An Investigation of Smartphone Use Behavior and Dependency

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Abstract: *The present paper aims to analyze how categorized groups of smartphone users differ from one another in use behavior and dependency. Questionnaire survey method is employed in this study to collect data for analysis. The research instruments include Smartphone use behavior scale and Smartphone dependency scale. In total, 639 valid questionnaires are collected for data analysis. Data analyses show that smartphone users in the average manifest moderate smartphone dependency. In contrast to younger users who are found to have higher degree of dependency, older users are less dependent on smartphone. Smartphone dependency is therefore in inverse proportion to the user's age. Younger users are apt to feel anxious where there is need for interpersonal relations, thus resulting in their dependency on smartphone. It is suggested that young people pay more attention to the interpersonal relations of the real world and be less dependent on the virtual online relations.*

Keyword: *Smartphone use behavior, dependency, interpersonal relations.*

1. GENERAL INSTRUCTIONS

1.1. Smartphone Usage

In its 2014 report, International Telecommunication Union (ITU) points out that the number of mobile phone users worldwide will reach a record high of 7 billion by the end of 2014, with the total market penetration rate being at 96% (ITU, 2014). Indeed, smartphone with its high mobility and portability is more competitive than PC. As a result, smartphone has enjoyed a higher use rate than PC. According to a survey of American adolescents (12-17 years old) conducted by Internet & American Life Project in Sep 2012, 95% of the surveyed adolescents are Internet users. The survey also finds that 25% of them use smartphone as the interface for surfing the Internet. Specifically, more than one-third of American adolescents were smartphone users (Pewinternet, 2013).

1.2. Smartphone Dependency

By mobile phone dependency is meant the user's cognitive or behavioral dependency on mobile phone. This phenomenon is similar to the psychological mechanism of addiction. It is frequently found that once a mobile phone fails to function, runs out of power, or receives no signal; its user may feel anxious or even become panicked, thus affecting his or her daily life (SecurEnvoy, 2012). Young people value peer relations. Group or peer members regard mobile phone as an important means of communication. In order to maintain interpersonal relations with their group members, young people tend to use mobile phone more frequently. This phenomenon leads to overuse of mobile phone and aggravates the risk of phone dependency (Boasea & Kobayashi, 2008; Igarashi, Motoyoshi, Takai, & Yoshida, 2008; Walsh, White, Cox, & Young, 2011).

In the advent of the digitalized world, interaction between people no longer needs face-to-face contact. Interpersonal links are made possible through the Internet, computer, or mobile phone. Interpersonal communication modes have become much faster and more convenient. With the popularity of smartphone, PC-based communication mode has gradually been replaced by mobile phone. I-phone oriented communication has therefore become trendy (Lu, Watanabe, Liu, Uji, Shono, & Kitamura, 2011; Reid & Reid, 2007).

In the report "2013 Our mobile Planet: Taiwan," Google pointed out that Taiwan's smartphone popularity rate reached a record high of 51% in the 1st quarter of 2013. Of all users, 81% carry

smartphone wherever they go. Taiwan ranks NO 1 in smartphone dependency (Goole, 2013). Smartphone functions as a micro computer. People communicate with others by calling, text messaging and emailing. Additional functions include surfing the Internet, renewing community websites and providing online shopping. Using smartphone to communicate with others has become an integral part of our daily life. In view of this phenomenon, users' dependency behavior and anxiety are questions worth our investigating. Therefore, the present paper aims to investigate how categorized groups of users are related to smartphone use behavior and dependency.

2. METHOD

2.1. Samples and Sampling Method

Smartphone users are the targeted respondents of the present research. The population approximately consists of 9.16 million Taiwanese people. At 95% confidence level and 4% sampling error, the effective samples are statistically rendered at 600 (Krejcie & Morgan, 1970). Upon taking return rate and invalid questionnaires into consideration, the researcher decides to solicit answers from 800 respondents, who are randomly selected, as formal samples. Some paper-pencil questionnaire surveys are conducted at public sites, including the Taipei Railroad Station Square and fast food restaurants, for on-site answers. Others are conducted on the Internet, where respondents answer the questionnaire and send it back. In all, a total of 639 valid returned questionnaires are collected for 8 weeks period and the answers serve as the source for data analysis. At 95% confidence level, the empirical sampling error of the present study is 3.88%.

