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Understanding Microblog Addiction on Smartphone: The Role Of Media Characteristics

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UNDERSTANDING MICROBLOG ADDICTION ON SMARTPHONE: THE ROLE OF MEDIA CHARACTERISTICS

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Abstract

With the growing pervasive use of smartphone, people are becoming increasingly dependent on their mobile social media for real-time information obtainment and social connection. However, the addictive use of social media has drawn little attention in IS research and the very few extant studies tend to merely adopt conceptualizing approaches such as content analysis, statistic descriptions, and general measurement. Given that there is little theory-driven empirical research on the underlying process of addictive use of social media, this study focuses on understanding the process of addiction (using microblogging as an example) as well as identifying the role of relevant enacting variables. Drawing from the stimulus-organism-response model of behavior, this study proposes a research model that explains the development of addictive use of microblog. In particular, we focus on the role of media characteristics in the provision of technological stimulus which may have a bearing on the resulting additive usage behaviour. An online survey was conducted to empirically validate the theoretical model. The results indicate that microblog addiction is a repetitive response to avoid internal negative affect, rather than to strengthen positive affect. The media characteristics of microblog (i.e., information scope, feedback mechanism, and convenience to access) that satisfy users' pleasurable media experience are found to exert an important effect on both positive and negative affect. In addition, individuals' social psychological characteristic (i.e., deficient self-regulation) was found to play a critical role in the development of addiction behavior.

Keywords: Media characteristics, problematic mobile phone use, addiction, positive affect, negative affect, deficient self-regulation, microblog, social media

1 Introduction

In recent years, social media (e.g. Facebook and Twitter) have become one of the most important platforms for social connection, information seeking and exchange. Moreover, the extensive penetration of smartphones frees users from time and location constraints, providing social media access to individuals whenever and wherever they want. However, despite the crucial role of being a bridge for communication and connection, the unregulated use of social media can lead to increasing user dependency on and even addiction to social media. It has been reported that social media exert negative effects on individual's life, including not only diversion and low productivity, but also isolation and physical health problems (Kuss & Griffiths, 2011). Scholars in psychology and pathology have begun to realize this problem and investigate the emerging symptoms and possible management of them. For instance, Miles and Zhang (2012) observed that tweeting in China has become a national problematic usage phenomenon often entailing addiction symptoms such as withdrawal, salience, conflict, and loss of control. Li et al. (2012) found that continued use of microblog would lead to a psychology status of addiction, accompanied with diminished impulse control, loneliness, social comfort, and distraction. Nevertheless, scholars in IS have rarely theoretically addressed the underlying mechanism of addiction behavior. Only a few studies have investigated the addictive use with content analysis, statistic descriptions, and general measurement (Miles & Zhang, 2012; Thadani & Cheung, 2011b). There is hardly any empirical research reported in the literature on the process and enacting variables involving the addictive use of social media.

In this study, we focus on the addiction behavior in the use of social media, particularly in microblogs. As a burgeoning platform, microblog provides a great opportunity for information seeking and social communication. Technological attributes, such as pervasive access, mobility, and broadcast nature, enable the use of microblog in a more effective and efficient manner (Zhao & Rosson, 2009). However, the same technological attributes may also facilitate the problematic use of microblog in the course of users pursuing desired media gratifications (Li et al., 2012). To understand the underlying process of microblog addiction behavior, this study attempts to explore the question — what factors drive users to be addicted to microblog? Specifically, do technological attributes of microblog facilitate the addiction behavior? Do individuals' social-psychological characteristics play a role in the formulation of microblog addiction? To answer these questions, this study focuses on understanding the development of addiction behavior, particularly the role of media characteristics functioning as the technological stimulus towards addictive use. We first define microblog addiction on the basis of previous research. We then use the stimulus-organism-response model as the theoretical framework to further explore and identify the predictors of microblog addiction. An online survey was conducted to empirically validate the theoretical model.

This study makes important contributions to theory and practice. First, our study is among the first to explore the process of users' addiction behavior in the use of microblog and identify the key role of media characteristics impacting on addiction behavior. Second, our findings

contribute to the addiction research by demonstrating that microblog addiction is a repetitive response to avoid internal negative affect, rather than to strengthen positive affect. Third, our study provides insights into helping educators and service providers to manage addiction behavior of social media use.

