Sociable people beware? Investigating smartphone vs. non-smartphone dependency symptoms among young Singaporeans

Trisha T. C. Lin, Ph.D,
Assistant Professor,
Division of Broadcast and Cinema Studies,
Wee Kim Wee School of Communication and Information,
Nanyang Technological University, Singapore
Email: trishalin@ntu.edu.sg

Yi-Hsuan Chiang, Ph.D,
Assistant Professor,
Department of Radio, Television and Film,
School of Journalism and Communication,
Shih Hsin University, Taiwan
Email: yihsuan@cc.shu.edu.tw

Qiaolei Jiang, Ph.D.
Associate Professor,
Department of Journalism and Communication,
Dalian university of technology, China
Email: QiaoleiJiang@dlut.edu.cn

Abstract

In addition to examining sociability, this study relates smartphone and non-smartphone use to mobile dependency and symptoms. The web survey study uses a stratified sampling to recruit 551 Singaporean undergraduates. The results show that young smartphone users tend to have higher mobile dependency and more severe symptoms than non-smartphone users. Smartphone users who utilize mobile Internet and text messages more are likely to have higher dependency while non-smartphone activities had no effect. Sociable mobile users were found to have higher dependency. Productivity loss is identified as the most common symptom among youths.

Keywords: Smartphone dependency, sociability, mobile internet, text message, mobile instant message

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**Introduction**

Mobile phones have become the most prevalent communication devices with global mobile-cellular penetration at 96% (ITU, 2014). Due to affordability and cellular network advancements, smartphone adoption rose rapidly to nearly 40% of world population (eMarketer, 2014). Smartphones refer to mobile phones with advanced capabilities by executing an identifiable operating system which allows users to extend functionalities with third party applications (Theoharidou, Mylonas & Gritzalis, 2012). According to Google’s multi-screen study (2012), smartphones with mobile internet services enhance users’ social connectivity and serve as the backbone of cross-screen interactions.

When people consciously use mobile phones, they have various levels of dependency (Carbonell, Oberst, & Beranuy, 2013). Only heavily reliant users who have excessive and improper use of mobile phones show pathological symptoms and maladaptive behaviors of mobile addiction (Leung, 2008a; 2008b). Instead of assuming everyone as mobile addicts, this study investigates youths’ mobile dependency as a neutral concept which is defined as a relationship in which individuals attain goals in reliance on using mobile activities (Park, Kim, Shon, & Shim, 2013). Since smartphones with advanced features are likely to increase users’ attachment, it makes a worthwhile comparison with non-smartphones in regard to causing severe mobile dependency symptoms.

Sociability, defined as a human’s desire to socialize with others through using technology (Junglas, Goel, Abraham, & Ives, 2013), is a crucial psychological trait associated with users’ dependence on Internet and mobile technologies (Igarashi, Motoyoshi, Takai, & Yoshida, 2008; Zywica & Danowski, 2008). Rice and Hagen (2010) argue that young people use mobile communication to keep perpetual contact with social networks, thereby causing mobile dependency. This constant connection via smartphones turns into a norm for digital natives (Hyman, 2013).

Although young adults and adolescents are prone to losing self-control in using mobile phones (Igarashi et al., 2008; Leung, 2007; Leung, 2008b), despite a climate of social alarm, relatively little smartphone dependency has been conducted. To fill the research gap, this study examines differences between smartphone and non-smartphone dependency and symptoms, and their relations of sociability and mobile dependency. The findings are useful to health authorities and professionals in developing effective campaigns to promote healthy smartphone usage among youths.

**Literature Review and Hypotheses**

On one hand, young people use mobile phones to demonstrate personal autonomy, express self-identity, entertain themselves, and establish and maintain interpersonal relationships (Chóliz, 2010). On the other hand, heavy reliance on mobile phones led to college students’ severe dependency symptoms (Rice & Hagen, 2010). According to Chóliz (2010), the social and affective functions of mobile phones may cause youth's uncontrolled, inappropriate or excessive phone use, resulting in clinical problems (e.g., psychological distress) (Beranuy, Oberst, Carbonell, & Chamarro, 2009) and negative outcomes (e.g., disruption to school work, costly phone bills, and conflicts with parents) (Leung, 2008b). Heavy mobile dependency turns into addiction, a maladaptive pattern of mobile device use resulting in psychological impairment (Leung, 2008a).
Major mobile addiction syndromes include inability to control craving, feeling anxious and lost, withdrawal/escape, and productivity loss (Chou, 2001; Leung, 2008a).