2.2. Instruments

Smartphone Use Behavior Scale Respondents' demographic backgrounds include: sex, age, educational background, and profession. Smartphone use behaviors include: type of smartphone Internet plan, use of social networking sites, use of social apps and the number of good friends. In total, 9 questions (items) are identified by the researcher.

Smartphone Dependency The researcher develops "Smartphone dependency scale" by referring to the MPIQ (Mobile Phone Involvement Questionnaire) developed by Walsh et al (2010), the Self-perception of Text Message Dependency developed by Igarashi et al., and other related papers. The questionnaire, which consists of 29 items, measures the users' dependency on smartphone. The format of each item goes from strongly disagree, through disagree, partially agree, agree, to strongly agree, all of which, in order of strength, respectively assumes 1, 2, 3, 4 and 5 points. The total score of each returned questionnaire ranges between 29 and 145 points. The higher the total score is, the more smartphone dependency there is.

2.3. Analytical Technique

The SPSS 20.0 version is implemented to process statistical analysis of the data. It undergoes exploratory factor analysis of "Smartphone dependency scale". It establishes the common factors in the scale by deleting items with factor loading less than 0.5 and maintaining items with factor loading more than 0.5. Thus, the construct validity of the scale is generated for further reliability analysis. Cronbach's α coefficient is then used to test internal consistency. An independent samples t test and one-way ANOVA are used to examine how categorized users differ from each other in mobile phone dependency.

3. RESULTS

3.1. Description of Smartphone Users

Of all respondents, 48.83% are males and 51.17% are females. Most respondents are between 18 and 25 years old. Only 5.16% of the respondents are older than 56. This is due to the fact that young people have easy access to digital devices and are likelier to use smartphone. With respect to the educational background, more than half of the respondents are college graduates (65.73%). As far as the profession is concerned, 35.37% are government service people. Concerning styles of Internet surfing, 51.96% prefer 3G-without limit. Presently, smartphone users prefer to surf the Internet at any time in any place without any restraint on time or download volume.

As regards experience in using social network, more than half of the respondents (56.49%) use mobile phone to connect social networks every day. Most smartphone users visit social networks via smartphone.

As to experience in using social App, more than 70% of the respondents (70.42%) use social App every day. Most smartphone users make the best use of the social App function of smartphone in place of the voice calling or text messaging of traditional mobile phone. Daily users of social App outnumber those of social networking sites (70.42% vs. 56.49 %) This shows that smartphone users communicate with others via social App more frequently. Social App is more frequently used because social APP provides simple and ready-for-use interface. Additional functions include text messaging, stickers providing and voice calling, and photograph and file transmitting. Because of its convenience and practicality, all age groups can accept and use it.

3.2. Types of Internet Plans on Dependency

Five constructs, including compulsive behavior (F = 25.71), social connections (F = 4.57), withdrawal (F = 12.06), significant behavior (F = 7.46), and friendship connection urge (F = 9.24), respectively display significant difference. Concerning the construct of compulsive behavior, 3G-without limit is significantly different from 3G-with limit and WiFi. As to the construct of social connections, 3G-without limit is significantly different from 3G-with limit and Wifi. With respect to the construct of withdrawal, 3G-without limit is significantly different from 3G-with limit and Wifi. As far as the construct of significant behavior is concerned, 3G-without limit is significantly different from 3G-with limit and WiFi. As regards the construct of friendship connection urge, 3G-without limit is significantly different from 3G-with limit and Wifi (See Table 1).

Compared with other two types of Internet surfing, 3G-without limit enables users to surf the Internet at any time in any place without any restraint on download volume. This satisfies users in their desire to surf the Internet freely. This also heightens the use frequency of mobile phone and the interpersonal interactions of mobile phone users. However, mobile phone dependency arises accordingly.

