



I need my smartphone: A hierarchical model of personality and cell-phone addiction



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ABSTRACT

Using a comprehensive personality model, this study is the first to examine the relationship between a full range of personality traits and cell phone addiction. 346 college students completed an online survey that asked respondents to complete measures of the Big-Five personality traits and measures of materialism and need for arousal, Barratt's (1959) impulsiveness scale, and a four-item measure of cell phone addiction. Data were analyzed using structural equation modeling. Couched in Mowen's (2000) 3M Hierarchical Model of Personality, the elemental traits of emotional instability and materialism were positively associated while introversion was negatively associated with cell phone addiction. The central trait of attention impulsiveness exhibited a direct and positive association with cell phone addiction. A significant negative relationship between conscientiousness and all three dimensions of Barratt's impulsiveness scale (central trait) was found. Several additional relationships between the elemental traits of Mowen's personality hierarchy and the three dimensions of impulsiveness (central trait) also were uncovered. Study implications and future research directions are discussed.

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1. Introduction

Media use has become so much a part of young adults' lives that many do not realize their level of dependence and/or addiction to their cell phones (Roberts, YaYa, & Manolis, 2014). A survey of over 1649 college students found that they spend 97 min a day texting, 118 min searching the Internet, 41 min on Facebook, 49 min e-mailing, and 51 min talking on their cell phone (Junco & Cotten, 2012).

This heavy investment of time interacting with a cell phone may be related to college students' academic performance. Junco and Cotten (2012) found that using technology while studying was inversely associated with GPA. Lepp, Barkley, and Karpinski (2014) also found a negative relationship between college students' cell phone use and GPA. Excessive cell phone use can also negatively affect job performance and one's relationships with family, friends, classmates, and instructors (Takao, Takahashi, & Kitamura, 2009). Roberts et al. (2014) concluded that cell phone addiction undermines scholastic achievement as students use their

cell phones to 'remove' themselves from classroom activities, cheat, and disrupt their studies.

1.1. Study goals

With the growing amount of time people spend with technology, especially the cell phone, the paucity of research in the area of cell phone addiction is somewhat surprising. Few studies to date have investigated a full range of personality traits and their association with cell phone addiction. Given the proposed similarities across substance and behavioral addictions such as loss of control over one's behavior and the conflict created by such behavior (Griffiths, 1995, 2012), it is likely that certain personality traits may be more strongly associated with cell phone addiction (c.f., Bianchi & Phillips, 2005; Butt & Phillips, 2008; Ehrenberg, Jukes, White, & Walsh, 2008). Since no single set of personality characteristics explains all addictions, research which focuses on specific behavioral addictions is necessary. In this research, Mowen's 3M Hierarchical Model of Personality (Mowen, 2000) was used to better understand the role of personality in cell phone use and/or addiction.

1.2. A hierarchical personality model of cell phone addiction

Mowen's model utilized a hierarchical approach to personality to provide a cogent and defensible model of how personality traits

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influence behavior. The 3M's hierarchical approach is based upon the earlier work of Allport (1961), Buss (1989), Lastovicka (1982) and others who argue that personality traits exist within a hierarchy varying in their degree of concreteness. At the most concrete level of the hierarchy lie Surface traits – behavioral tendencies that investigators wish to explain or predict. The next level of personality traits is labeled Central traits. In the present study, the personality factor of impulsiveness is considered a Central trait. A Central trait may fully or partially mediate the effects of the more abstract Elemental traits (e.g., Five-Factor Model), or may have no impact on how these Elemental traits influence Surface traits (behavior). Mowen used the Five-Factor Model of personality as the starting point for his hierarchical model adding material and physical needs and need for arousal to accommodate his vision of the most basic (Elemental) personality traits of his hierarchy.

