

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

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The Asian Conference on Psychology and the Behavioral Sciences 2016
Official Conference Proceedings

Abstract

Technological addiction has been a highly controversial and common issue globally. This paper explores the complexities and challenges surrounding Smartphone addiction and issues related to technological dependence with a particular focus on parenting styles, attachment and self-regulation. A convenience sampling method was used to gather data from 211 university students in Hong Kong (138 females/74 males) through their responses to four questionnaires. Structural equation modeling were used to test the hypotheses. One model was formed successfully which indicated that parenting style (authoritative and permissive style) can be a desirable predictor of attachment style (secure and dismissive) and self-regulation (impulse control and goal setting) to Smartphone addictions (positive anticipation, withdrawal, cyberspace relationship and 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 can form a significant model with self-regulation and Smartphone addiction. Furthermore, secure attachment has higher mediation power, while impulse control and goal setting behavior has a fairly mediated effect on influencing addiction tendency. The new finding may be the first paper to explore the relationships between Smartphone addiction and other constructs in educational psychology. Based on this finding, 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 parenting skills, motivating children through self-regulation and goal setting is proposed through this study.

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

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Introduction

Smartphone or related technology has been rapidly developed in the past decay, and the smartphone revolution is changing our world more than ever before. Smartphone has already emerged into our daily routine, those enormous influence of smartphone has already changed the manner of society function (Chóliz, 2012; Khang et al., 2011; Sánchez-Martínez & Otero, 2009). To explain the function on smartphone, two study has pointed out that (Kitamura et al., 2009; Sánchez-Martínez & Otero, 2009) mobile phone already evolutes into a way of reflecting self-identity, distinguishing themselves from others and enhance autonomy.

Smartphone is the most common and important "computer like" device in developed countries. According to South China Morning Post (Kao, 2013), Hong Kong has the highest smartphone usage rate and over 96 per cent of young generation use it intensively every day. In other developed countries, over 45% of population are using smartphone in their daily life basis (Bianchi & Phillips, 2005; Oulasvirta et al., 2012; Takao et al., 2009). Because of the high using rate, sign of addiction or dependence under the use of smartphone is rapidly rising in all developed countries (Bhatia, 2008; Sánchez-Martínez & Otero, 2009).

Although there are still controversial on the existence of problematic use of smartphone, the impact already beyond our imagination. A survey in Korea found that larger percentage of people are addicted to smartphone rather than internet (Cho et al., 2013; National information society agency, 2012). It also believed that it contributes to increase number of cases of bullying or harassment, high level of social anxiety, low self-esteem and complicate symptoms in behaviour problems among adolescents (Kitamura et al., 2009; Srivastava, 2005). Also, it has been reported that technological like dependence has a similar degree of addiction compare with gambling or drug abuse (Cho et al., 2013), hence there is a potential risk of pathological use and dependence of smartphone.

For this decay, most studies are focused on the negative consequence on mobile phone use (e.g. excessive texting or driving while using phones), but there is no study aiming at discovering the cause of dependences in communication devices, especially smartphone. This research will use parenting style, attachment style, self-regulation and self-esteem as the starting point to explore the situation on smartphone addiction in Hong Kong, as those are the important factors of young adolescent's development. Also, hope to explore the possible framework between parenting style and smartphone addiction, raise awareness of the danger of excessive smartphone use.

Literature Review

Parenting style and Attachment

Baumrind's theory of parenting style (1971) is adapted in the research to investigate the relationship between parenting and Smartphone. According to the level differences in parental demandngness and responsiveness, three parenting styles have been distinguished and they are authoritarian, authoritative and permissive (Asgari et al., 2011; Baumrind, 1971). In this research, parenting style is the main predictor of

affecting people's attachment style, self-regulation and self-esteem, it will discuss in the following literature.

Parenting is highly linked to children's deviant behavior, addiction and psychological problem. In the long history of studying parenting style, there are different theories and researches suggested that, to efficiently prevent children delinquency is to have a good parenting and parental monitor skills (Lee & Leung, 2012; Kerr & Stattin, 2000). Good and positive parenting is highly associate with their prevention of children's delinquency, psychological, behavior dysfunction and addiction (Al-Bahrani, 2011; Betts et al., 2013; Kehl, 2008).