2 Theoretical Framework and Hypotheses

Typically, addiction behavior develops with a translation into an automatic or habitual control by environmental associated stimuli (Hogarth & Chase, 2011). From this perspective, stimulus-organism-response model (S-O-R) is identified as one of the most widely used models to explain the causal relationships of addiction behavior (Hull, 1943; Keehn, 1976). This model proposes that external objects and conditions exert an emotional effect on the organism that in turn induces the performance of addictive behavior. In the classical S-O-R model, stimulus refers to those external factors functioning to stimulate individuals' internal states (Eroglu et al., 2001). Organism, representing the internal processes such as perceptual, feeling, and thinking activities (Bagozzi, 1986), are typically conceptualized as positive affect and negative affect in previous research (Beatty & Ferrell, 1998; Verhagen & van Dolen, 2011). Following that, individuals make the final decisions and choose their behavioral response accordingly (Mehrabian & Russell, 1974).

2.1 Response: microblog addiction

Based on the definition of American Psychiatric Association (2000), addiction refers to a chronic brain disease that causes compulsive use despite harmful consequences. Similarly, Turel et al. (2011) defined technological addiction as a psychological state of maladaptive dependency on the use of a technology to such a degree that the behavior addiction symptoms arise with salience, withdrawal, conflict, relapse and reinstatement, tolerance, and mood modification. Other symptoms include continued excessive use despite knowledge of negative psychosocial problems, loss of interests, previous hobbies, and entertainment as a result of addictive behavior (American Psychiatric Association, 2000). Importantly, it should be noted that addiction only occurs with the negative effects arising. In other words, it is conditional on the existence of negative impact upon an individual's life (Charlton & Danforth, 2007). From this perspective, is has been demonstrated that addiction is distinguished from habit (Thadani & Cheung, 2011a), high engagement (Charlton & Danforth, 2007), and deficient self-regulation (LaRose et al., 2003). Consistent with the previous research, we define microblog addiction as "an uncontrollable continuous usage pattern to produce pleasure or to provide escape from internal discomfort, despite the significant negative consequences" (Goodman, 1990, p. 1404).

2.2 Organism: positive affect and negative affect

The role of affect has been identified in media use (Katz et al., 1973). According to Beatty and Ferrell (1998), people are more likely to feel the urge to repeat an act when they feel positive affect in response to the act. Similarly, the uses and gratifications paradigm suggests

that when gratifications are obtained, people feel satisfied and are very likely to continue to use a particular medium (Song et al., 2004). In some extreme cases, pleasurable experiences are so strong that addiction symptoms may develop (Chou & Hsiao, 2000). In a consistent manner, a person may check his/her microblog all the time for the latest information and social connection. To satisfy media needs and strengthen pleasurable experiences, individuals always act up on it and turn into excessive use of microblog.

Negative affective responses will also increase the probability that users repeatedly use their microblogs, as a reaction to the negative affect. Without the use of microblogs, individuals will feel lost, wonder what is happening on microblog, and find it hard to stop thinking about what is waiting for them (Thadani & Cheung, 2011b). They even become distressed, upset, irritable, and anxious when they cannot check their smartphones (Hato, 2013). From this perspective, negative affect has an important effect on users' repetitive checking behavior.

H1: Positive affect will increase the addictive behavior in the use of microblog.

H2: Negative affect will increase the addictive behavior in the use of microblog.

2.3 Stimulus: media characteristics

Technological attributes enable the use of microblog in a more effective and efficient manner. Specifically, Lee (2011) suggested that perceived user values like mobility and interactivity, perceived characteristics like relative advantage and observability, and perceived ease of use significantly influence the attitude toward Twitter use. Analogously, usability, collaboration, and personality are three factors that lead to the success of microblogs (Ebner & Schiefner, 2008). Brevity, mobility and pervasive access, and broadcast nature are also found to motivate the use of Twitter for informal communication (Zhao & Rosson, 2009).

However, the rapid growth of information communication and technologies (i.e., microblog in the current study) can also facilitate the development of unregulated usage behavior by increasing the accessibility to information and the ease with which the social connection can be made (Strack et al., 2006). This is because when media systems are able to serve many unique and central information and social functions, the need for messages increases the potential to alter individuals' cognitive, affective, and behavioral paradigms (Ball-Rokeach & DeFleur, 1976). The link between seductive properties of Internet (e.g., the pleasure of being in control) and Internet addiction has been demonstrated in previous research (Leung 2004). Similarly, Davis (2001) has recognized technological reinforcement (e.g., positive feedback) plays a crucial role in the development of pathological Internet use. Most importantly, communication pleasurable experiences such as the pleasure from interaction with information, other people, and the behavior itself, are found to be significantly correlated with Internet addiction (Chou et al., 1999; Chou & Hsiao, 2000). Consistent with these findings, we conjecture that technological attributes strengthening individuals' pleasurable media experiences primarily have a bearing on addictive use of microblog.