Specifically, this research investigated the relationship between Mowen's Elemental traits (personality characteristics) and cell phone addiction. Modeled as a Central trait in Mowen's hierarchy, impulsiveness was also investigated with respect to cell phone addiction as this trait has been shown to potentially play an important role in both substance and behavioral addictions (Roberts & Pirog, 2012). Placing impulsiveness as a central personality trait in Mowen's hierarchy of personality will shed light on how (and if) the basic building blocks of personality (elemental traits) are associated with a technology related addiction. This proposed relationship may be direct or channeled through impulsiveness.

1.3. Cell phone addiction and personality traits

We propose that seven of Mowen's (2000) elemental (i.e., personality) traits influence cell phone addiction: agreeability, extraversion, need for arousal, emotional instability, neuroticism, materialism, and conscientiousness. Next, we review the rationale supporting the association between these personality characteristics and cell phone addiction.

1.3.1. Agreeability

Agreeability can best be understood as a person's need to be considerate of others and their well-being. Agreeable individuals are concerned with interpersonal relationships based on honesty and equality (Phillips, Butt, & Blasczynski, 2006). Research by Phillips et al. (2006) found that agreeability is associated with the use of cell phones to play games. In a sample of 112 adults, those low on agreeableness were found to be more likely to play games on their mobile phones compared with those high on agreeableness. Costa and McCrae (1992) described those low on agreeability as self-centered and selfish. The authors added that individuals who are low on agreeableness are also more anti-social and predisposed to misuse their cell phones compared with those high on agreeableness.

A survey of 200 college students found that students who are low, versus high on agreeableness, spent more time using instant messaging (IM) and were more likely to report stronger IM addictive tendencies (Ehrenberg et al., 2008). Research by Butt and Phillips (2008) largely supported this finding: with those low on agreeability more likely to use text messaging compared with more agreeable respondents. More recently, Andreassen et al. (2013) found agreeableness to be negatively associated with cell phone addiction in college students.

1.3.2. Extraversion

Extraversion is related to an individual's propensity to be outgoing in social situations. Extraverts are often self-centered and are open to sharing and leading conversations in social situations. Extraverts are generally impulsive, enjoy excitement, and crave social interaction. As noted by Bianchi and Phillips (2005), the trait

of extraversion is linked to addictive behavior. An extravert, the authors asserted, tends to be under-aroused and likely to seek-out stimulation. Results of their survey of 195 members of several college campuses and the general public suggested that those high in extraversion are more likely to overuse their cell phones.

Several other studies also found support for the extraversion-problematic cell phone use link. Andreassen et al. (2013) found, in a sample of 218 university students, that more extraverted students were more likely to be addicted to their cell phones than their less extraverted counterparts. Love and Kewley (2003) found that cell phone user attitudes toward the use of cell phones in public places are partially driven by levels of extraversion. Extraverts were more likely to carry their cell phone with them at all times and to be less bothered by others when using their cell phone in public places. A survey of 196 Austrian college students found that extraverts are more likely to report problematic mobile phone use compared with students low on the extraversion trait.

1.3.3. Need for arousal

Those high in need for arousal are chronically seeking to increase their stimulation and excitement levels. Past research suggests that Zuckerman's (1979) sensation seeking construct, which is very similar to need for arousal, is linked to a variety of behaviors resembling addictive tendencies such as illicit drug use. An important dimension of Zuckerman's sensation seeking construct is susceptibility to boredom. Much of cell phone use can be seen as an attempt to stave off boredom. Research by Leung (2008), found that, in a large sample of teens and young adults, cell phone addiction was positively associated with both sensation seeking and leisure boredom.

1.3.4. Emotional instability

Emotional instability entails moody and temperamental behavior. Neurotic behavior also is characterized by moodiness, anxiety, and worrying. Neurotics are highly emotional and exhibit strong emotional responses to a variety of stimuli. Bianchi and Phillips (2005) noted that neuroticism is linked to a number of excessive behaviors and drug addiction. The neurotic or emotionally unstable person may use their cell phone as a means of coping with stress and anxiety. A number of research studies have found that stress/anxiety are related to problematic cell phone use (Beranuy, Oberst, Carbonell, & Chamarro, 2009; Ha, Chin, Park, Ryu, & Yu, 2008; Jenaro, Flores, Gomez-Vela, Gonzalez-Gil, & Caballo, 2007; *Psychiatric Dispatches*, 2008; Reid & Reid, 2007). A survey of 196 college students found that chronic stress and low emotional stability are significantly associated with problematic mobile phone use (Augner & Hacker, 2012).