Besides the effect on parenting, attachment also influence people view of self and others. According to Bartholomew's attachment styles (Bartholomew & Horowitz, 1991), it can separate into secure, preoccupied, fearful and dismissing style (Denollet et al., 2011; Huntsinger & luecken, 2004). Different attachment style can have a different view of self and other, hence develop different levels of security. With positive attachment, like secure attachment, they are more stable while facing separation anxiety and form closer emotional bonding. Also, less tendency of facing distress, less alcohol and drug addiction, more positive behavior outcome and have higher self-esteem.

As attachment is highly associate with parenting style, these two important factors will shape people's worldview, schema and their behavior outcome.

Self-regulation

Self-regulation is an essential mediator in goal achievement and emotional independence, which mainly developed in adolescent. According to the first theory on self-regulation, it mentions that "self-regulation is the ability to develop, implement and flexibility to maintain planned behavior to achieve one's goals" (Asgari et al., 2011). Some research takes social environment, parenting and genetic factors as the effect of self-regulation. In this research it will focus on the area of impulse control (allow delay gratification in short term) and goal setting behavior (subsume goal-direct behavior) (Carey et al., 2004).

Social environment, parenting and genes can shape person's self-regulation. In parenting theory, it points out that positive parenting and warmth can relate to better development of self-regulation, while excessive parental control will hinder children's develop proper self-regulation schema (Baumrind, 1991; Moilanen, 2007). Therefore, different parenting style may cause positive or negative development of self-regulation among children, adolescent and young adult. Also good psychological and behavior control in caregiver also helps predict university student's emotional regulation (Manzeske & Stright, 2009).

Furthermore, self-regulation was associate with various personal achievement, success, social problem and psychological disorder (Mazzucchelli & Sanders, 2013). Level of self-regulation is significantly linked into people's behavior of adjustment and achievement. People with good self-regulation may experience better psychological health, interpersonal relationship, even higher income and academic achievement. There is significant correlation on self-regulation and addiction among

teenagers, as self-regulation is related to person's decision making, emotional and impulse control. It is essential reference on 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 higher risk on 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), high degree of self-regulation is a good prevention for deviant behaviour. Also, numbers of studies supported that there is a significant correlation on self-regulation and addiction among teenagers. It is because self-regulation is linked to person's emotional and impulse control, therefore, low self-regulation is contributed to adolescence's problematic behaviour or substance use (Moilanen, 2007).

Self-esteem

There are different studies support possible relationship among parenting style and self-esteem, especially in young adulthood (Cardinali & D'Allura, 2001; Lee & Leung, 2012). They prove that people raised under authoritative parenting style, those with supportive, warm and responsive parenting, will have higher self-esteem, more independent and socially adjusted. The reason is that parents with higher sense of control and caring behavior, like authoritative parenting style, will develop better parent and children interaction, then enhances children's self-esteem (Karimpour & Zakeri, 2011; Garcia & Martinez, 2008). Therefore, in this study parenting style may possibly link to self-esteem, as self-esteem is constrained by various variables and the result between parental authority, control and self-esteem is inconsistent (Karimpour & Zakeri, 2011).

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

Attachment to self-regulation and self-esteem (put some to discussion point)

According to Schore and Schore (2008), caregiver-infant relationship might help develop the ability of self-regulation. From Shaver's model of self-regulation and attachment (Asgari et al., 2011; Mikulincer, 2010), attachment did influence people's achievements. The model noticed that, secure attachment can let people become more calm and confident to deal with difficulties and with a more effective plan. While people who are insecure are more emotional disturbance from the threats and have a tendency to depend on others, hence lack self-regulation skills. Also, as parenting and

attachment are highly correlated, a good parenting and attachment may positively related to good self-regulation.