In the context of microblog addiction, technological attributes might reinforce individuals' various pleasurable media experiences through the interaction with information (e.g., information scope), the interaction with other people (e.g., feedback mechanism), and the

behavior itself (e.g., convenient access). Firstly, information scope refers to user's perception of the extent of information provided by microblog to cover a wide range and variety of topics, and number of different subjects. When a high level of information scope is perceived, individuals would deem that microblog provides a critical way to satisfy their cognitive pleasure. Secondly, feedback mechanism, referring to user's perception of support mechanism to facilitate interaction with other users (e.g. comment/ reply/ forwarding/ followers), reinforces interpersonal dependence in the use of microblog. Lastly, brevity, mobility, and pervasive access of microblog enable users to enjoy the use of microblog at any time, and readily escape from stress, tension, and negative emotions. Integrating with the three types of technological facilities, the use of microblog would become extremely important for individuals to pursue the desired pleasurable experience. Therefore, we assume that these media characteristics stimulate the internal affect responses to use microblog.

2.3.1 Information scope

Information scope is reflected by a great deal of information with scale and capacity (McKinney & Yoon, 2002). In the microblog, the content in communication includes a range of topics from personal daily activities to business information. Hashtag with a specific topic in particular, provides a unique tagging convention to classify message with different events or contexts (Chang, 2010). Meanwhile, tailored information is timely pushed to satisfy individuals' current reference needs (Daft et al., 1987), thus enabling individuals to seek and share information conveniently.

In addition, microblog is perceived as an information resource being adept at providing information to those seeking to reduce uncertainty. Although information in the microblog might be unconfirmed, fragmental, and even inaccurate, using the power of the crowd information will create real-time maps and increase the reliability of information resource (Tobias, 2011). Hence, information scope plays a critical role in satisfying users' desire for pleasurable experience in the interaction with information.

2.3.2 Feedback mechanism

Feedback mechanism refers to satisfying users' desire for interpersonal pleasure through the enhancement of communication effectiveness by personal focus (Otondo et al., 2008). The role of feedback mechanism in the development of addiction behavior has been identified in the study of Davis (2001) — if an individual receives positive response through the online activity, the reinforcement will drive him/her to continuously and conditionally excessive use in order to receive the desired response. Extending this viewpoint into microblog, feedback mechanism is reflected by interpersonal relations development and reputation obtained through consecutive participation. The positive feedback experience (e.g. fans increase, comments, reply, and retweet obtainment) satisfies individuals' desires for pleasurable media experience, such that users would tweet more to build reputation, enhance status, and improve social role when they get a higher quantity of followers or their information are retweeted and commented a lot. Hence, feedback mechanism plays a crucial role in enhancing pleasurable experiences arising from interaction with other people.

2.3.3 Convenience to access

Given the brevity and pervasive access of microblog, individuals have the possibility to use microblog anywhere and at any time. The wide spread of smartphones also extends the use of microblog. To be more specific, easy access to microblog service allows users to post updates at any time (Zhao & Rosson, 2009), and the mobility provides added value to users for information obtainment and social communication (Lee & Cho, 2011). Hence, the "whenever" and "wherever" usage facilitates users to engage in the repetitive usage pattern, and reinforces the pleasurable experience in the use of microblog.

On the one hand, these perceived media characteristics act as technological stimulus in the production of positive affects in the use of microblog. On the other hand, the inability to use microblog will generate a corresponding negative affect in that users' desire for pleasure is not satisfied.

H3: The perceived media characteristics (i.e., information scope, feedback mechanism, and convenience to access) will increase the positive affect arising from the use of one's microblog.

H4: The perceived media characteristics (i.e., information scope, feedback mechanism, and convenience to access) will increase the negative affect arising from not being able to use one's microblog.