1.3.5. Materialism

Materialism is best understood as the value an individual places on worldly possessions and the importance those possessions play in his daily life (Belk, 1985), or, as described by Mowen (2000), as a need to collect and possess material objects. Given the central role cell phones play in the social lives of college students and young adults, it is expected that cell phones are important status symbols for young adults (Roberts & Pirog, 2012). Highly materialistic consumers place a greater value on products consumed in public. The ubiquitous nature of cell phones makes them an important tool in creating a social identity for young adults.

Clearly, iPhones have a certain panache and have sparked loyal brand communities (Wu & Sukoco, 2010). Apple technology users are portrayed in advertising as laid-back hipsters versus the more conservative and up-tight PC users. It is evident that the use and display of one's cell phone extends well beyond its utilitarian value. Of particular interest to the present study is a recent survey conducted by Roberts and Pirog (2012). Conducting an online

survey of college students from two universities, the researchers measured the students' level of materialism, impulsiveness, and instant messaging and mobile phone addiction. Results suggested that both materialism and impulsiveness drive dependence on cell phone use and Instant Messaging.

1.3.6. Conscientiousness

An important aspect of exercising self-control is the willingness to monitor and keep track of one's behavior (Baumeister, 2002). Conscientious individuals closely monitor their behavior and are better organized and efficient in carrying out tasks. Self-discipline is an important characteristic of the conscientious person (Costa & McCrae, 1992). A survey of 112 individuals ranging in age from 18 to 59 found that less conscientious people spent more time sending text messages than those higher in conscientiousness. Conscientiousness was also found to be inversely associated with impulsiveness (Mowen, 2000; Roccas, Sagiv, Schwartz, & Knafo, 2002). For those who lack the ability to stay focused on a given task, the omnipresent cell phone may increasingly be used to assuage the impulsive tendencies of the low-conscientious person.

1.3.7. The role of impulsiveness in cell phone addiction

People who are impulsive make reflexive decisions with little deliberation as to future consequences. They often make rash decisions that can have destructive and even fatal results (texting/talking while driving). In fact, research has shown that impulsivity may predispose individuals to addiction. With respect to illicit drug use, Belin, Mar, Dalley, Robbins, and Everitt (2008) found that people who are impulsive are more likely to progress from occasional or recreational cocaine use to habitual or compulsive use.

In a recent study of college students, Roberts and Pirog (2012) found that impulsiveness (along with materialism) had a direct (and positive) relationship with mobile phone technology addiction. Impulsiveness was also found to partially mediate materialism's impact on mobile phone addiction.

The findings of several earlier studies by Billieux, Van Der Linden, D'Acromont, Ceschi, and Zermatten (2007), Billieux, Van Der Linden, and Rochat (2008) provided corroborating evidence of impulsivity's impact on cell phone addiction. Measuring various sub-dimensions of impulsiveness, for instance, Billieux and his co-authors found that urgency and lack of perseverance were associated significantly with both actual use of and perceived dependence on one's cell phone in a sample of female college students (Billieux et al., 2007). In a subsequent study of 339 young adults (ranging in age from 20 to 35 years of age), Billieux and his colleagues found the urgency dimension of impulsiveness to be the strongest predictor of problematic mobile phone use (Billieux et al., 2008). Those scoring high on the Urgency dimension of impulsiveness reported stronger cravings or impulses especially when experiencing negative feelings or emotions.

