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Is Personality Related to Risks Associated with Smartphones?

Roman Yavich & Nitza Davidovitch
Ariel University, Israel

Abstract: This is a preliminary study investigating the risks associated with smartphone addiction by personality and type of phone. The results relate to personal background, personality, smartphone usage, smartphone satisfaction, level of exposure to risks, and correlations between the variables. A significant but partial correlation was found between personality and smartphone addiction, satisfaction, and level of risk. Smartphone addiction was found to be positively correlated with extraversion ($r = .21$, $p < .01$). Satisfaction was found to be correlated positively with extraversion ($r = .28$, $p < .01$), agreeableness ($r = .41$, $p < .01$), and conscientiousness ($r = .38$, $p < .01$), and negatively with emotional stability ($r = -.57$, $p < .01$). Risk was found to be negatively correlated with agreeableness ($r = -.17$, $p < .05$). Differences between types of phone in satisfaction, risk, and smartphone addiction were examined. A significant correlation ($F(4, 145) = 2.96$, $p < .05$) was found in the level of smartphone addiction, but no differences were found in smartphone satisfaction or the level of risk associated with smartphones ($F(4, 145) = 2.96$, $p > .05$ and $F(4, 145) = .45$, $p > .05$, respectively). According to the results, it seems that personality greatly affects phone usage and exposure to risks, regardless of the type of phone, and that reducing smartphone usage may be beneficial. However, further research using larger study samples is needed to confirm this.

Keywords: *big five personality traits; personality; smartphone; smartphone addiction; smartphone risk.*

Introduction

Smartphones entered our lives more than a decade ago to improve our quality of life. Few people foresaw the fast development of the cellphone and its negative effects on our lives. The cellphone quickly developed into a smartphone and became man's best friend. Most people today own smartphones, including teenagers and children who first encounter smartphones at an early and critical age. A survey conducted by the American Psychological Assosiation (APA), published in 2015, found that 53% of children between the ages of 8 and 12 already own a tablet computer and 24% own a smartphone (American Psychological Association, 2019). Smartphones have many useful functions, causing people to be dependent on them and carry them around wherever they go (car rides, classrooms, and workplaces). Moreover, smartphones are even present during times spent with friends and family, as well as intimate situations (a first date, a child's birthday party, the bedroom, and the bathroom). A survey that was conducted among 1,649 higher-education students found that they spent 97 minutes a day on the phone sending and reading text messages, 118 minutes surfing the Internet, 41 minutes on Facebook, and 51 minutes conversing (Junco & Cotten, 2012).

The smartphone is a combination of a cellphone and a computer, and it existed in the industrial market long before it entered the consumer market (Qureshi, 2012). The smartphone is equipped with the abilities needed and required by the consumers. It may be used to display pictures, play games, play video recordings, navigate, take photographs, play and record audio and video strips, send and receive email, connect to wireless Internet, and much more. The variety of smartphone functions has turned it into a status symbol in the social lives of young adults and adolescents (Roberts &

Pirog, 2013). A great future, still unknown, lies ahead for the smartphone, which may continue to develop and have positive as well as negative effects that will change the face of society. In the current study, preliminary data on smartphone overuse are presented, and the relationship between smartphone overuse and personality is examined. However, further research with a sample of at least 250 subjects is needed to verify the reselts presented here (Schönbrodt & Perugini, 2013).

Research Literature

Smartphones

Many studies conducted over the past decade show that, despite their positive contributions to our lives, smartphones also have a negative effect on us. For example, Takao et al. (2009) found that overuse of smartphones may negatively affect work performance and one's relationships with family, friends, classmates, and teachers. Although only a decade has passed since this study was published, it seems that much information is missing in the world of research because of the quick development of smartphones and the big consumer demand. According to analyst firm Gartner, more than 1.5 billion smartphones have been sold worldwide in 2017, which is 2.7% more than the amount sold in 2016 (TheMarker, 2018).

The need for research on smartphones exists in almost all areas: education, driving, health, society, parenting, and more. Most studies show that there is a need for supervision and regulations for smartphone use spanning all ages and genders, because many dangerous deficiencies are already appearing in consumers. For example, Vaidya et al. (2016) explore the social consequences of the growing widespread usage of phones, and claim that it reduces face-to-face communication, causes visual impairments resulting from radiation-induced impairments, increases the chances of involvemnt in car accidents because of driver distraction, and causes many more problems. Smartphones are even used in areas where this is forbidden, such as hospitals, courts, and gas stations.