2.4 Personal characteristic: deficient self-regulation

Self-regulation plays a role in decision making and behavioral response through personal cognitive processes (Baumeister et al., 1994). According to the theory of self-regulation, self-regulation can be defined as the ability to control one's emotions, behaviors, and desires by the sub-functions of self-monitoring, judgmental process, and self-reaction (LaRose et al., 2003). Consistent with this definition, self-regulation is perceived as the function of cognitive, emotionally neutral, integrated, coherent, spatiotemporal, slow, episodic, and strategic system, whereas stimulus-control is the effect of emotionality, fears, and passions arising from external stimuli (Metcalfe & Mischel, 1999). It is important to note that a lessening of self-regulation will lead to a strengthening of stimulus-control. Hence, deficient self-regulation will facilitate the formulation of irrational behaviour such as Internet addictive usage (LaRose et al., 2003). From this perspective, we conjecture that deficient self-regulation will distort the social cognition and belief system, and promote the development of addiction behavior.

H5: Deficient self-regulation will increase the addictive use of one's microblog.

3. Methodology

We measured our constructs by adapting multi-item instruments from previous studies. The wording of these instruments is modified to fit the microblogging context. Appendix A shows

the final set of measures used in the survey. All items were measured by using a seven-point Likert scale, with the anchors ranging from "strongly disagree" to "strongly agree."

An online survey was conducted in April 2013 among Chinese microblog users. We recruited our target respondents (i.e., individuals frequently use their microblogs) by sending them a message that contained a link to the online survey through multiple channels, including group private letters to microblog users, postings to special interest groups in microblogs, and postings to the official microblog platforms. To encourage respondents, we provided economic incentives to respondents who completed the required questionnaire.

The respondents were asked to describe their microblog usage behavior and provide demographic data. A total of 412 microblog users participated in the online survey and completed the questionnaire, of which 56.6% were male and 43.4% were female. Approximately 93.2% of the respondents have used microblog service for over six months.

4. Data Analysis and Results

Smart PLS was used to estimate the reliability and validity of the measurement model and to examine the proposed hypotheses in the structural model. This two-step analytical procedure ensures that appropriate path coefficients of the model are estimated and that the model constructs possess the desired psychometric properties (Cheung & Lee, 2010).

Appendix A shows the results of the measurement model, including the composite reliability (CR), average variance extracted (AVE), factor loadings, and t-values of the measures for each construct. All statistical results reach the recommended levels of convergent and discriminant validity (Fornell & Larcker, 1981). Table 1 shows the inter-construct correlations and square roots of AVE.

	COA	IS	FM	PA	NA	ADD	DSR
COA	0.887						
IS	0.620	0.897					
FM	0.747	0.729	0.888				
PA	0.492	0.512	0.482	0.903			
NA	0.202	0.161	0.126	0.474	0.936		
ADD	0.042	-0.043	-0.055	0.224	0.661	0.776	
DSR	-0.048	-0.054	-0.084	0.081	0.444	0.648	0.892

Table 1. Inter-construct correlations and square roots of AVE

Figure 1 shows the assessment results of the model, including the overall explanatory power, and standardized path coefficients. Except the nonsignificant relationship between positive affect and addiction behavior, all hypotheses are found to be supported. Overall, the research model explains 59.5 % of the variance in the dependent variable.

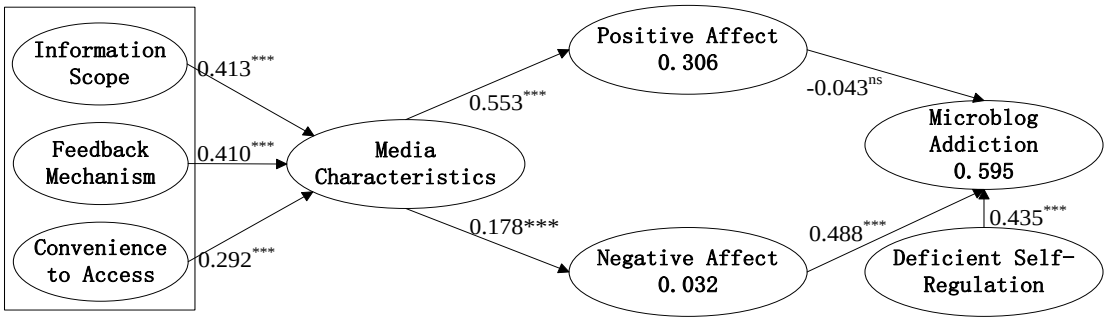

Figure 1. The results of the research model

Discussion

Although social media addiction appears ubiquitous and serious, there is limited theory-driven research in the area of microblog addiction. This study is among the first to explore the nomological process and possible variables of addiction behavior in the use of microblog. Particularly, we identify the key role of media characteristics acting as external stimuli in the development of microblog addiction. Hopefully this research has made some initial headway in establishing a general understanding of addiction behavior in microblog.

