
<tr>
<td>EJ</td>
<td>0.392</td>
<td>0.314</td>
<td>0.329</td>
<td>0.354</td>
<td>0.933</td>
</tr>
</tbody>
</table>

Note: Diagonal elements are square roots of the AVE

5.2. Structural model

Before analyzing the structural model, we controlled the effects of demographic variables such as gender, age, income and education on smartphone addiction. As delineated in Figure 2, we found that convenience had significant effects on concentration ($\beta =0.278$, $t=4.781$) and enjoyment ($\beta =0.163$, $t=2.631$). Similarly, habit influenced both concentration ($\beta =0.141$, $t=2.572$) and enjoyment ($\beta =0.329$, $t=5.997$). Convenience also placed a significant impact on habit ($\beta =0.459$, $t=9.264$). Further, both concentration ($\beta =0.158$, $t=2.904$) and enjoyment ($\beta =0.408$, $t=8.531$) were found to predict smartphone addiction. The variances explained were 28.1% in smartphone addiction, 21.1% in habit, 13.3% in concentration and 18.4% in enjoyment. In sum, all hypotheses were supported.
6. Discussion and conclusion

The objective of this current study is to address a research gap in understanding the development of smartphone addiction. More specifically, we focus on a unique phenomenon, i.e., extensive exposure, and elucidate this issue from the lens of MEE. Our findings show that convenience drives users to form smartphone usage habits. Both convenience and habit can push users to concentrate on their activities in smartphones and promote them to experience enjoyment. Further, concentration and enjoyment can influence users to become addicts. Overall, our findings interpret that the unique phenomenon of extensive exposure may become a possible “danger” to smartphone users.

6.1. Implications

The current research calls several important implications in both theory and practice. First, given limited research on smartphone addiction, this study provides noteworthy insights to this research area. We follow the perspective of MEE to offer a theoretical guidance to explain why users may develop smartphone addiction. Our results show that the convenience feature makes users exposed to the stimuli of smartphone usage. In a similar vein, the mechanism of habit will also activate MEE. People may accordingly develop reactions of either attention or affection, which further increase the risks of smartphone addiction. Thus, we believe that this study extends existing efforts to fill the voids in IT addiction research.

Second, we apply and extend MEE to the IS field, and reveal its potential adverse consequence. Our findings validate that the exposure to repetitive stimuli can have an important influence on smartphone addiction. We empirically provide insights about the dangers of MEE in triggering smartphone addiction, which has been neglected in prior research. Most previous studies emphasize the positive role of MEE in the marketing and psychology disciplines, such as promoting brand reputation and continuance consumption. We believe that this study is one of the first ones to lend support to its dark side in the IS field.

Third, previous research on MEE highlights the result of affective reactions and overlooks the potential outcomes of non-affection. Based on the prior literature, we incorporate concentration as another reaction outcome besides enjoyment. We confirm that mere exposure does generate both affection (i.e., enjoyment) and attention (i.e., concentration) reactions. This study thus adds to the existing body of relevant research and enriches our understanding of MEE.

Finally, this study offers implications to practitioners. Our results yield important insights to the public awareness of smartphone addiction. Smartphones have highly penetrated into both of our lives and work. People can now use smartphones with fewer constraints, which implies the high exposure level of smartphone usage. In view of this, the present study signals the potential threat of such extensive exposure. We posit that the extensive exposure of smartphone usage may result in the hidden dangers of potential addiction. According to our findings, to prevent the formation of addiction, it may be effective to decrease the levels of enjoyment and distract users’ concentration on smartphones. Since the exposure to stimuli on smartphone usage generates the risks of addiction, clinicians, educators and parents should create an environment where smartphone usage is monitored and restricted to prevent further addictive behavior. These approaches may enable smartphone usage in a more “healthy” manner.

6.2. Limitations and future research

Despite of the contributions, we have to note the limitations of this study and the directions for the future work. First, most respondents were university students with a homogeneous background, which may limit the generalizability of the results. Hence, further studies are encouraged to consider larger samples with various backgrounds. Besides, we centre on the specific context of smartphone addiction at the present stage, which provides guidance for the future research. Our future research will further analyze our model in other broader contexts to achieve better external validity. The second limitation is related to the cross-sectional method we used. Although this approach is justified in the initial exploration of a relatively new phenomenon, it cannot explicate cause-effect relationships. Since addiction is a time-consuming...
process, future work is encouraged to conduct longitudinal research designs to provide more information about causal relationships. Third, given the relatively small variances explained in the model, we are aware of that there may be some other important factors missing. Future research is suggested to explore more factors from different theoretical perspectives. Researchers can also further combine the qualitative (e.g., interview) and quantitative methods together to find out more potential determinants for smartphone addiction. Fourth, as an initial study, we preliminary demonstrate the dangers of factors that are regarded as desirable in previous IS research. Although we advance our knowledge, our model does not specify the threshold in which the transition takes place. In such cases, further study should continue to clarify the transition point. Finally, this study adopts MEE to study smartphone addiction. In this respect, we assume that the stimuli are neutral or even preferable to users. Thus, future efforts may shed light on the effects of other stimuli (e.g., threatening stimuli) in the development of smartphone addiction.

7. References