The problematic use of smartphones is sometimes reffered to as smartphone addiction. This term is not necessarily correct, since some researchers argue that, although smartphones may be used in a negative way, this does not lead to the severe consequences created by addiction (Panova & Carbonell, 2018). Montag et al. (2019) claim that overuse of smartphones, in itself, is not necessarily indicative of addiction, since the nature and consequences of the use depend on the content. Similarly, Lowe-Calverley and Pontes (2020) claim that the smartphone itself is not addicitve but, rather, the functionalities used, namely, the content. In contrast, other researchers claim that there are biological symptoms underlying smartphone overuse which are similar to those existing in substance addiction. Although it is more difficult to determine whether a behavior is addictive than it is to identify substnace addiction, researchers claim that behavioral addiction also has defining elements, such as loss of control, dependency, and the persistence of the behavior despite its negative effects (De-Sola Gutiérrez et al., 2016). Here, we use the term smartphone addiction interchangeably with smartphone overuse, with the assumption that the problems associated with smartphone use result from addictive behavior.

Personality Types

To understand how smartphones control people's personal lives, studies were conducted using personality tests. These tests show that certain personality traits may be significantly related to smartphone addiction (Bianchi & Phillips, 2005; Butt & Phillips, 2008; Ehrenberg et al., 2008). One of the most common research questions is what characteristics in individuals put them at risk for smartphone addiction, such as personality traits, parenting styles, culture, and gender. Rees and Noyes (2007), for example, show that men are more likely than women to become addicted to online games. In research on addiction and its relation to personality, various types of questionnaires were used. One of the questionnaires used is the well-known NEO Personality Inventory (NEO PI), which examines people's personality traits according to the Five-Factor model (Big Five personality traits). This is a prominent multi-system model that was developed by psychologists Costa and McCrae (1992), and was later refined by John and Srivastava (1999). As evident from its name, the model describes five traits that make up an individual's personality:

Extraversion: Extraverted people direct their energy outward. They are socially engaged, active, assertive, and adventurous. Introverted people, who score low on the extraversion scale, are shy, quiet, and cautious.

Agreeableness: Those who score high on agreeableness are characterized by good-heartedness, tactfulness, cooperativeness, and generousity. Those who score low are cynical, harsh, rude, and selfish.

Conscientiousness: A high score on conscientiousness indicates a willingness to work hard, responsibility, practicability, and the ability to focus on goals. A low score indicates laziness, irresponsibility, enjoying the moment, and sloppiness.

Emotional stability: Emotionally stable people are calm, self-confident, and less emotionally reactive to situations. At the other end of the scale is neuroticism, a term used here as similar but not identical to neuroticsim in the Freudian sense. Some psychologists relate to neuroticism using the term emotional instability to prevent confusion. Neurotic people have feelings of inferiority and hysteria, and are full of anxiety. Neuroticism is related to the area in the brain responsible for negative feelings and anxiety, and is sometimes considered to consist of two separate componenets: anxiety and irritability.

Openness to experience: Creativity and the willingness to explore new intellectual avenues and pursue various interests, imagination, and a love of art are characteristic of individuals who rate high on openness to experience. At the other end of the scale, narrow-minded people are limited in their fields of interest.

Studies that examine smartphone usage by personality traits show inconclusive results (Davidovitch & Yavich, 2018). Lane and Manner (2011), for example, found that extraversion is strongly related to smartphone text-messaging, and that neuroticism is positively related to emailing. In contrast, Igarashi et al. (2008) found that extraversion affects smartphone overuse, and that neuroticism contributes to increased interactions. Cyders and Smith (2008) found that

impulsive people have a higher tendency to overspend money, gamble, abuse drugs, engage in dangerous sexual activity and, in general, do things that they later regret. Marengo et al. (2020) and Carvalho et al. (2018) found that, in general, neuroticism is possitively associated with smartphone use disorder. According to Horwood and Anglim (2020), neuroticism and conscientiousness are moderately related to problematic smartphone use. Maier et al. (2020) show that smartphone use while driving is related to combinations of the Big Five personality traits. Maier (2012) compares the Big Five personality traits with the cognitive-style traits in the context of technology use, and claims that the Big Five theory better explains beliefs and behaviors in this context. According to Busch (2020), openness, extraversion, and neuroticism are strongly related to problematic smartphone use.