Smartphone addiction

Addiction has define as "repetitive habit pattern increase risk of disease, personal and social problem; and experience the feeling of loos control" (Bare et al., 1988). Social networks and other online activity are the causes of the wild spread of smartphone use. Smartphone already discover can leads to mental health symptoms such as sleep disturbance and depression (Eklöf Et Al., 2007; Hagberg Et Al., 2011). Most of the researches define smartphone addiction as one of the behavioural addiction or name as "cyber-addiction", symptom include uncontrollable use of mobile phone and online activity, craving or distress while withdrawal, even damaging interpersonal relationships (Billieux, 2012).

Unfortunately, there is no official definition or explanation on the cause and symptoms of excessive smartphone use, because it is difficult to distinguish whether "non-chemical" and "human-machine interaction" can be defined as an addiction (Griffiths, 1996; Lee & Leung, 2012). It is because the majority of past research which studies smartphone addiction are based on literature of internet addiction. Hence, although more and more research pointed out the impact on excessive use of mobile and compare with substance abuse, people still criticize smartphone addiction as the new dependence like behavior.

No matter the official diagnosis exists or not, some research has already linked smartphone dependence, internet addiction and technological addiction with other problematic behaviour and daily life dysfunction. Some study discovered that (Chiu, Hong & Huang, 2012), female are more addicted to mobile phone, because they use it as a method of maintaining close interpersonal relationship. Also, university student who is extrovert and with higher anxiety are correlated with phone addiction.

In this research will mainly focus on evaluating the behavior of smartphone addiction based on Koera well developed scale and studies (Cho et al., 2013), and five types of addiction symptoms are:

1. Daily life disturbance
Missing planed work, difficulty in concentrating on specific tasks or caused physical pain.
2. Positive anticipation
Feeling excited or stress relief with smartphone use and feeling empty without smartphone.
3. Withdrawal
Intolerable without a smartphone, irritated when bothered.
4. Cyberspace-oriented relationship
Feeling more intimate with virtual friendship or constant phone-checking behavior.
5. Overuse
Uncontrollable habit and urge to check and use smartphone.

Research Hypotheses

The hypothesis below are formulated according to the research question:

H1: Parenting style (authoritative, authoritarian and permissive style) is a significant predictor with attachment style (secure, preoccupied, fearful and dismissing style).

H2: Attachment style (secure, preoccupied, fearful and dismissing style) is a significant predictor with self-regulation (impulse control and goal-setting).

H3: Attachment style (secure, preoccupied, fearful and dismissing style) is a significant predictor with self-esteem.

H4: Self-regulation (impulse control and goal-setting) is a significant predictor with smartphone addiction.

H5: Self-esteem is a significant predictor with smartphone addiction.

Due to the linkage between variables, a model was established. Figure 1 shows the framework about the relationships of the variables in the present research.

