The Structural Model in Parenting Style, Attachment Style, Self-regulation and Self-esteem for Smartphone Addiction

Kwan Hoi Ching and Leung Man Tak
Hong Kong Shue Yan University, Hong Kong

Abstract

Excessive smartphone usage has become a highly controversial and substantial worldwide issue. This paper explores the complexities and challenges of smartphone addiction with a particular focus on parenting styles, attachment, and self-regulation. Convenience sampling was used to gather data from 211 university students in Hong Kong (138 females/74 males) through their responses to four questionnaires. One structural equation model was formed successfully which indicated that parenting style (authoritative or permissive) could be a reasonable predictor of attachment style (secure or dismissive) and self-regulation (impulse control or goal setting) for smartphone addictions (positive anticipation, withdrawal, cyberspace relationship or overuse). Parenting style was a positive correlate to predict attachment, while the attachment positive correlated to predict self-regulation. Self-regulation was a negative correlate to smartphone addiction. It was revealed that a positive parenting style and positive attachment style could form a significant model with self-regulation and smartphone addiction. Furthermore, secure attachment had higher mediation effect, while impulse control and goal setting behavior had a fair mediation power over influencing addiction tendency. This model helped explore the relationships between smartphone addiction and other constructs in educational psychology. Based on findings, educators can gain insights into how parenting and self-regulation can influence the tendency towards excessive smartphone usage. More educational programs which aim at promoting adequate parenting skills, motivating children through self-regulation and goal setting, is proposed through this study.

Keywords: smartphone addiction, parenting style, attachment style, self-regulation

The high penetration ability and accessibility of smartphones has garnered considerable attention in recent times; the smartphone revolution is changing our world more than ever before. Smartphone usage has already been subsumed into our daily routine, and the enormous influence of smartphones has already changed the manner of society function (Chóliz, 2012; Khang et al., 2011; Sánchez-Martínez & Otero, 2009). Two studies have examined the psychological role of the smartphone in self-identity, and pointed out that mobile phones have evolved into a way of reflecting self-identity, distinguishing themselves from others and enhancing autonomy (Kitamura et al., 2009; Sánchez-Martínez & Otero, 2009).

In developed countries, over 45 percent of the population use smartphones in their daily life (Bianchi & Phillips, 2005; Oulasvirta et al., 2012; Kitamura, 2009). According to the *South China Morning Post* (Kao, 2013), Hong Kong has the highest smartphone usage rate, with over 96 percent of its young generation using it intensively every day. Because of this high usage rate, addiction or dependence on smartphones is rapidly rising (Bhatia, 2008; Sánchez-Martínez & Otero, 2009). More and more research findings prove the smartphone is a cause of addiction, poor academic performance, less life satisfaction and social stress (Bian & Leung, 2015; Bolle et. al, 2015; Hawi & Samaha, 2016; Lee & Lee, 2016).

Although the existence of smartphone addiction is still under discussion, researchers have argued that smartphone addiction has close similarity to, and overlap features with, excessive gambling, drug abuse and other addictive behavioral disorders (Cho et al., 2013). A survey in Korea found that a greater percentage of people are addicted to smartphones than to the internet (Cho et al., 2013; National Information Society Agency, 2012). It is also believed that it contributes to an increasing number of cases of bullying or harassment, high level of social anxiety, low self-esteem and complicate symptoms in behavior problems among adolescents (Kitamura et al., 2009; Srivastava, 2005).

It appears that past studies have focused on the negative consequences of mobile phone use (e.g. harm of excessive texting or driving while using phones). However, there is no study that aims at discovering the cause of dependencies on communication devices, especially smartphones. Since self-regulation and self-esteem are important factors in young adults' and adolescents' development, this study investigated how parenting style, attachment style, individuals' self-regulation and self-esteem may interfere with the problematic tendency of smartphone usage among university students in Hong Kong. Also, it explored the possible relationship between parenting style and smartphone addiction, and awareness of the danger of excessive smartphone use.

Literature Review

Parenting Style and Attachment
Baumrind's theory of parenting style (1971) was adapted in this study to investigate the relationship between parenting and smartphone addiction. According to the level differences in parental demand and responsiveness, three parenting styles have been distinguished. These are authoritarian, authoritative and permissive (Asgari et al., 2011; Baumrind, 1971). In this research, parenting style is the primary predictor affecting people's attachment style, self-regulation, and self-esteem. Discussion of the literature follows.