Billieux et al. (2015) developed a model for examining smartphone overuse from a psychological viewpoint, claiming that not all smartphone overuse is strictly addictive, but is personality-based. According to their model, different personality traits and needs may result in different problematic behaviors related to smartphone use, for example: people who seek reassurance and are anxious to maintain their existing relationships tend to have, among others, low self-esteem and emotional instability, leading to addictive patterns of smartphone use, while extraverts and imulsive people may, alternatively, show risky or antisocail patterns of smartphone use.

Risks

Many risks are associated with smartphones, some of which are direct risks (health problems, sleep problems) and some of which are indirect (social problems, depression). The risks relate to various areas, for example: in the social realm, smartphone usage plainly reduces the ability of people to communicate. It causes them to have difficulty understanding intuition, lack eye contact and, in general, lose basic social skills that affect the ability to create romantic relationships or friendships. In a study conducted at the University of Illinois, it was found that romantic relationships are seriously damaged when one of the partners allows the phone to interfere with the face-to-face ineraction by making phone calls and not being completely present. Among children, it was found that the fear of missing out (FOMO), alongside screen addiction, damages the development of social skills. It also contributes and is related to obesity, sleep problems, social problems, and academic problems at school. Concerning health, severe physical injuries such as hearing damage, blurred vision, and damage to the salivary glands are evident, and there are even studies that show a relationship to cancerous tumors. A recent study published in the journal Jama Psychiatry suggests that frequent use of the media may increase the chances of developing attention deficit hyperactivity disorder (ADHD) symptoms (Ra et al., 2018).

These risks develop from a primary risk of smartphone use called cellphone dependency, which is common mainly among teenagers and adolescents. According to Ahmed et al. (2011), the term addiction is usually used for alcohol and drug abuse. Addicted individuals become disconnected from their surroundings, and this is also what happens to adolescents who become dependent on their smartphones. Krithika and Vasantha (2013) show that smartphone use by adolescents causes them to develop symptoms of behavioral addiction.

The dependency that smartphones create opens the door to many dangers, one of the biggest and most common of which is the loss of the ability to realize immediate or imminent danger. This situation creates a serious weakness that leads people into dangers that they would probably not encounter in the outside world or about which they do not have the ability to make wise decisions. The inability to make controlled decisions when using screens exposes people to great risks such as intense loneliness, and may lead to overt use of sexuality, suicide, and a search for creative ways to feel needed and important in society. Seo et al. (2012) conducted research in Korea and found that smartphone addiction in adolescents is strongly correlated with physical symptoms, depression, anxiety, delinquency, and aggression.

An example of the risks associated with smartphone use is brought in a study by Keizer-Heller (2018), who explains how cyberbullying, exclusion from WhatApp and Facebook groups, and postings of sexual pictures or videos on social media can damage a child's feeling of wellness. This negatively affects the child's ability to effectively cope with reality which, eventually, leads to feelings of dissatisfaction, lack of creativity, and lack of personal and professional self-fulfillment. FOMO is a common risk associated with smartphone addiction among youngsters. It is characterized by feelings of uneasiness and anxiety, sometimes accompanied by high levels of stress, caused by preoccupation with the fear that others are having satisfying experiences without the person who suffers from FOMO, that others have something that he lacks, or that he may be missing out on something in life because of wrong choices that he made. Those who suffer from FOMO stop paying attention to real life. They turn to social media in an attemt to find balm for their pain, anxiety, and loneliness (Scott, 2020).

In the current study, the NEO PI is used to examine the risks associated with addiction to various types of smartphones. Studies show that addiction is related to personality type. The current study examines whether personality type predicts more than just the probability of smartphone addiction, but also what risks people may be exposed to as a result of smartphone addiction: the risk for feelings of depression and loneliness, the risk for overexposure and social compliance, and more. In addition, the study examines whether the type of phone used predicts the type of risk, for example, whether Apple smartphones cause lower self esteem than Samsung smartphones, or whether old-fashioned phones hold the same risks as smartphones.