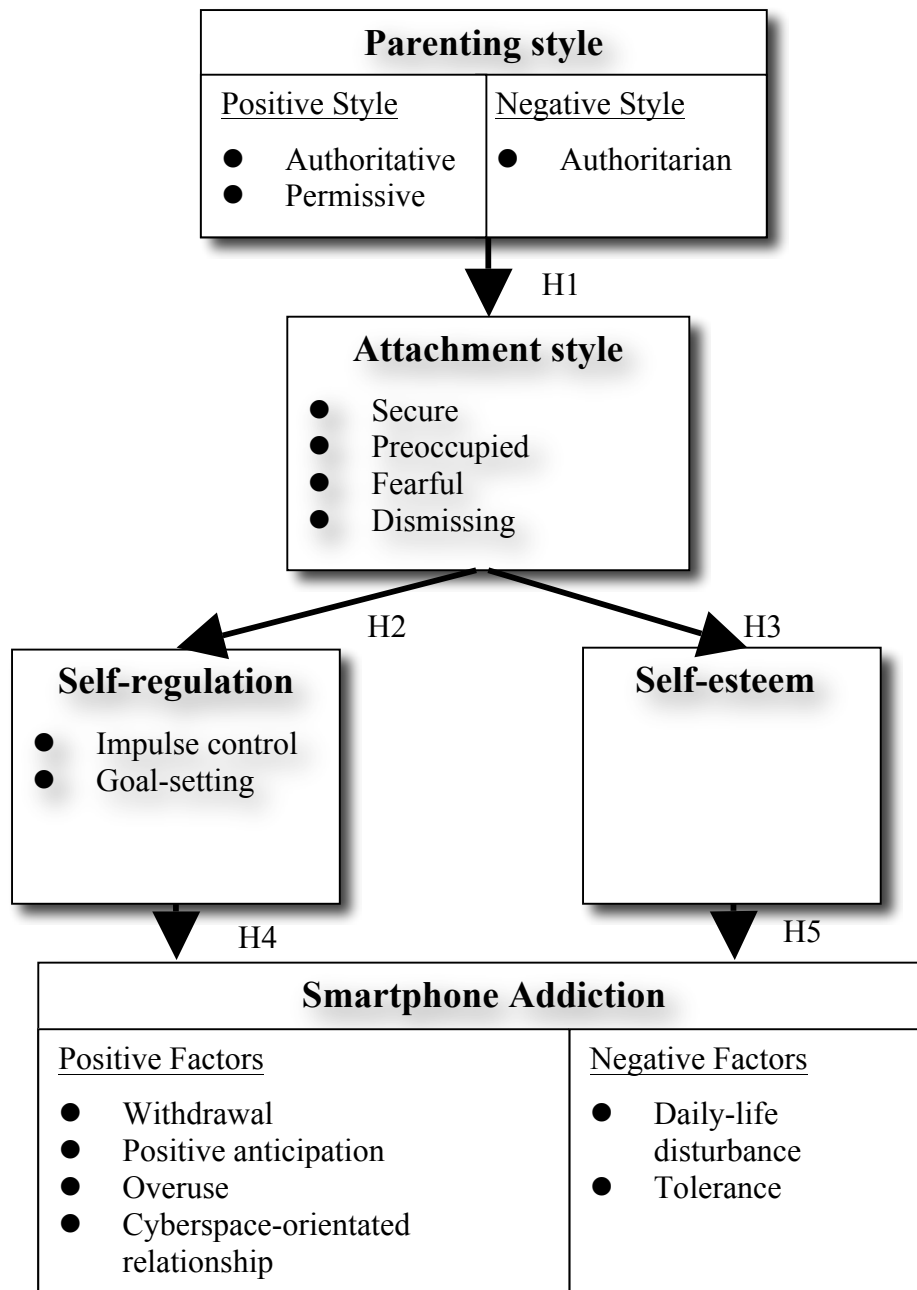


Figure 1. Research framework

Specific Hypothesis

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

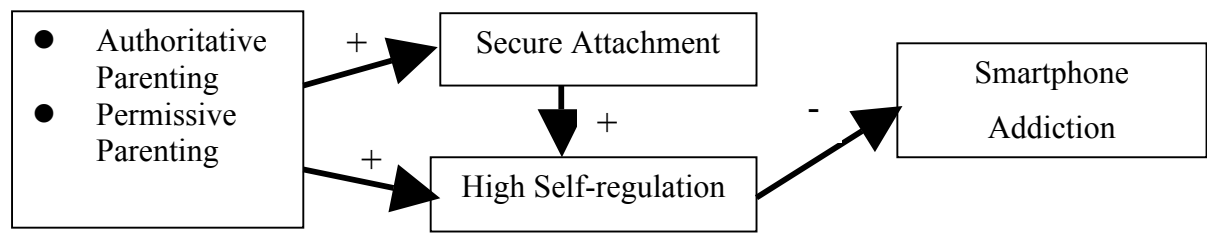


Figure 2. Model 1, Authoritative and permissive parenting style'