Parenting style is closely linked to children's deviant behavior, addiction, and psychological problems. In the long history of studying parenting style, there are different theories, and researchers have suggested that to efficiently prevent children's delinquency is to have a good

parenting and parental monitor skills (Lee & Leung, 2012; Kerr & Stattin, 2000). Good and positive parenting is highly associated with the prevention of children's delinquency, psychological, behavior dysfunction and addiction (Al-Bahrani, 2011; Betts et al., 2013; Kehl et al., 2008). Restricted parenting has been shown to lead to a higher chance of smartphone addiction (Lee & Lee, 2016). Also, it affects the parental mediation behavior of children's media use (Hwang & Jeong, 2015).

Besides the effect on parenting, attachment also influences people's views of self and their social development. As attachment is highly associated with parenting style, these two important factors shape people's worldview, schema, and behavior outcome.

Bartholomew's attachment styles (Bartholomew & Horowitz, 1991) can be separated into secure, preoccupied, fearful and dismissive (Denollet et al., 2011; Huntsinger & Luecken, 2004). Different attachment styles lead to distinct views of the self and other; thereby developing varying levels of security. Attachment in early age has high impact on the development of one's adjustment levels, shapes the belief of responsiveness and trustworthiness of others; as well as a sense of security in a relationship (Asgari et al., 2011; Brumbaugh et al., 2011). People with positive attachment, like secure attachment, are more stable while facing separation anxiety and form closer emotional bonding. Also, they have less tendency of experiencing distress, less proclivity towards alcohol and drug addiction, more positive behavior outcome and have higher self-esteem. The positive attachment has already proved to inhibit the tendency of excessive smartphone phone usage; and insecure attachment can serve as a predictor of possible problematic smartphone use (Chan et al., 2015; Ko et al., 2011).

Self-regulation
Self-regulation is an essential mediator in goal achievement and emotional independence, which are mainly developed in adolescence. According to the first theory of self-regulation, "self-regulation is the ability to develop, implement and flexibility to maintain planned behavior to achieve one's goals" (Asgari et al., 2011). Some researchers claim social environment, parenting, and genetic factors as the effects of self-regulation. This research focuses on the area of impulse control (allows delayed gratification in the short term) and goal setting behavior (subsumes goal-direct behavior) (Carey et al., 2004).

Social environment, parenting, and genes can shape a person's self-regulation. Parenting theory states that positive parenting and warmth can promote positive self-regulation, while excessive parental control hinders development of proper self-regulation skills in children (Baumrind, 1991; Moilanen, 2007). Therefore, different parenting styles may contribute to the positive or negative development of self-regulation among children, adolescents and young adults. As well, good psychological and behavior control in caregivers also helps predict a university student's emotional regulation (Manzeske & Stright, 2009).

The level of self-regulation is significantly linked to people's ability to make proper judgment, resist immediate impulse, and pursue long-term goals (Ariely & Lowenstein, 2006; Baumeister et al., 2001). People with good self-regulation may experience better psychological health, interpersonal relationship, even higher income and academic achievement. There is a significant correlation between self-regulation and addiction among teenagers, as self-regulation is related to a person's decision making, emotions and impulse control. It is an essential reference for many psychological interventions and problematic behavior prevention (Mazzucchelli & Sanders, 2013; Moilanen, 2007). People with low self-regulation skills on

impulse control and goal setting behavior have a higher risk of problematic behavior and substance use (Carey et al., 2004).

Self-regulation is an important mechanism in many psychological interventions (Sanders & Mazzucchelli, 2013). According to Jessor and Jessor (1977), a high degree of self-regulation is a good prevention of deviant behavior. Also, a number of studies have established a significant correlation between self-regulation and addiction among teenagers. Since self-regulation is linked to a person's emotional and impulse control patterns, low self-regulation may contribute to problematic behavior or substance use in adolescents (Moilanen, 2007).

Self-esteem
Previous studies have supported a possible relationship between parenting style and self-esteem, especially in young adults (e.g., Cardinali & D'Allura, 2001; Lee & Leung, 2012). These prove that people raised under an authoritative parenting style – with supportive, warm and responsive parents – will have higher self-esteem, more independent behavior patterns and be socially adjusted. The reason is that parents with a greater sense of control and caring behavior, such as the one prevalent in the authoritative parenting style, will develop better parent-children interaction, thereby enhancing children's self-esteem (Karimpour & Zakeri, 2011; Garcia & Martinez, 2008). Therefore, in this study, parenting style may be linked to self-esteem, as various variables constrain self-esteem. However, the result of parental authority, control and self-esteem are inconsistent (Karimpour & Zakeri, 2011).