Based on the S-O-R model, we find that microblog addiction is more likely a consequence of avoiding internal negative affect (H2 was supported), rather than strengthening positive affect (H1 was not supported). The non-significant effect of positive affect on addiction paves a venue to explain the underlying mechanism of addiction behavior. It should be noted that positive affect might initially elicit the pleasurable rewarding experience which would lead to repeated usage; however, only the presence of negative affect leads to the compulsive usage and behavior modification (Marlatt et al., 1988). Consistent with our finding, Soutullo et al. (1998) has proposed that the repetition of a behavior is yielding from the response to regulate one's negative emotions. Similarly, the escape and avoidance of negative affect act as the predominant motives to addiction behavior (Baker et al., 2004). From this perspective, it can be concluded that negative affect plays a more important role in the development of addiction behavior. Meanwhile, our study has found that media characteristics impact on negative affect. System designers should therefore adjust the corresponding media characteristics in their design in such a way so that negative affect is reduced in order to lessen the likelihood of addiction.

Our findings should be interpreted with some obvious cautions. First, cross-sectional data, by nature, can only provide a weak support to causal relationships hypothesized in the research model. Second, since our data involves only certain types of Chinese microblog users, the generalization of our findings to other populations and other social media platforms remain to be tested. In addition, technological stimuli are only one type of antecedents impacting addiction. Other types of antecedents (e.g., habit) will need to be investigated in further studies.

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Appendix A. Measurement Scales

Construct	Item	Loading	t-value
Information Scope (McKinney et al., 2002) CR=0.942, AVE=0.804	IS1. Information with a wide range of topics is covered in the microblog.	0.899	122.312
	IS2. Information with a wide variety of topics is contained in the microblog.	0.918	150.052
	IS3. Information with a number of different subjects is contained in the microblog.	0.894	89.576
	IS4. Information with a broad scope is covered in the microblog.	0.874	95.868
Feedback mechanism (Liu, 2003) CR=0.937, AVE=0.789	FM1. Microblog is effective in providing and obtaining feedback.	0.875	95.171
	FM2. Microblog facilitates two-way communication among users.	0.895	112.373
	FM3. Microblog provides useful interactive sessions for users.	0.904	119.944
	FM4. Microblog provides useful feedback "loops" from user to user.	0.879	99.429
Convenience to access (Lee & Cho, 2011) CR=0.917, AVE=0.787	COA1. Microblog is more convenient to use on the move rather than other media.	0.839	59.664
	COA2. It is convenient to use microblog no matter where I am.	0.915	118.521
	COA3. Microblog is more convenient to use than other media, because I can use it anywhere.	0.905	119.416
Positive Affect (Verhagen & van Dolen, 2011) CR=0.957, AVE=0.816	PA1. While using microblog, I was excited.	0.910	133.332
	PA2. While using microblog, I was enthusiastic.	0.920	121.286
	PA3. While using microblog, I was proud.	0.899	116.394
	PA4. While using microblog, I was inspired.	0.927	178.428
Negative Affect (Verhagen & van Dolen, 2011) CR=0.955, AVE=0.876	NA1. While not being able to use microblog, I was distressed.	0.922	160.723
	NA2. While not being able to use microblog, I was upset.	0.938	178.949
	NA3. While not being able to use microblog, I was irritable.	0.948	192.988
Deficient Self-regulation (Santhanam et	DSR1. I never tried to think through each use and decide what I was supposed to do when I use microblog.	0.898	125.432
	DSR2. I was unaware of the process of microblog usage with respect to my goals for this behavior.	0.929	160.868

al., 2008) CR=0.921, AVE=0.795	DSR3. I never thought about what things I needed to do in the use of microblog.	0.845	48.206
Microblog addiction (Charlton, 2002) CR=0.932, AVE=0.602	MA1. I sometimes neglect important things because of an interest in microblog.	0.746	42.661
	MA2. My social life has sometimes suffered because of interacting with microblog.	0.711	36.349
	MA3. Using microblog sometimes interfered with other activities.	0.745	43.177
	MA4. When I am not using microblog I often feel agitated.	0.783	59.724
	MA5. I have made unsuccessful attempts to reduce the time I interact with microblog.	0.804	60.789
	MA6. I am sometimes late for engagements because I interact with microblog.	0.791	52.940
	MA7. Arguments have sometimes arisen because of the time I spend on microblog.	0.777	55.851
	MA8. I think that I am addicted to microblog.	0.807	74.119
	MA9. I often fail to get enough rest because I interact with microblog.	0.813	70.611

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