1.3.8. The mediating effect of impulsiveness

Mowen (2000) positioned impulsiveness as a Central trait in his personality hierarchy. Positioning impulsiveness as a Central personality trait sheds light on how the basic building blocks of personality impact cell phone addiction. This proposed impact may be direct as hypothesized above and/or channeled through impulsiveness. As Mowen (2000) stated, Central traits such as impulsiveness may partially or fully mediate, or have no impact on how the basic elements of one's personality influence surface traits (behavior) like cell phone addiction.

Earlier research found several significant correlations between the five factors of personality and impulsiveness. The Lack of Pre-meditation and Perseverance factors of the UPPS Impulsive Behavior Scale were correlated with conscientiousness, while the

Urgency factor was correlated with neuroticism and the sensation seeking factor with Extraversion (Whiteside & Lynam, 2001).

Eysenck and Eysenck (1985) viewed impulsiveness as a component of sensation seeking. Zuckerman, Kuhlman, and Thomquist (1991) also found impulsiveness and sensation seeking to be positively correlated. In addition to its correlation with sensation seeking, Rook (1987) linked impulsiveness to materialism. Sharma, Sivakumanran, and Marshall (2010) found variety seeking (novelty seeking) to be positively associated with impulse buying. In sum, prior research evidence suggested that the six elemental personality factors of Mowen's (2000) model of personality included in the present study may be associated with any or all of the three facets of impulsiveness as measured by the Barratt Impulsiveness scale. The association between Mowen's personality factors and cell phone addiction may be direct and/or mediated by impulsiveness.

1.3.9. The present study

We examined the relationship between seven personality traits and cell phone addiction. Agreeableness (H1) and conscientiousness (H2) were hypothesized to be negatively associated with cell phone addiction. The variables of extraversion (H3), need for arousal (H4), emotional instability (H5), materialism (H6), and impulsiveness (H7) were hypothesized to be positively associated with cell phone addiction. Couched in Mowen's (2000) Hierarchical Model of Personality, we also assessed the potential mediating role of impulsiveness on the above relationships (H8).

2. Method

2.1. Procedures and sample

Data for the present study were collected via self-report questionnaires using Qualtrics survey software. Potential respondents were all members of a student subject pool and were contacted by e-mail which included a secure link to the survey questionnaire. Those who participated in the survey were college students from a major university in Texas and ranged in age from 19 to 24 years with an average age of 21. The total sample consisted of 346 respondents of which 49% were male. Twenty-five percent of the sample was sophomores, 59% juniors, and 16% seniors. Seventy-five percent were Caucasian, 14% Hispanic, 11% Asian, 6% African American, and 3% were Native American. The survey took between 10 and 15 min to complete and was approved by the university IRB committee prior to the beginning of data collection.

2.2. Measures

2.2.1. Personality factors

Likert-type scales (e.g., 1 = extremely inaccurate, 9 = extremely accurate) from Mowen (2000) were used to assess respondents' perceptions of the seven personality factors (emotional instability, introversion, openness to experience, agreeableness, conscientiousness, materialism, and need for arousal). Scale items, alphas, and factor loadings for all scales used in this study can be found in the Appendix A and Table 1 of this manuscript.

2.2.2. Impulsiveness factors

To measure impulsiveness, we utilized the short-form of the Barratt Impulsiveness Scale (BIS). The 15-item BIS identifies three impulsiveness factors (five items each): non-planning, motor impulsivity, and attention impulsivity.

2.2.3. Cell phone addiction

To measure cell phone addiction we utilized the four-item Cell phone Addiction Scale (Roberts et al., 2014).

Table 1
Internal consistency estimates and correlation among constructs.