 Self-esteem is a good indicator of people's adjustment skills and relationship satisfaction levels; individuals with a poor view of self may commit more deviant behavior. Studies point out that self-esteem is negatively related to Internet addiction and other addiction-like symptoms (Khang et al., 2011; Kim & Yea, 2003). Also, regarding interpersonal interactions, it appears that people with low self-esteem prefer indirect communication rather than face-to-face interaction, compared to those with high self-esteem (Kim & Yea, 2003). Studies have reported high correlations between self-esteem, problematic mobile phone use, and other addictive behavior (e.g., Chiu, 2014; Kitamura et al., 2009). Besides, people with low self-esteem prefer indirect communication (e.g., text messages or social media) to seek assurance. Therefore, they may have higher chances of depending on a smartphone to interact with others, and consequently develop an uncontrollable tendency for usage of the phone (Billieux, 2012; Joinson, 2004; Kitamura et al., 2009).

Effect of Attachment on Self-regulation and Self-esteem
According to Schore and Schore (2008), the caregiver-infant relationship might contribute to the development of a child's self-regulation. In Shaver's model of self-regulation and attachment (Asgari et al., 2011; Mikulincer & Shaver, 2010), attachment did influence people's achievements. Shaver's model stated that secure attachment could lead to people becoming more calm and confident in dealing with difficulties, and even having a more efficient plan ready to deal with problems. On the other hand, individuals who are insecure are more emotionally disturbed by threats and have a tendency to depend on others, hence lacking self-regulation skills. Also, as parenting and attachment are highly correlated, good parenting and attachment may be positively related to good self-regulation. Positive parenting and attachment would reduce the unfavorable outcome of overdependence on digital media use, because it helps develop a child's insights to recognize consequences afterward (Kalmus et al., 2013; Lee & Lee, 2016; Lee & Jeon, 2010).

Smartphone Addiction

Addiction defined as a "repetitive habitual pattern that increases risk of disease, personal and social problem; and experience the feeling of loose control" (Laitakari et al. 1998, p. 224). According to Bilieux (2012), smartphone addiction is the loss of ability to properly regulate the use of smartphone to the point that it causes negative consequence in someone's daily life. Studies on smartphones suggest that its improper usage could lead to mental health symptoms and physical problems such as depression, preoccupation, and mood regulation under cyberspace activity (Widyanto, Griffiths & Brunsden, 2011; Young, 1998; Eklöf et. al., 2007; Hagberg et al., 2011). These symptoms are similar to symptoms of substance abuse and addiction, such as compulsive behavior, withdrawal, positive anticipation and tolerance (Chang et al., 2014; Cho et al., 2016; Kim et al., 2013).

Most researchers define smartphone addiction as a type of behavioral addiction, or name it cyber-addiction; the symptoms include an uncontrollable use of mobile phone and online activity, craving or distress while withdrawing, even damaging interpersonal relationships (Billieux, 2012). In recent years, questionnaires have been developed to help assess the tendency of compulsive smartphone use (Akpinar, et al., 2014; Chang, et al., 2014; Kim, et al., 2013). Within those evaluation tools, problematic smartphone usage comprises four main factors – tolerance, withdrawal, compulsive behaviors and functional impairment (Chang, et al., 2014).

With the ongoing controversy about the existence and seriousness of smartphone addiction, there is still no official definition or explanation of the cause and symptoms of excessive smartphone use. This is because it is hard to distinguish whether "non-chemical" and "human-machine interaction" can be defined as an addiction (Griffiths, 1996; Lee & Leung, 2012). Hence, the majority of past studies on smartphone addiction are based on the literature of internet addiction. More and more research points to the impact of excessive use of mobile phones, and compares this with substance abuse.

Despite the absence of any official diagnosis, a number of studies have already linked smartphone addiction, internet addiction and technological addiction with other problematic behavior and daily life dysfunctions. One such study (Chiu, 2014; Chiu et. al, 2012) argued that females are more addicted to mobile phones because they use it as a method of maintaining close interpersonal relationships. Extroverted university students with higher levels of anxiety are more likely to be identified with phone addiction. Another study on the younger generation smartphone user showed people in this age category have 27–36 percent tolerance; 18 percent failed to reduce usages, and 10 percent faced functional impairment of close relationships (Huang et al., 2009).

In this research, we will primarily focus on evaluating the behavior of people with smartphone addiction based on a well-developed Korean scale (Cho et al., 2013). The five types of addiction symptoms are:

1. Daily life disturbance: Missing planned work, difficulty in concentrating on specific tasks or causing physical pain.
2. Positive anticipation: Feeling excited or stress relief with smartphone use and feeling empty without the smartphone.
3. Withdrawal: Intolerable without a smartphone, irritated when bothered.
4. Cyberspace-oriented relationship: Feeling more intimate with virtual friendship; indulging in constant phone-checking.