Excessive messaging is the key determinant resulting in youth’s “non-smartphone” dependency (Igarashi et al., 2008; Perry & Lee, 2007). The frequency of texting was positively related to mobile addiction (Park, Hwang, & Huh, 2010). The popular smartphone activities like mobile Internet and mobile instant messages (MIM) raise concerns about youths’ problematic phone use (Sultan, 2014). It is crucial to examine the relations between these mobile activities and dependency symptoms as well as compare the results between smartphone and non-smartphone users. Hence, this study proposes:

**H1:** Mobile phone users who use more mobile Internet or text messages show a higher level of mobile dependency.

**H2:** Smartphone users who use more mobile Internet or text messages (i.e., SMS and MIM) show higher levels of mobile dependency and more symptoms than non-smartphone users.

Mobile phones extend users’ lives in the way they develop social and spatial relationships (Thompson & Cupples, 2008). Mobile phone usage is significantly related to many forms of sociability (Fortunati & Taipale, 2012). As mobile phones allow youths to be constantly connected without time and space constraints, they experience a form of social dependency on the devices (Rice & Hagen, 2010). Adolescents who frequently use non-smartphones for interpersonal relationships show a high level of mobile dependency (Igarashi et al., 2008; Leung, 2008b). When disrupting constant connectivity with one’s social network, it is likely to cause negative affective responses (Licoppe & Smoreda, 2005). Mobile over-dependent youths could experience loss of control and become withdrawn (Rice & Hagen, 2010).

As social interactions are positively associated with mobile dependency syndromes (Shih, Chen, Chiang, & Shih, 2012), sociable people tend to be more susceptible to problematic mobile phone use (Park, Hwang, & Huh, 2010). Extraversion is a positive factor associated with mobile addiction (Bianchi & Phillips, 2005; Hong et al., 2012). Extraverted young students spend more time on texting for social interactions (Hong et al., 2012) and feel susceptible to problematic phone use (Bianchi & Phillips, 2005). According to Sultan (2014), extraverts with high social anxiety are likely to be addicted to MIM applications. Thus, this study proposes:

**H3:** Mobile phone users with higher sociability are likely to have a higher level of mobile dependency.

**H4:** Sociability of smartphone users is associated with more mobile dependency symptoms than non-smartphone users.

### Method

**Study Procedure**

To investigate youths' smartphone dependency, this study used a random, stratified sampling method to select 2,000 undergraduate students in a comprehensive Singapore university. Young people aged 16 to 24 years old have a high smartphone ownership rate in Singapore (Blackbox Research, 2012). In April 2012 an online questionnaire was emailed to selected respondents. Using a USD $7.90 voucher as incentive, we recruited 551 mobile phone users between 19 and 25 years
old, consisting of 47% males and 53% females. 88.7% used smartphones and over 38.8% used mobile phones for at least ten years.

**Measures**

All measures were adapted from prior studies and validated by a pilot test in which the English questionnaire was tested by 35 students to improve unclear items (Appendix). A 17-item Mobile Phone Problem Use Scale (MPPUS) (Leung, 2008a) was used for “mobile dependency” with a five-point Likert scale ranging from 1 (“not at all”) to 5 (“always”). It generates a composite mobile phone dependency index (MPDI) and contains a four-factor structure: “inability to control craving,” “feeling anxious and lost,” “withdrawal/escape,” and “productivity loss.” “Sociability” (Zywica & Danowski, 2008) was measured by a four-point Likert scale ranging from 1 (“strongly disagree”) to 4 (“strongly agree”). Five items were dropped after the exploratory factor analysis (Cronbach’s alpha at .748). Mobile phone activities were measured by average daily time spent on mobile Internet, the daily average number of using SMS, and daily frequency of using MIM. Constructs’ CR (composite reliability) value above 0.70 and AVE (average variance extracted) above 0.50 were accepted. “Mobile phone dependency” and “sociability” constructs satisfied the requirements. Bivariate correlation and t-test were used for data analysis.