Method

Research Hypotheses

We hypothesize that smartphone addiction, smartphone satisfaction, and the level of risk in using smartphones are related to the Five Big personality traits (extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience), and that placement across the continuum of each of the Five Big personality traits determines the degree to which people are prone to smartphone addiction, satisfaction, and risk. We further hypothesize that the level of smartphone addiction varies between types of phone (iPhone, Samsung, Huawei, and Xiaomi).

Subjects

The number of subjects who participated in the research was 150. The subjects answered all the research questionnaires. The number of men was 74 (49.3%) and the number of women was 76 (50.7%). The ages of the subjects ranged between 18 and 62 years (M = 26.85, SD = 7.19). Concerning marital status, 119 subjects (79.3%) were single, 30 subjects (20.0%) declared they were married, and 1 (0.7%) declared he was divorced. Concerning the level of education, 3 subjects (2.0%) declared to have elementary-level education, 62 subjects (41.3%) declared to have high-school-level education, and 85 subjects (56.7%) declared to have academic-level education.

The differences between the various types of phone are examined. The number of subjects using iPhone smartphones was 39 (26.0%), 67 subjects (44.7%) reported using Samsung smartphones, 3 subjects (2.0%) reported using Huawei smartphones, 23 subjects (15.3%) reported using Xiaomi smartphones, and 18 reported "other."

Sample

The sample was heterogenous and the subjects were chosen randomly, from all areas of Israel. All subjects had owned cellphones for at least 1 year. The subjects were divided into groups according to the number of years they owned a cellphone. The largest group was of subjects owning phones for at least 10 years (51.7%), and the smallest group was of those owning phones between 3 and 5 years (6.7%). It is assumed, here, that the research conclusions apply to the general population as well.

Research Tools

Four questionnaires were used:

Personal and background information. This questionnaire includes four items that are related to the personal background of the subjects (gender, age, marital status, and level of education).

NEO PI. A limited version of this questionnaire was used, including 44 items that examine the personality of each subject (Walensky et al., 1998).

Questionnaire on phone usage. This questionnaire includes 20 items that examine the level of phone usage and addiction of the subjects.

Satisfaction and risk questionnaire. This questionnaire includes 41 items that examine the satisfaction of the subjects from their phones and the risks to which they are exposed. Questions 1–15 relate to satisfaction, and the other questions relate to risks. Questions 13, 14, and 15 are reverse questions. Questions 11 and 31 were later eliminated because they did not correlate with the other questions.

Statistical Analysis

Descriptive statistics were used to describe the variable characteristics. Pearson-correlation tests were used to examine the array of correlations between personality traits and phone usage, satisfaction, and risk. Also, one-factor analysis of variance (ANOVA) was performed to examine the differences between the various types of phone in satisfaction, risk, and cellphone usage. The internal reliability of all the items in each factor was assessed by Cronbach's alpha.

Results

The current study examines personality traits, smartphone addiction, smartphone satisfaction, and risks associated with smartphones based on preliminary data. Table 1 shows that all the means are relatively intermediate, with the mean of the "agreeableness" variable being high-average (M = 3.72) and the mean of the "risk" variable being low-average (M = 2.27). For all study variables, a range corresponding to the theoretical range of the scale was obtained and no abnormal scatter was found indicating very wide variance or lack of variance. For all variables, Cronbach's alpha was used to test reliability. For the "risk" variable, the reliability was found to be particularly high (0.94), and for all other variables, the reliability was found to be medium-high.

Table 1
Descriptive Statistics of the Study Variables

Variables	Mean	SD	Theoretical Range	Actual Range	A
1. Extraversion	3.21	.65	1–5	1.5–4.7	.74
2. Emotional Stability	2.80	.76	1–5	1.3–4.7	.84
3. Agreeableness	3.72	.59	1–5	2.4–5	.73
4. Conscientiousness	3.67	.57	1–5	2.5–4.8	.71
5. Openness to Experience	3.41	.63	1–5	1.5–4.7	.76
6. Smartphone Addiction	3.50	.66	1–6	1.8–5.2	.84
7. Smartphone Satisfaction	3.46	.60	1–5	1.8–4.8	.87
8. Risk	2.27	.84	1–5	1–4.9	.94

Source: Davidovitch & Yavich, 2018.