5. Overuse: Uncontrollable habit and urge to check and use the smartphone.

Research Hypotheses

According to the literature review, the hypotheses are as below:

H1: Self-regulation (impulse control and goal-setting) is a significant predictor of smartphone addiction.
H2: Self-esteem is a significant predictor of smartphone addiction.
H3: Parenting style (authoritative, authoritarian and permissive style) is a significant predictor of attachment style (secure, preoccupied, fearful, dismissive).
H4: Attachment style (secure, preoccupied, fearful and dismissing style) is a significant predictor of self-regulation (impulse control and goal-setting).
H5: Attachment style (secure, preoccupied, fearful and dismissing style) is a significant predictor of self-esteem.

Due to the linkage between variables, a model was established. Figure 1 shows the framework of the relationships between the variables in the current study.
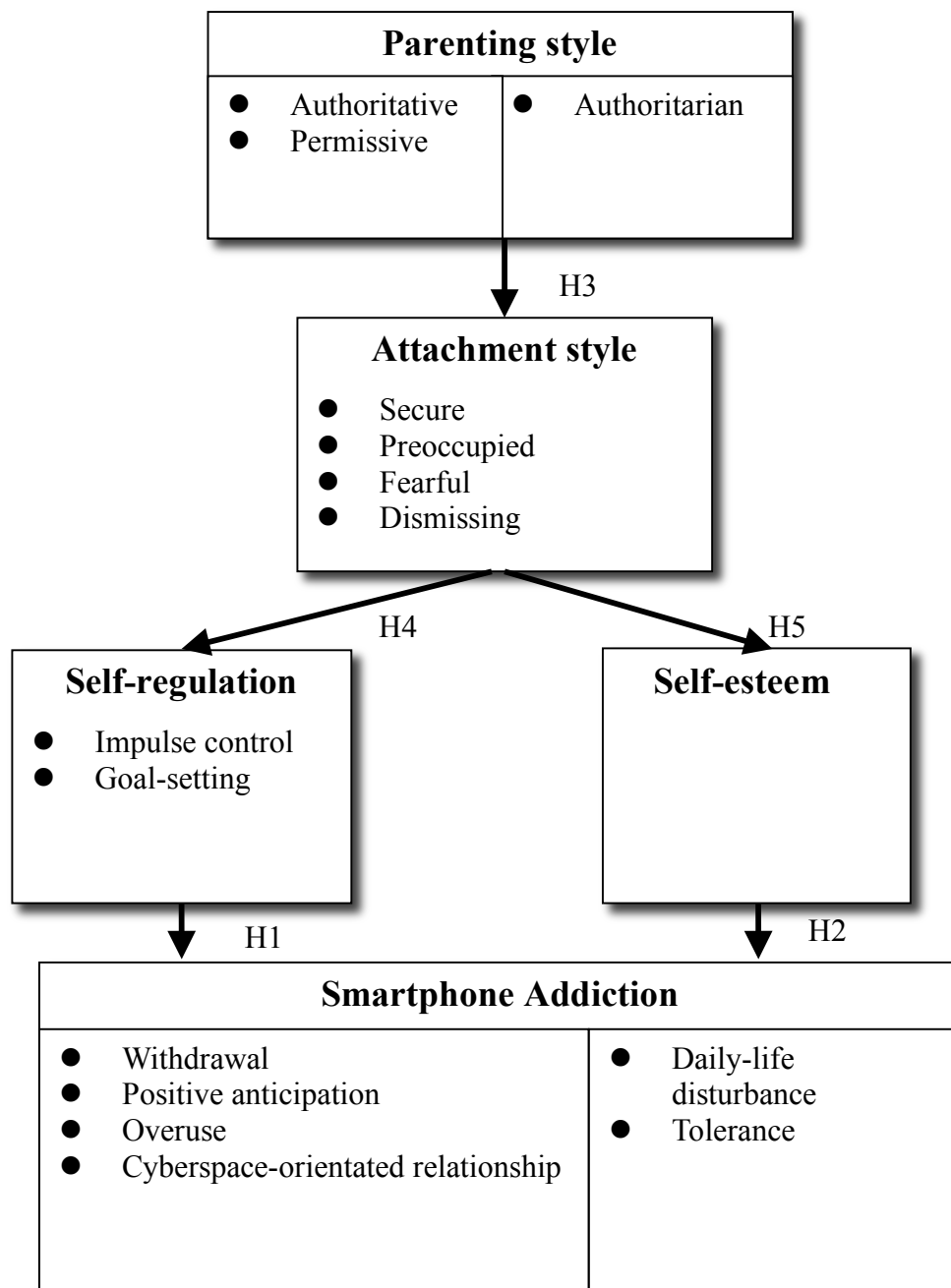
Figure 1: Research framework.