Dimension:	AVE	1	2	3	4	5	6	7	8	9	10	11
1. Emotional instability	.51	.87										
2. Introversion	.53	.36	.87									
3. Openness to experience	.57	.08	-.04	.87								
4. Agreeableness	.57	-.13	-.01	.09	.86							
5. Conscientious	.56	-.10	-.05	.00	.26	.89						
6. Materialism	.50	.17	.05	-.01	-.02	.13	.89					
7. Need for arousal	.56	.02	-.25	.17	-.02	-.09	.14	.89				
8. Impulse – motor	.44	.15	-.04	.09	-.08	-.28	.02	.35	.74			
9. Impulse – non-planning	.43	.07	.07	-.07	-.14	-.55	-.04	.10	.30	.77		
10. Impulse – attention	.36	.15	.07	-.03	-.15	-.34	.01	.21	.52	.31	.68	
11. Cell phone addiction	.49	.17	-.04	-.03	.01	.07	.19	.06	.07	-.01	.12	.80

Note: All correlations at or above .13 are significant ($p < .02$). Alphas for each scale can be found on the diagonal. See Appendix A for detail on final scales.

2.3. Measurement checks

We examined the psychometric properties of our measures by estimating two measurement models – one model containing the seven personality factors and another model including the three impulsiveness factors and the cell phone addiction measure. We used modification indices and factor loadings to eliminate problematic items before arriving at our final measures. Findings suggested that the final measures are satisfactory as both measurement models, respectively, resulted in satisfactory fit: $\chi^2 (329) = 654.39$, $p < .00$; $CFI = .94$; $IFI = .94$, $RMSEA = .05$ (the $\chi^2 [378]$ for the null model was 6139.84) and $\chi^2 (139) = 255.38$, $p < .00$; $CFI = .94$; $IFI = .95$, $RMSEA = .05$ (the $\chi^2 [171]$ for the null model was 2259.64). Items retained along with factor loadings are shown in the Appendix A. Internal consistency, average variance extracted estimates, and correlations among the constructs can be found in Table 1.

3. Analysis and results

To test the proposed hypotheses and relationships between variables, we estimated a structural equation model with 11 latent variables (seven personality factors, three impulse factors, and a cell phone addiction dimension). Specifically, the cell phone addiction factor was regressed onto each of the impulse and personality factors, and each impulse factor was regressed onto each personality factor. The results suggested a satisfactory model fit: $\chi^2 (647) = 1200.76$, $p < .00$; $CFI = .92$; $IFI = .92$, $RMSEA = .06$ (the $\chi^2 [741]$ for the null model was 7953.91).

To provide the most parsimonious reporting of results, only the significant individual standardized path estimates and R^2 estimates for each endogenous variable are shown in Fig. 1. As depicted, four of the formal hypotheses were supported: (a) H5 was supported, the path from emotional instability to cell phone addiction was significant (.20, t -value = 3.74, $p < .01$), (b) H3 was supported, the path from introversion to cell phone addiction was significant and negative (–.15 t -value = 2.34, $p < .05$), (c) H6 was supported, the path from materialism to cell phone addiction was significant (.13, t -value = 2.98, $p < .01$), and (d) H7 was supported, the path from attention impulsiveness to cell phone addiction was significant (.22, t -value = 2.02, $p < .05$).

H8 was partially supported, the paths from conscientiousness (–.36, t -value = 2.99, $p < .01$), and need for arousal (.26, t -value = 3.35, $p < .01$) to attention impulsiveness were as predicted.

4. Discussion

Couched in Mowen's (2000) Hierarchical Model of Personality, the study's findings suggest that, in addition to the attention impulsivity factor, three personality factors are significantly associated with cell phone addiction. Additionally, four personality

factors were associated with at least one of the three impulsivity factors (motor impulsiveness, non-planning impulsiveness, and attention impulsiveness).

Attention impulsiveness was the only impulsiveness factor found to have a significant relationship with cell phone addiction. Attention impulsiveness captures the respondent's inability to concentrate on the topic at hand. This finding is consistent with the earlier findings of Billieux et al. (2007) who found that the lack of perseverance dimension of impulsiveness is significantly correlated with a self-reported measure of perceived cell phone dependence.