Table 2
Pearson Correlations Between the Study Variables

Variables	1	2	3	4	5	6	7
1. Extraversion	-						
2. Emotional Stability	-.27**	-					
3. Agreeableness	.19*	-.46**	-				
4. Conscientiousness	.27**	-.35**	.47**	-			
5. Openness to Experience	.24**	.02	.16*	.32**	-		
6. Smartphone Addiction	.21**	.03	.05	.07	.02	-	
7. Smartphone Satisfaction	.28**	-.57**	.41**	.38**	.07	.00	-
8. Risk	-.01	.11	-.17*	-.14	-.13	.17*	-.16

**p < .01, *p < .05
Source: Davidovitch & Yavich, 2018.

In addition to the dispersion and reliability measures, Table 2 shows the Pearson correlations between the study variables.

In testing the relationship between personality traits and smartphone addiction, a positive correlation was found between extravesion and smartphone addiction ($p < .01$, $r = .21$). However, no correlation was found between the other personality traits and smartphone addiction.

In testing the relationship between personality traits and smartphone satisfaction, positive correlations were found between satisfaction and extraversion ($p < .01$, $r = .28$), agreeableness ($p < .01$, $r = .41$) and conscientiousness ($p < .01$, $r = .38$). Also, a negative correlation was found between satisfaction and emotional stability ($p < .01$, $r = -.57$). However, no correlation was found between openness to experience and satisfaction.

In testing the relationship between personality traits and the level of risk in using smartphones, a negative correlation was found between risk and agreeableness ($p < .05$, $r = -.17$). However, no correlation was found between the other personality traits and risk.

Table 3
One-Way Analysis of Variance (ANOVA)–Smartphone Addiction

		N	Mean	SD
Smartphone Addiction	iPhone	39	3.77	.73
	Samsung	67	3.46	.62
	Huawei	3	3.50	1.08
	Xiaomi	23	3.21	.67

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.03	4	1.25	2.96	.02
Within Groups	61.59	145	.45		
Total	66.62	149			

Group (i)	Group (j)	Mean Difference	Std. Error	Sig.
iPhone	Samsung	.31	.13	.21
	Huawei	.27	.39	.97
	Xiaomi	.56	.17	.03
Samsung	iPhone	-.31	.13	.21
	Huawei	-.03	.38	1.0
	Xiaomi	.24	.15	.64
Huawei	iPhone	-.27	.39	.97
	Samsung	.03	.38	1.0
	Xiaomi	.28	.40	.97
Xiaomi	iPhone	-.56	.17	.03
	Samsung	-.24	.15	.64
	Huawei	-.28	.40	.97

Source: Davidovitch & Yavich, 2018.

To test the differences in satisfaction, risk, and smartphone addiction between the various types of phone (iPhone, Samsung, Huawei, and Xiaomi), we conducted one-way ANOVA. In testing the differences between the various types of phone concerning the degree of smartphone addiction, a significant correlation was found ($F(4, 145) = 2.96$, $p <$

.05) (Table 3), confirming the hypothesis that the level of addiction varies between types of phone. However, to examine the source of the differences, a subsequent Scheffe analysis was conducted post hoc, and it was found that the degree of iPhone addiction (Mean = 3.77, SD = 73) was indeed significantly higher than the degree of Xiaomi addiction (Mean = 3.21, SD = 67) ($p < .05$).

Table 4
One-Way Analysis of Variance (ANOVA)–Smartphone Satisfaction

		N	Mean	Std. Deviation
Smartphone Satisfaction	iPhone	39	3.41	.66
	Samsung	67	3.53	.57
	Huawei	3	2.95	.76
	Xiaomi	23	3.29	.57

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.09	4	.52	1.47	.21
Within Groups	51.75	145	.35		
Total	53.85	149			

Source: Davidovitch & Yavich, 2018.

In testing the differences between the types of phone in the level of smartphone satisfaction, no differences were found between the groups ($F(4, 145) = 2.96$, $p > .05$) (Table 4). Also, in testing the differences between the types of phone in the level of risk associated with smartphones, no differences were found between the groups ($F(4, 145) = .45$, $p > .05$) (Table 4).