Specific Hypothesis

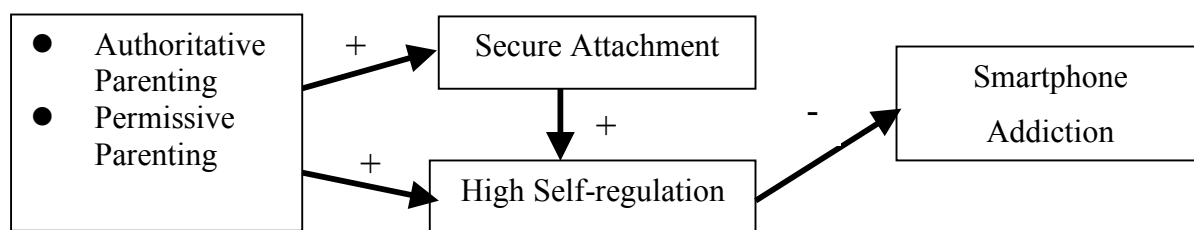There are two possible pathways between parenting style and smartphone addiction.

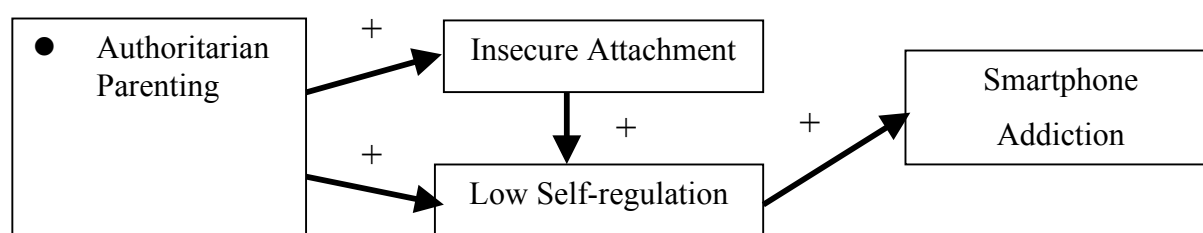Figure 2: Model 1, Authoritative and permissive parenting style.

Figure 3: Model 2, Authoritarian parenting style.

Research Method

Using convenience sampling, a cross-sectional design was implemented, with 211 people participating in this study (Age: M = 22.4, SD = .86). All participants were required to have been using a smartphone daily for not less than one year. The research was conducted by a self-reported survey which included a questionnaire to help assess participant's parenting style, attachment style, self-regulation, self-esteem and degree of smartphone dependence. All questionnaires were in Likert scales, and had satisfactorily tested reliability and validity, and thus had a positive result, thereby supporting the research framework.

Five questionnaires were used in the survey, with a total of 188 questions. The measurement scales were:

  1. Perceived parenting style: Chinese Parental Authority Questionnaire (CPAQ) (2002).
  2. Attachment Style: Chinese Relationship Styles Questionnaire (CRSQ) (2003).
  3. Self-regulation: Short self-regulation questionnaire (SSRQ) (Carey et al., 2004; Carey & Neal, 2005).
  4. Self-esteem: Chinese version of Rosenberg self-esteem scale (CSS) (1965).
  5. Smartphone addiction: Smartphone addiction scale (SAS) (2013).

Results

Descriptive Statistics and Correlational Analysis
In this research, 15 measured variables from five questionnaires were analyzed through means, standard deviations and correlation analyses. The results of statistically significant data are shown in Table 1.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Parenting Style															
1. Authoritative	--														
2. Authoritarian	-.250**	--													
3. Permissive	.471**	-.392**	--												
Attachment Style															
4. Secure	.336**	-.202**	.320**	--											
5. Anxious	-.187**	.269**	-.228**	-.389**	--										
6. Dismissive	.229**	-.122	.234**	.152*	-.112	--									
7. Fearful	-.044	.201**	-.047	-.450**	.391**	.207**	--								
Self-regulation															
8. IC	.090	-.087	.158*	.453**	-.350**	.092	-.326**	--							
9. GS	.162*	-.014	.222**	.492**	-.186**	.106	-.265**	.619**	--						
Self-esteem															
10. Self-esteem	.255*	-.226**	.308**	.641**	-.430**	.068	-.372**	.538**	.508**	--					
Smartphone Addiction															
11. DD	-.037	.014	.083	.107	-.200**	.073	-.259**	.376**	.221**	.163*	--				
12. PA	.126	.127	.088	-.002	.057	.066	.153*	-.342**	-.124	-.185**	-.433*	--			
13. Withdrawal	.078	.180**	-.013	-.075	.168*	-.103	.204**	-.321**	-.184**	-.221**	-.429**	.613**	--		
14. CR	.024	.258**	-.010	-.118	.129	-.061	.230**	-.332**	-.165*	-.227**	-.349**	.611**	.598**	--	
15. Overuse	.094	.117	.011	-.002	.184**	.018	.167*	-.146*	-.038	-.074	-.442**	.437**	.674**	.456**	--
M	3.22	3.03	3.00	3.85	4.13	3.90	3.30	3.24	3.49	2.74	3.63	3.34	3.32	3.03	3.78
SD	.57	.45	.53	.63	.79	.73	.74	.46	.49	.37	.86	.67	.89	.78	.90