**Results**

Based on correlation results, using voice calls, mobile Internet, and text messaging were positively associated with MPDI among all mobile phone users. When examining mobile dependency symptoms, the results showed using mobile Internet had highly positive correlations with four symptoms: “productivity loss,” “inability to control craving,” “feeling anxious and lost” and “withdrawal/escape.” However, text messaging was related to three symptoms except “feeling anxious and lost.” Hence, H1 is accepted.

The results also showed that smartphone users who used mobile Internet and text messages more had positive correlations to MPDI, while non-smartphone activities showed no significant results. For smartphone users, mobile Internet was positively related to four mobile dependency symptoms. Text messaging (SMS and MIM) was associated with “inability to control craving” and “productivity loss,” but SMS use on non-smartphones was only slightly positively associated with “withdrawal/escape.”

According to t-test results, smartphone users and non-smartphone users varied significantly in using mobile Internet (t = 6.58, p < .001) and text messaging (t = 2.06, p < .05). Smartphone users had a higher degree of mobile dependency (M = 43.2) than non-smartphone users (M = 34.1) and scored higher on all symptoms than the latter. t-test results indicated the two groups had significant differences in levels of mobile dependency symptoms: “productivity loss” (t = 5.54, p < .001), “inability to control craving” (t = 5.30, p < .001), “feeling anxious and lost” (t = 3.33, p < .001), and “withdrawal/escape” (t = 2.41, p < .05). Thus, H2 is accepted.

The correlation analyses showed that sociability was positively associated with all respondents' MPDI and three symptoms: “productivity loss,” “feeling anxious and lost,” and “withdrawal/escape,” indicating H3 is accepted. When examining two sets of correlation coefficients, smartphone users’ sociability was associated with MPDI and the aforementioned three symptoms; however, non-smartphone users’ sociability was significantly related to MPDI and “feeling anxious and lost” and “withdrawal/escape” symptoms. Therefore, H4 is accepted.
Discussion and Conclusion

This study investigated the relations of using smartphone and non-smartphone to mobile dependency and symptoms as well as examined the association of sociability with mobile dependency. The analyses showed that young smartphone users tended to have a higher degree of mobile dependency and more severe symptoms than non-smartphone users, indicating an urgent need to increase youths’ awareness of over-dependence on smartphone activities.

Users are not addicted to smartphones but to activities on the devices. This study found that mobile dependency and symptoms were associated with phone activities. Regardless of phone types, using mobile Internet was positively related to all mobile dependency symptoms (i.e., inability to control craving, feeling anxious and lost, withdrawal/escape, and productivity loss). Youths’ addiction to SMS (Igarashi et al., 2008; Perry & Lee, 2007) and MIM (Hong et al., 2012; Sultan, 2014) resulted from excessive use of these cheap or free connectivity features. The results also revealed that smartphone users who used SMS and mobile Internet more tended to have higher mobile dependency, yet non-smartphone activities had no significant impact on dependency. Hence, this study recommends setting time limit for using text messaging and mobile Internet among young smartphone users to prevent their over-dependency.

Similar to prior mobile addiction research (Hong et al., 2012; Park et al., 2010), this study found a positive association between sociability and mobile dependency among both smartphone and non-smartphone users. When examining all mobile phone users and smartphone users, sociability was significantly related to three dependency symptoms (i.e., feeling anxious and lost, withdrawal/escape, and productivity loss); however, non-smartphone users’ sociability had no relation with productivity loss. The practical implication is that extraverts who use smartphones’ compelling activities tend to cause productivity loss in studying or work, but using non-smartphones are unlikely to result in such negative outcomes. Hence, sociable young mobile phone users should be wary of mobile addiction, and extravert smartphone users have a high risk of over-dependency. Additionally, this study identified “productivity loss” as the most common symptom among young smartphone users as it shows significant relations or differences between key communicative and social mobile phone activities.