Table 5
One-Way Analysis of Variance (ANOVA)–Risk

		N	Mean	Std. Deviation
Smartphone Satisfaction	iPhone	39	2.32	.89
	Samsung	67	2.25	.88
	Huawei	3	2.45	.40
	Xiaomi	23	2.39	.80

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.30	4	.32	.45	.77
Within Groups	105.02	145	.72		
Total	106.32	149			

Source: Davidovitch & Yavich, 2018.

In conclusion, the hypothesis that the Five Big personality traits are related to smartphone addiction, satisfaction, and risk was partially confirmed: a positive correlation was found between extraversion and smartphone addiction, but no correlation was found between the other personality traits and smartphone addiction; except for openness to experience, correlations were found between the personality traits and satisfaction; and a negative correlation was found between agreeableness and risk, but no correlation was found between the other personality traits and risk. In testing the differences between the various types of phone, the hypothesis that there are differences between them in the degree of smartphone addiction was confirmed, but no differences were found between them in satisfaction or in the degree of risk associated with smartphones.

Discussions and Conclusion

The current study examined the personality traits of smartphone users with the aim of examining the users' level of smartphone addiction, satisfaction, and risk associated with smartphones, focusing on the effect of the various types of phone (iPhone, Samsung, Huawei, and Xiaomi) on these variables. The theoretical section mentioned many studies on smartphone addiction that used personality traits to examine smartphone addiction and found a strong relationship between smartphone addiction and extraversion. The current study contributes to the literature by providing correlations based on preliminary data that validate the existence of this relationship and, in addition, suggest that there are also relationships between smarthpone satisfaction, as well as risks associated with smartphone use, and personality traits. It was found that extraversion, agreeableness, and conscientiousness are related to increased smartphone satisfaction, while emotional stability is negatively correlated with smartphone satisfaction, meaning that emotionally stable people are not satisfied with their smartphones.

According to previous studies and the results of the current study, it seems that extraverts, who are more socially invovled, impulsive and, in general, have a greater desire than others to experience life, tend to use their smartphones as a quick and easy way to achieve their needs, which puts them at risk. It is not surprising that extraverts are very satisfied with their smartphones, but it seems that agreeableness and conscientiousness are also related to smartphone satisfactin. This may be because it is easy for people with these personality types to achieve their goals and needs through smarphones (for example, smartphones help conscientious people be more organized through the smartphone calendar and task board). Surprisingly, emotionally stable people are not satisfied with their smartphones. This may be because smartphones make it difficult to emotionally detach, and using them often arouses a wide variety of emotions.

Regarding the various types of phone, no past research on smartphone addiction, satisfaction, and risk associated with smartphone addiction was conducted. The results of the current study indicate that there is no difference between the various types of phone in smartphone satisfaction or risk associated with smartphone addiction, but iPhone users are more addicted than Xiaomi users. It may be concluded that most of the cellular companies use the same methods to keep users connected to their smartphones, and continuously update the devices so that they are easy to use or, in other words, easily addictive. As new types of phones are developed, further research will be needed to examine their effects, as well. According to the current research, it seems that smartphone addiction is related to personality type and risk. In addition, it may be concluded that smartphones encourage users to be dependent on them and stop using their cognitive and emotional abilities, thereby making the users disabled or sick. However, further research using larger study samples is needed to confirm these results.

It seems that people like to choose the easy path that requires less of an effort and less energy. It is easier for people to send someone their photo than to describe themselves to the other person and let the person get to know them though words, and it seems that people enjoy sending photos of their vacations more than actually enjoying the vacations. It seems that people are so afraid of missing out on life that they simply do miss out. So, until further research discovers

ways to live with our technological friend the smartphone, we recommend starting to train anxiety as if it were a muscle and, like in the plank challenge, try to turn off the smartphone every day during an activity when this is difficult to do: first for a minute, the next day for two minutes, and so on, until the anxiety muschle becomes strong and it becomes easier to enjoy the surroundings for a longer period without suffering.

In the current study, it was found that risks associated with smartphones are related to the type of phone used. Personality type serves as a key to dealing with the phenomonon of addiction. Specifically in the technological age, there is a need to examine how technology affects personality type so that we can teach people the proper way to use smartphones. The way to educate people on the proper use of technology is through the individual's personality.

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Corresponding Author Contact Information:

Author name: Roman Yavich

University, Country: Ariel University, Israel

Email: romany@ariel.ac.il

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