Note: IC= Impulse-control, GS= Goal-setting, DD= Dailylife Disturbance, PA= Positive anticipation, CR= Cyberspace relationship, *p<.25 **p<.01 ***p<.001

Table 1: Zero order correlations, means, and standard deviation for study variables.

Reliability Analysis

Scale	α
Parenting Style	
1. Authoritative Style	.845
2. Authoritarian Style	.635
3. Permissive Style	.765
Attachment Style	
4. Secure	.722
5. Anxious	.806
6. Dismissive	.760
7. Fearful	.794
Self-regulation	
8. Impulse Control	.731
9. Goal-setting	.825
Self-esteem	
10. Self-esteem	.825
Smartphone addiction	
11. Daily life Disturbance	.774
12. Positive Anticipation	.823
13. Withdrawal	.850
14. Cyberspace Relationship	.831
15. Overuse	.729

Table 2: Coefficient alphas and items comprising the scale of five questionnaires.

Confirmatory Factor Analysis

A confirmatory factor analysis was conducted with significant findings on tools' correlations and Cronbach's alpha. All scales were parceled and deviant items were deleted to reach a best-fit model. After item parceling and deletion, the confirmatory factor analysis was performed as below.

Questionnaires	df	χ^2	χ^2/df	GFI	CFI	RMSEA
CPAQ	74	159.69	2.16	.90	.97	.079
CRSQ	164	473.06	2.88	.81	.87	.095
SSRQ	26	76.83	2.96	.92	.96	.097
SAS	179	421.04	2.35	.83	.96	.080

Note: χ^2 = Minimum Fit Function Chi-Square; RMSEA = Root Mean Square Error of Approximation; GFI - Goodness of Fit Index; CFI = Comparative Fit Index

Table 3: Goodness of fit indicator for CPAQ, RSQ, SSRQ, SAS.

Structural Equation Modeling (SEM) with Parenting Style, Attachment Style, Self-regulation and Smartphone Addiction

The relationship between the observed variables and the underlying latent variables in parenting style, attachment style, self-regulation, self-esteem and smartphone addiction is shown in the figure below. The hypothesized model was tested with maximum likelihood method, $X^2(32) = 80.59$, Goodness of Fit Index = .934, Comparative Fit Index = .926, Root Mean Square Error of Approximation = .087. Since CFI is higher than .9, a fit structural equation model was established.

Parenting style included two observed variables—authoritative and permissive style. Parenting style was (p <.001) significantly related with authoritative (β = .40) and permissive (β = .35). It shows that authoritative parenting style was the best predictor in this model.

Attachment style also included two observed variables—secure and dismissive style. Attachment style was (p <.01) significantly related with secure (β = .59) and dismissive (β = .14).

Self-regulation included two observed variables—impulse control and goal-setting. Self-regulation was (p <.001) significantly related with impulse control (β = .37) and goal-setting (β = .35).

Smartphone addiction included four observed variables—positive anticipation, withdrawal, cyberspace relationship and overuse. Smartphone addiction was (p <.001) significantly related with positive anticipation (β = .47), withdrawal (β = .80), cyberspace relationship (β = .53) and overuse (β = .62).