Our results and Billieux's results suggest that cell phone addiction is associated with the respondent's inability to concentrate on the task at hand. When bored or frustrated, the respondent finds distraction in his or her cell phone. The wide array of functions available on the modern smart-phone provides even the most attentive person an outlet for their boredom. Billieux et al. (2007) conjectured that people low in perseverance may be plagued with more irrelevant thoughts and memories and that the cell phone allowed them to rid (or at a minimum distract) themselves of such thoughts. It appears that one's inability to focus on a particular task is more important than the propensity to act on impulse (motor impulsivity) or lack of planning (non-planning impulsiveness) when it comes to understanding the impact of impulsivity on cell phone addiction.

In regard to the role of personality in cell phone addiction, the present study found that the personality trait of emotional instability had a direct and positive relationship with cell phone addiction. A person who is moody and temperamental may be more likely to be addicted to their cell phone than more stable individuals. Although emotional instability was not directly related to attention impulsivity, it appears that emotionally unstable individuals – similar to those who have trouble concentrating – may find solace (distraction) in their cell phone. Much like a variety of substance addictions, cell phone addiction may be an attempt at mood repair. Incessant checking of e-mails, sending texts, tweeting, and surfing the web may act as pacifiers for the unstable individual distracting him or herself from the worries of the day and providing solace, albeit temporary, from such concerns.

Introversion was the next personality trait found to have a direct and negative relationship with cell phone addiction. Those who express feelings of shyness and bashfulness may be less likely to become dependent on their cell phones than their more extraverted counterparts. A large-scale survey of 7446 adults ranging in age from 18 to 44 found that “a sense of being connected” is the most important sentiment driving cell phone use (IDC/Facebook, 2013). So, it appears that being shy and/or bashful may keep introverted individuals from seeking a sense of connection so important to their more extroverted cohorts who use, and often overuse, their cell phones.

Given the central role cell phones play in the lives of young adults, it was hypothesized and found that materialism plays a