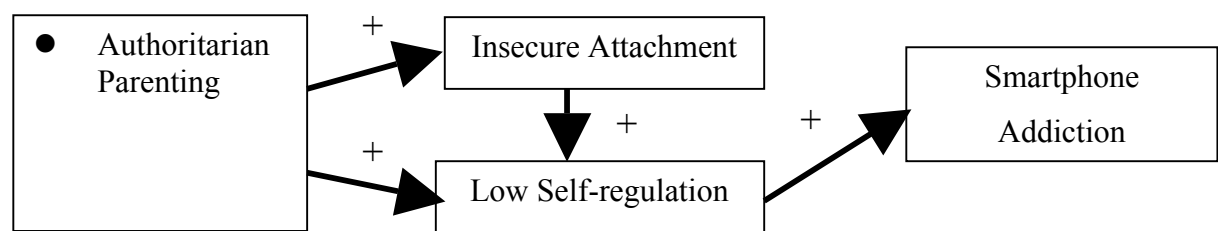


Figure 3. Model 2, Authoritarian parenting style

Research Method

By convenience sampling, cross-sectional design was used, 211 people participate in this studies (Age: $M = 22.4$, $SD = .86$.) All participant are require to use smartphone not less than one year.

This research was conducted by self-report survey which include 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 with satisfy tested reliability and validity, in order to have a persuasive result and support for the research framework.

Five questionnaires, total number of 188 question was use. The measurement as below:

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 5 questionnaires were analysed through means, standard deviations and correlation analysis. The result has been shown in Table 1, sixty out of one hundred and five correlations were statistically significant and were greater than or equal to .12. Over 57% of the data.

Table 1

Zero order Correlations, Means, and Standard Deviation for Study Variables

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**	--
<i>M</i>	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
<i>SD</i>	.57	.45	.53	.63	.79	.73	.74	.46	.49	.37	.86	.67	.89	.78	.90

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

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. Dailylife 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

With satisfy result on tool's correlations and Cronbach's alpha, confirmatory factor analysis was conducted. All scales were parcelling and deleting those deviant items in order to make a best fit model. After item parcelling and deletion, the confirmatory factor analysis was conducted 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 2 observed variables concerning authoritative and permissive style. Parenting style was ($p < .001$) significantly related with authoritative ($\beta = .40$) and permissive ($\beta = .35$). It shows that authoritative parenting style was the best predictor in this model.

Attachment style also included 2 observed variables concerning secure and dismissive style. Attachment style was ($p < .01$) significantly related with secure ($\beta = .59$) and dismissive ($\beta = .14$).

Self-regulation included 2 observed variables concerning impulse control and goal-setting. Self-regulation was ($p < .001$) significantly related with impulse control ($\beta = .37$) and goal-setting ($\beta = .35$).

Smartphone addiction includes 4 observed variables concerning positive anticipation, withdrawal, cyberspace relationship and overuse. Smartphone addiction was ($p < .001$) significantly related with positive anticipation ($\beta = .47$), withdrawal ($\beta = .80$), cyberspace relationship ($\beta = .53$) and overuse ($\beta = .62$).

For the relationship between latent variables, parenting style was positively significantly ($p < .001$) related with attachment style ($\beta = .52$). On the other hand, attachment style was positively ($p < .001$) related with self-regulation ($\beta = .61$). Furthermore, self-regulation was negatively ($p < .001$) related with smartphone addiction ($\beta = -.31$).