For the relationship between latent variables, parenting style was positively significantly (p <.001) related with attachment style (β = .52). On the other hand, attachment style was positively (p <.001) related with self-regulation (β = .61). Furthermore, self-regulation was negatively (p <.001) related with smartphone addiction(β=-.31).
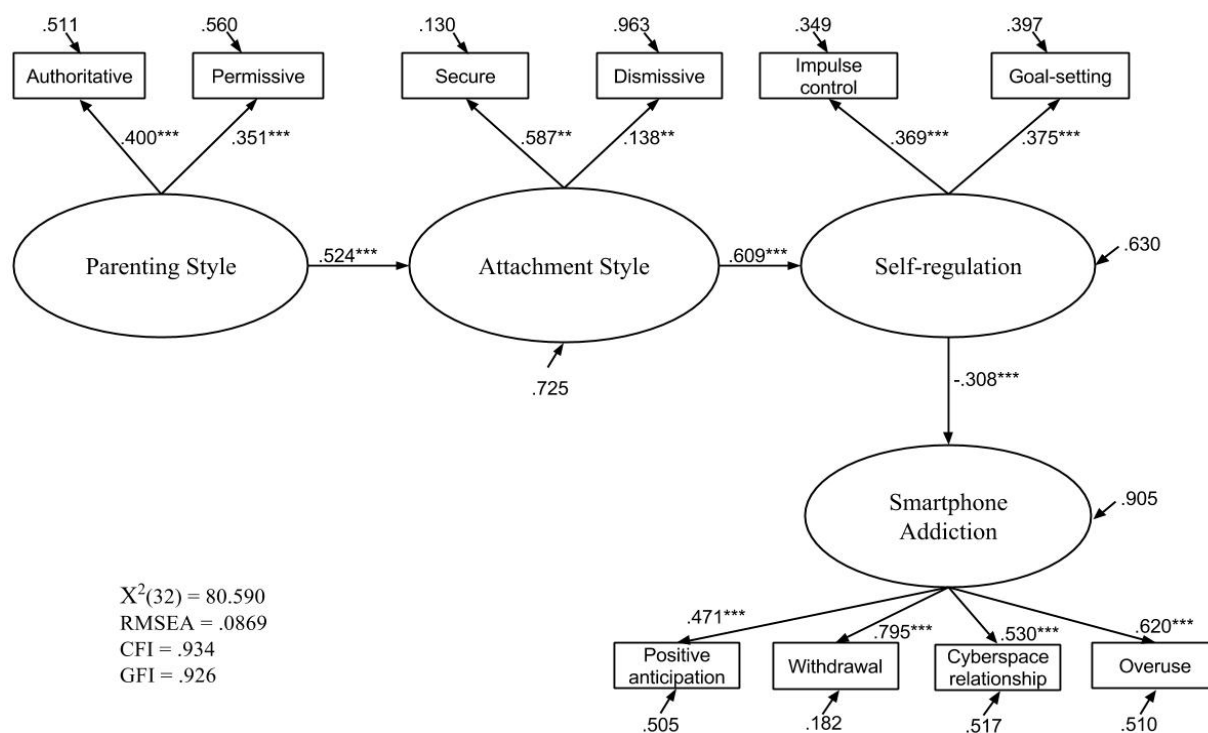
Figure 4: The structural model of the link between parenting style, attachment style, self-regulation and smartphone addiction. Note: RMSEA = Root Mean Square Error of Approximation; GFI = Goodness of Fit Index; CFI = Comparative Fit index
**p<0.01 ***p<0.00

Discussion

One SEM model with self-regulation was established with good fit. The linkages between positive parenting style, positive attachment style, and self-regulation to smartphone addiction were found. This model is consistent with the hypotheses, as positive parenting style might predict higher self-regulation and consequently the risk of smartphone addiction. In line with past studies, parenting style was positively related to self-regulation (Baumrind, 1991; Moilanen, 2007), whereas low self-regulation was negatively related to problematic behavior (Moilanen, 2007). Negative parenting style might not be a good predictor in this research, as self-esteem, negative parenting style, and negative attachment style cannot successfully form any SEM model to predict smartphone addiction.

In this model, authoritative and permissive parenting style have similar mediation power. This indicates that people who receive authoritative and permissive style parenting would generate positive attachment style, hence this would contribute to the development of a person's self-regulation. Moreover, impulse control and goal-setting also have fair power on predicting smartphone addiction.

The result strongly points out that sufficient parent-child interaction and relationship has a positive effect on the prevention of compulsive smartphone use. Individuals who receive or perceive themselves in positive parenting would develop higher trust, sense of control in relationship with others, and less urge to feel being connected to others. Furthermore, secure attachment has higher predictive power on self-regulation than dismissive attachment. Secure

attachment promotes greater internal locus of control compared to dismissive parenting, which may lead individuals to be more active and responsive in their life. Also, they are emotionally stable and have effective coping strategies in dealing with difficulties and distress by adopting useful plans (Conklin & Padykula, 2001; Schore, 2003). In this research, positive parenting is the essential criteria for addiction prevention, as it strongly contributes to a person's degree of self-regulation.