The study enhances the understanding of differences between smartphone and non-smartphone dependency and impacts of phone activities on dependency symptoms. The findings also provide directions for parents, educators and health authorities to look out for specific smartphone activities and dependency symptoms. Sociable smartphone users who frequently engage in mobile Internet, text messaging, and MIM are at high risk of mobile over-dependency. Campaigns about healthy smartphone usage are crucial to create awareness among young users, especially emphasizing the significance of self-control in using sticky phone activities. Future research is advised to investigate how personal traits affect smartphone dependency symptoms which may cause various outcomes (e.g., study, work and well-being).
References


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<td></td>
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<td>MPDI</td>
<td>Inability to control craving</td>
<td>Feeling anxious &amp; lost</td>
<td>Withdrawal/escape</td>
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<td>.263**</td>
<td>.094*</td>
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Note. * < .05, ** < .01, *** < .001
## Appendix. Tests for Validity and Reliability

<table>
<thead>
<tr>
<th>Construct</th>
<th>Measurement Items</th>
<th>Factor Loadings</th>
<th>AVE</th>
<th>CR</th>
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</thead>
<tbody>
<tr>
<td><strong>Dependency Symptoms</strong></td>
<td>1. You have been told that you spend too much time on your mobile phone.</td>
<td>0.82</td>
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<td>2. Your friends and family complained about your use of the mobile phone.</td>
<td>0.78</td>
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<td></td>
<td>3. You have tried to hide from others how much time you spend on your mobile phone.</td>
<td>0.70</td>
<td>0.60</td>
<td>0.90</td>
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<td></td>
<td>4. You find yourself engaged on the mobile phone for longer period of time than intended.</td>
<td>0.75</td>
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<td></td>
<td>5. You can never spend enough time on your mobile phone.</td>
<td>0.76</td>
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<tr>
<td></td>
<td>6. You have attempted to spend less time on your mobile phone but are unable to.</td>
<td>0.82</td>
<td></td>
<td></td>
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<tr>
<td><strong>Inability to Control Craving</strong></td>
<td>1. When out of range for some time, you become preoccupied with the thought of missing a call.</td>
<td>0.59</td>
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<td></td>
<td>2. You feel anxious if you have not checked for messages or switched on your mobile phone for some time.</td>
<td>0.76</td>
<td>0.55</td>
<td>0.83</td>
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<td></td>
<td>3. You find it difficult to switch off your mobile phone.</td>
<td>0.81</td>
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<td></td>
<td>4. You feel lost without your mobile phone.</td>
<td>0.78</td>
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<tr>
<td><strong>Feeling Anxious and Lost</strong></td>
<td>1. You have used your mobile phone to talk to others when you were feeling isolated.</td>
<td>0.95</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>2. You have used your mobile phone to talk to others when you were feeling lonely.</td>
<td>0.96</td>
<td>0.78</td>
<td>0.91</td>
</tr>
<tr>
<td></td>
<td>3. You have used your mobile phone to make yourself feel better when you were feeling down.</td>
<td>0.71</td>
<td></td>
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<tr>
<td><strong>Withdrawal / Escape</strong></td>
<td>1. You find yourself occupied on your mobile phone when you should be doing other things, and it causes problem.</td>
<td>0.87</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>2. Your productivity has decreased as a direct result of the time you spend on the mobile phone.</td>
<td>0.86</td>
<td>0.70</td>
<td>0.88</td>
</tr>
<tr>
<td></td>
<td>3. There are times when you would rather use the mobile phone than deal with other more pressing issues.</td>
<td>0.78</td>
<td></td>
<td></td>
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<tr>
<td><strong>Productivity Lost</strong></td>
<td>1. I have more friends than most people.</td>
<td>0.72</td>
<td></td>
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<tr>
<td></td>
<td>2. I am very sociable.</td>
<td>0.84</td>
<td>0.50</td>
<td>0.80</td>
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<td></td>
<td>3. I prefer parties with lots of people.</td>
<td>0.52</td>
<td></td>
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<tr>
<td></td>
<td>4. I make friends very easily and quickly.</td>
<td>0.72</td>
<td></td>
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</tbody>
</table>

AVE = average variance extracted; CR = composite reliability