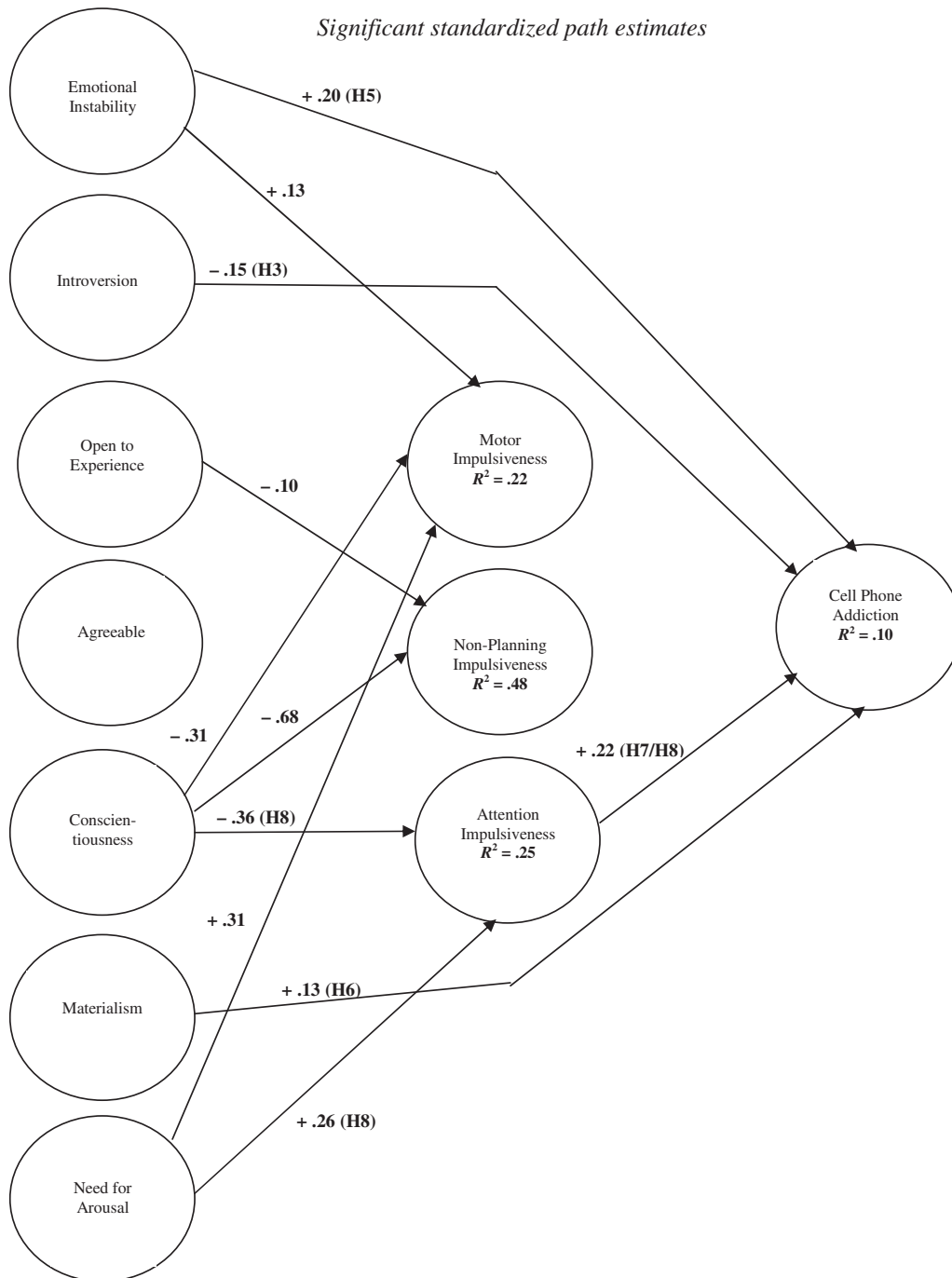


Fig. 1. Significant standardized path estimates.

significant role in cell phone addiction. Those high in materialism were more likely to report being addicted to their cell phones compared with those who reported lower levels of materialism. It is evident that cell phones are much more than a utilitarian tool. Cell phones are often used in public and play an important role in the social lives of young adults (Roberts & Pirog, 2012). As evidenced by the popularity of the iPhone, the brand and features of the cell phone play important roles in fostering the self-identity of young adults (Takao et al., 2009).

Three other personality factors (openness to experience, conscientiousness, and need for arousal) had no direct relationship with cell phone addiction but were found to be related to one or more of the impulsiveness dimensions. Openness to experience was associ-

ated significantly with non-planning impulsiveness which suggests that those who seek new experiences are less likely to plan and are more flexible in their approach to life. Although somewhat similar to attention impulsivity, non-planning impulsivity was not significantly associated with cell phone addiction. It appears that cell phones may play a significant role in assuaging short-term problems brought on by boredom and restlessness, but have no relationship to the propensity for longer-term planning.

Conscientiousness was found to be significantly associated with all three dimensions of impulsivity. The need to be organized, orderly, and efficient was negatively correlated with the propensity to act on impulse (motor impulsiveness), engage in non-planning (non-planning impulsiveness), and the tendency to

be easily distracted or bored (attention impulsiveness). The role of conscientiousness in cell phone addiction is not well understood. The present findings suggest that its association with cell phone addiction may be via its relationship with attention impulsiveness.

The personality trait of Need for Arousal was found to be positively associated with motor impulsiveness and attention impulsiveness. Intuitively, those with a strong desire for stimulation and excitement might find it difficult to resist urges to say or do something on a whim (motor impulsiveness) or remain on task (attention impulsiveness).

5. Study limitations and future research directions

Although this study expands our knowledge of the role personality plays in cell phone addiction, it must be tempered by certain limitations. First, the sample consisted of college students from one university. Although the sample was adequate for the purposes of the present study, future studies could benefit from larger and more diverse samples of students and the larger adult population. Second, further testing of Mowen's Hierarchical Model of Personality is needed. Additional research will help to further validate this comprehensive model of personality. The survey methodology and correlational nature of the present study suggests future research would benefit from experimental research designs.