In most cases, self-regulation fails to occur when certain activities hold immediate pleasure or different regulatory goals are in conflict (Baumeister et al., 2001). Furthermore, studies indicate that most people often chose immediate rewards over a greater delayed reward (Green and Myerson, 2004; Rachlin, 2009). Smartphone use is a pleasure pathway response, inducing quick and persistent activity with reward-based behaviors; it yields immediate gratification and a diminished sense of volitional control (Hagberg, Thomée & Härenstam, 2011). People with a high sense of self-control would be more aware of the reason and aim of their particular behaviors, and have comparably more desirable goals. This makes them less likely to use smartphones compulsively. Also, impulsive use occurs when a person chooses small and quicker rewards over a larger reward after delays. Internal force is mostly needed for self-control in selecting the more significant delayed reward, and giving up the small but immediate reward (Cho et al., 2016; De Wit et al., 2006). This is because stopping usage of the phone is against the natural mechanism of the pleasure pathway. Also, when the positive immediate reward outweighs the power of already established goals, less self-regulation ability occurs. When individuals are addicted, they may establish an automatic habit of phone usage; hence they experience higher impulsivity and fail to control themselves. The inner conflict to stop using the smartphone creates conflict and distress, which weakens their ability to self-regulate and favors the selection of immediate rewards (Baumeister et al., 2001).

People with higher self-regulation tendency may have better self-discipline, long-range focus of distant goals, greater capacity to delay gratification, and less tendency to strike for external—rather than immediate—satisfaction which smartphones can provide. Another explanation is that individuals with proper regulation use smartphones for informational purposes. For users with higher motivation for achieving instrumental goals, the smartphone could be perceived as a tool to reach such goals. They thus show better inhibitory control while using the device, and fewer tendencies towards impulsively aggressive behavior. Further, because of their high goal-oriented tendencies and self-reflective character, people with high self-regulation are aware of most of the motives and triggers that cause them to behave in particular ways. As a result, this may increase the likelihood of delays of impulsive gratification and consequently decrease the tendency to use smartphones compulsively.

The finding also shows that impulse control and goal setting have the potential power to be a negative mediator in smartphone addiction. It appears that adequate inhibitory control could lead to less impulsive aggressive behaviour, and consequently less chance of dependency on smartphones. The level of self-regulation may represent people's capacity to delay gratifications. Also, greater strength to react to stimulus, and less deviant or unplanned behavior might occur. For these reasons, self-regulation may play a substantial role in smartphone addiction, as the dependence on smartphone is the result of uncontrolled and uncontrollable behavior.

However, it is important to note that smartphone addiction not only affects the user's mind and body, but also influences the interaction mechanism and relationship between parents and their children. The co-use of a smartphone between a parent and child might intermediate each other

on the tendency of developing smartphone addiction. Hence, the changes in communication with technology and usage of smartphone suggests that the traditional theory of parenting style may not be successfully adapted to current times. As noted earlier, some previous studies have pointed out that the pattern of parental smartphone usage also affects teenagers' phone addiction tendency.

Research Implications

Regarding self-regulation, the present research points out that goal-setting and impulse control have similar predictive power, but contradict the relationship with smartphone addiction. Therefore, effective educational programs for cultivating students' self-regulation skills could be launched. Especially, a program on teaching better impulse control skills and healthy goal setting habits can be effective. Learning to have good impulse control skills and setting relatively achievable goals in these programs, could contribute to less tendency to smartphone addiction or other forms of harmful dependencies. For clinical use, the findings might also help provide insights on developing useful intervention tools for addiction rehabilitation programs.

Conclusion

There is limited research focused on exploring the causes and effects of smartphone addiction. Also, previous studies have failed to provide a comprehensive framework on addiction to technological devices; hence, the findings from this study can enhance awareness and raise interest for further exploration of this topic.

The results of this study highlight the relationships between parenting style, attachment style, self-regulation and smartphone addiction. Also, the findings show that authoritative and permissive parenting styles generate positive attachment styles, which leads to higher impulse control and goal setting skills; consequently, this influences the tendency of smartphone dependence. From a theoretical perspective, this paper provides a new vision for future research. As well, this study examined concepts such as parenting style and attachment style, and explored new tools to measure the risk of smartphone addiction.

Furthermore, there are no conceptual definitions or explanations on whether smartphone or other technological dependencies can be considered as addictions or disorders. The researchers hope this study may offer evidence of the possibility of phone addiction and stimulate further research activities investigating the effects of this new type of non-substance dependence/addiction. Also, the findings may promote greater insight among parents and mental health professionals about the importance of healthy family communication, and the value of positive parenting style for achieving healthy developmental outcomes among children.

It is important to note that these findings cannot determine the direction of correlation among these variables; therefore, parenting style may influence the addiction probability, or vice versa. Also, the long-term usage of smartphones may also change the dynamics of interpersonal interactions, especially in parent-child relationships. Therefore, it would be interesting to examine the possible impact of smartphone usage on the parent-child relationship, as well as the interrelated influence between parenting and smartphone addiction.

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Corresponding author: Kwan Hoi Ching
Email: marthakwanhc@gmail.com