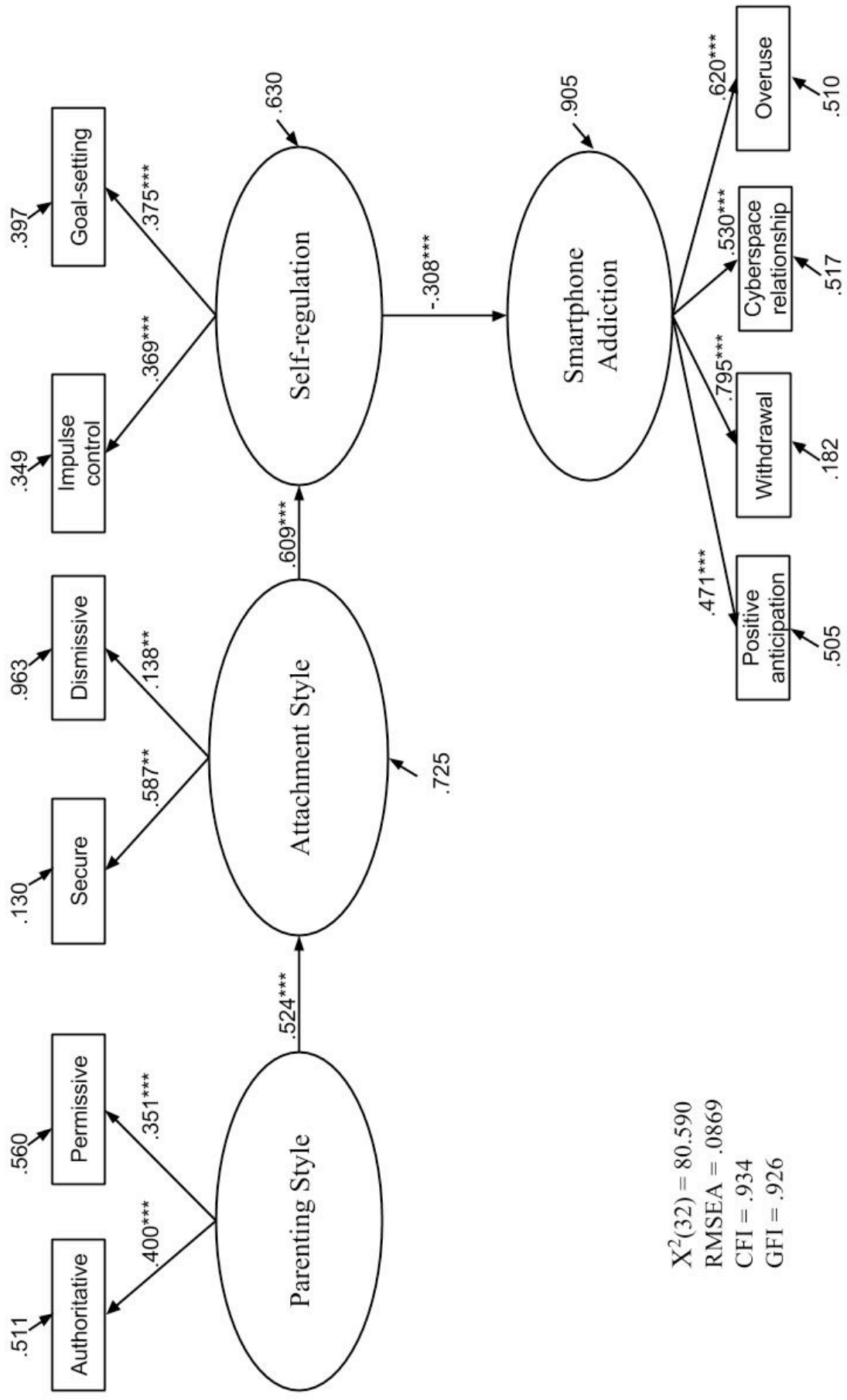


Figure 4. The structural model of the link between parenting style, attachment style, self-regulation and smartphone addiction. Note: RMSEA = Root Mean Square Error of Approximation; GFI = Goodness of Fit Index; CFI = Comparative Fit index ** $p < 0.01$ *** $p < 0.001$

Discussion

One SEM model with self-regulation was established with good fitness. The linkages between positive parenting style, positive attachment style, self-regulation to smartphone addiction was found. And this model is consistent with the hypothesis, as positive parenting style might predict higher self-regulation then to addiction. In line with past studies, parenting style was positively related to self-regulation (Baumrind, 1991; Moilanen, 2007), whereas low self-regulation were negatively related to problematic behaviour (Moilanen, 2007). Self-esteem, negative parenting style and negative attachment style cannot successfully form any SEM model to predict smartphone addiction. This implies that negative parenting style might not be a good predictor on this research.

In this model, authoritative and permissive parenting style has similar predictive power. It revealed that people who receive authoritative and permissive style, would generate positive attachment style hence effect the development of person's self-regulation. Moreover, impulse control and goal-setting also has fair power on predicting smartphone addiction.