Third, given the moderate correlation between impulsiveness facets, future research that focuses on the measurement of impulsiveness will be helpful in better understanding addictions of all types given the central role this construct plays in addictive behavior. Although the Barratt impulsiveness scale used currently has an extensive history, there are other measures that assess different elements of impulsiveness (Whiteside & Lynam, 2001).

Further research into the role personality plays in our behavior is needed. To date, most personality research has not been couched in a defensible model of personality. Although the process by which certain personality characteristics impact our behavior is complex, improved scales of the constructs of interest ensconced in a defensible model of personality will be a significant step toward better understanding the complex milieu that drives human behavior.

Appendix A.

Seven personality factors (Mowen, 2000).

Item	Factor loading
<i>Emotional instability</i>	
1. Moody more than others	.802
2. Temperamental	.850
3. Touchy*	.603
4. Emotions go way up and down	.705
5. Testy more than others	.811
(correlation between four- and five-item factors = .98)	
<i>Introversion</i>	
1. Prefer to be alone rather than in a large group	.600
2. Shy	.874
3. Quiet when with people	.922
4. Bashful when with people	.785
<i>Openness to experience</i>	
1. Frequently feel highly creative	.787
2. Imaginative	.930
3. More original than others	.796

Appendix A. (continued)

Item	Factor loading
<i>Agreeable</i>	
1. Kind to others	.783
2. Tender-hearted with others	.947
3. Sympathetic	.757
<i>Conscientiousness</i>	
1. Orderly	.910
2. Precise	.773
3. Organized	.925
4. Efficient	.660
<i>Materialism</i>	
1. Enjoy buying expensive things	.779
2. Enjoy owning luxurious things	.747
3. Acquiring valuable things is important to me	.825
4. Like to own nice things more than most people	.885
5. Possessions are important to my happiness	.662
<i>Need for arousal</i>	
1. Drawn to experiences with an element of danger	.816
2. Like the new and different more than the tried and true	.621
3. Seek an adrenaline rush	.902
4. Enjoy taking risks more than others	.926

Note: Items followed a 9-point, Likert-type response format (9 = extremely accurate, 1 = extremely inaccurate) and the 'asterisked item' was eliminated in order improve the psychometric properties of the corresponding factor/dimension (see Table 1).

Three impulsiveness factors (Barratt, 1959).

Item	Factor loading
<i>Motor impulsiveness</i>	
1. I act on impulse*	.648
2. I do things without thinking	.846
3. I say things without thinking	.661
4. I buy things on impulse*	.441
5. I act on the spur of the moment	.652
(correlation between three- and five-item factors = .92)	
<i>Non-planning impulsiveness</i>	
1. I plan for the future (R)	.736
2. I plan for job security (R)	.715
3. I save regularly (R)*	.431
4. I plan tasks carefully (R)	.711
5. I am a careful thinker (R)*	.552
(correlation between three- and five-item factors = .93)	
<i>Attention impulsiveness</i>	
1. I don't pay attention	.582
2. I am restless at lectures or talks	.728
3. I concentrate carefully (R)*	.479
4. I squirm at plays or lectures	.625
5. Easily bored solving thought problems*	.516
(correlation between three- and five-item factors = .91)	

Note: Items followed a 4-point, Likert-type response format (4 = almost always/always, 1 = rarely/never); (R) = reversed-coded; and, the 'asterisked items' were eliminated in order improve the psychometric properties of the corresponding factor/dimension (see Table 1).

Cell phone addiction scale (Roberts et al., 2014).

Item	Factor loading
1. I get agitated when my cell phone is not in sight	.658
2. I get nervous when my phone's battery is almost exhausted*	.602
3. I spend more time than I should on my cell phone	.821
4. I find that I am spending more and more time on my cell phone	.824

(correlation between three- and four-item factors = .97)

Note: Items followed a 7-point, Likert-type response format (7 = strongly agree, 1 = strongly disagree) and the 'asterisked item' was eliminated in order to improve the psychometric properties of the corresponding factor/dimension (see Table 1).

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