Table1. *One-way ANOVA of Dependency on types of Internet Plans (n=639)*

Smartphone Dependency	F value	P value	Scheffe's comparison
Compulsive behavior	25.71***	.000	A>B.C
Social connections	4.57*	.011	A>B
Interpersonal interaction	0.15	.860	
Withdrawal	12.06***	.000	A>B.C
Significant behavior	7.46**	.001	A>B.C
Friendship connection urge	9.24***	.000	A>B.C

Note1: *$p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Note2: *a is 3G-without limit, B is 3G-with limit, C is WiFi*

3.3. Social Network Sites on Dependency

Table2. *Independent samples t test of dependency on social network sites (n=639)*

Smartphone dependency	Mean	SD	T value
Compulsive behavior			
Yes	3.46	0.82	4.31***
No	3.17	0.83	
Social connections			
Yes	3.19	0.81	7.92***
No	2.67	0.83	
Interpersonal interaction happiness			
Yes	3.37	0.70	5.19***
No	3.06	0.79	
Withdrawal			
Yes	3.56	0.90	4.35***
No	3.25	0.89	
Significant behavior			
Yes	3.50	0.90	4.31***
No	3.19	0.90	
Friendship connection impulsive			
Yes	2.63	0.85	4.52***
No	2.33	0.80	

Note: *$p < 0.05$；*** $p < 0.001$

All six constructs, including compulsive behavior (t=4.3), social connections (t=7.92), interpersonal interaction happiness (t=5.19), withdrawal (t=4.35), significant behavior (t=4.31), and friendship connection urge (t=4.52), show significant difference. Obviously, those who have access to social network sites have higher dependency than those who do not have (See Table 2).

3.4. Number of App friends on Dependency

Of the 6 constructs, 5, including compulsive behavior (t = -5.54, p < 0.05), social connections (t = -5.49, p < 0.05), withdrawal (t =-4.42, p < 0.05), significant behavior (t = -3.63, p < 0.05), and friendship connection urge (t = -4.81, p < 0.05), display significant difference. The 101-plus group is more dependent on mobile phone than the 100-minus group. The construct of interpersonal interaction happiness shows no significant difference (See Table 3).

Table3. *Independent samples t test of numbers of App friends on Dependency (n=639)*

Smartphone dependency	Mean	SD	T value
Compulsive behavior			
100-minus	3.16	0.82	-5.54***
101-plus	3.52	0.82	
Social connections			
100-minus	2.78	0.85	-5.49***
101-plus	3.14	0.83	
Interpersonal interaction happiness			
100-minus	3.17	0.77	-1.82
101-plus	3.28	0.76	
Withdrawal			
100-minus	3.27	0.89	-4.42***
101-plus	3.59	0.90	
Significant behavior			
100-minus	3.23	0.92	-3.63*
101-plus	3.49	0.90	
Friendship connection urge			
100-minus	2.34	0.80	-4.81***
101-plus	2.66	0.85	

Note: *$p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

4. CONCLUSION

The statistical analysis of the present study reveals that all respondents in the average have moderate mobile phone dependency. The possible reason is the penetration rate of smartphone usage is getting higher in recent years. Younger users are found to have higher mobile phone dependency. Of the 6 constructs, 5 show significant difference. The only exception is interpersonal interaction happiness. Mobile phone dependency is in inverse proportion to the age. This finding is consistent with that of Lu's study (2011). Young people have higher mobile phone dependency and are apt to feel anxious and fearful in social gatherings. Smartphone is a virtual electronic platform where young people can fully express their own ideas without having to be mindful of others' viewpoints or judgment of them. Interacting with others via smartphone may release them of the anxiety inherent in face-to-face interaction. They are allowed to have more time to think how to express what they like to say. Mobile phone, indeed, is an ideal means of communication for those who tend to feel anxious in social life. Over dependency on virtual online communication, however, inevitably leads to over dependency on mobile phone. It is advisable that young people value interpersonal relations and acquire skills necessary for interpersonal interaction. They need to develop ability in face-to-face communication thought it seems to become an evitable trend.

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