The result strongly point out that good parent-child interaction and relationship had a positive effect on prevent compulsive smartphon use. People who receive or perceive themselves in positive parenting would develop higher trust, sense of control in relationship with others, less urge to gain the feeling of being connected. Furthermore, secure attachment has higher predictive power on self-regulation than dismissive attachment. Secure attachment develop higher internal locus of control compare with dismissive parenting, lead individuals to be more active and responsive on their life, also they are more calm and confident to deal with difficulties and distress by using effective plan. Besides, positive parenting is really important on addiction prevention, as it strong link with self-regulation.

We should aware is that Smartphone use is a pleasure pathway response, induce persistent activity with reward-based behaviors. It yield immediate gratification and diminished sense of volitional control (Hagberg, Thomée, & Härenstam, 2011). People with high sense of self-control would more aware of the reason and aim of their specific behavior, it makes them less likely to use smartphone compulsively. People with high self-regulation tendency may have better self decision and higher feeling of control in their life, less tendency to strike for external and immediate satisfaction which smartphone can provide. Another explanation is that, for people with good regulation they consider smartphone use as informational purposes rather than communal purpose. User with higher motivation for achieving instrumental goals, smartphone could be perceive as tool to achieves such goals and have better inhibitory control while using the device, less tendency to act out impulsively aggressive behaviour. Also, because the high goal-aimed tendencies and self-reflective character, they would aware most of the reason and cause of their behaviour, less likely to use smartphone compulsively.

The founding also show that impulse control and goal setting have fairly power to be a negative mediator to smartphone addiction. With adequate inhibitory control, less impulsive aggressive behavior and less change of addiction towards Smartphone. The level of self-regulation may represent people capacity on delay gratifications, also

more strength to react on stimulus, less deviant or unplanned behaviour might occur. For those reasons, self-regulation may have strong linkage in smartphone addiction because the dependence of smartphone is the product of unregulated and uncontrollable behaviour.

But one thing we needed to aware is that Smartphone addiction not only affect user's mind and body, but also influence the interaction mechanism and relationship between the parents and children. Hence, the changing way of communication with technology and smartphone makes the traditional theory of parenting style might not successfully adapt to the modern world, more investigation and discovery is essentially needed.

Research Implications

In the aspect of self-regulation, the present research pointed out that, goal-setting and impulse control has similar predictive power but contradict relationship with smartphone addiction. A better educational programs for cultivating student in good and balance self-regulation skills could be launched. Especially, program on educate better impulse control skills and healthy goal setting habits can be hold. While student learn to have good impulse control skills and fairly achievable goal, less tendency to smartphone addiction or other dependency might cause. For clinical use, the finding might also help provide insight on developing useful tools for addiction rehabilitation plan.

Conclusion

As there is limited research has focused on exploring the cause and effect in smartphone addiction, also they fail to provide a comprehensive framework on technological dependence, this study can raise interest or awareness for further exploration in this area.

This study has proven the relationship between parenting style, attachment style, self-regulation and smartphone addiction.. Besides, the positive parenting style and attachment style would also generate higher impulse control and goal setting skills, which influence the tendency of smartphone dependence. For theoretical perspective, the present paper can provide a new vision for further research. This research also explores new smartphone addiction measurements and examined the concept of educational psychology, such as parenting style and attachment style.

Furthermore, there are no conceptual definition and explanation on whether smartphone or other technological dependences can be counted as an "addiction" or "disorder". Hope this research may give support evidence on phone addiction or raise a new area of investigating the effect on this new type of non-substance dependence. Also, to promote the importance of healthy family communications and positive parenting style for a better development outcome among children.

The drawback of the result is that, it cannot explore the direction of correlation, parenting may influence the addiction probability and vice versa. Also, for the long term smartphone use may also changes the ways of interpersonal interaction

especially in parent-child relationship. For this point more discover is need in future focus on the interrelated influence between parenting and Smartphone addiction.

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