

Persuasion Design and Behavior Change Intent Regarding Smartphone Use

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Abstract

Smartphones are a useful and vital tool; however, they are full of highly addictive content.

Therefore, it is a challenge to design strategies that reduce its overuse successfully. This study investigated the effect of message orientation and personality type on the participant's intention to reduce smartphone use. The experiment had a 2x2 between-subjects factorial design.

Fifty-nine participants were randomly assigned to read a One-sided or a Two-sided version of an article about smartphone use. Then, they completed a questionnaire to attribute them to a Type-A or Type-B personality. Finally, they answered the Behavioral Change Intent to measure their intention to reduce their future smartphone use. Contrary to previous research, the results show that that message-sidedness and personality type did not affect Behavior Change Intent and that there was no significant interaction between both variables. Future research in health prevention should investigate actions rather than behavioral intentions.

Keywords: personality type, message-sidedness, Type-A personality, persuasion, health communications.

The use of smartphones has revolutionized the way humans interact with the world. Smartphones are a ubiquitous tool in the contemporary lifestyle. According to studies conducted by the Pew Research Center (2019), 81% of Americans own smartphones. While the benefits of this technology are obvious, its overuse has several adverse consequences. Smartphones are filled with highly addictive content; therefore, it is a great challenge to reduce their excessive use. In a recent study, Markowitz (2015) found that participants look at their smartphones every 18 minutes. As with any other addictive behavior, this checking habit is maintained even in dangerous situations (American Psychiatric Association, 2013). Therefore, it is crucial to research effective ways to regulate the time and frequency of smartphone use. The message format can play an essential role in designing persuasion strategies to reduce smartphone use. It is necessary to understand if one-sided or two-sided messages are more effective in lowering smartphone use. It is also crucial to know whether the same approach should be used with people with different personalities. There might be a relationship between the subject's personality traits and the message format they respond best to.

Persuasive communications are the foundation of any message that aims to generate a change in opinion, attitude, or behavior. Multiple factors influence the persuasiveness of a message. External factors of message design, such as message-sidedness (Allen, 1991; Cornelis et al., 2014) and the inclusion of refutational arguments (McCroskey et al., 1972), significantly influence persuasion. Likewise, internal characteristics such as prior beliefs (Vainio et al., 2018), awareness of persuasive intention (Golnar et al., 2014; Jones & Brehm, 1970; Rosnow, 1968), personality traits (Hesapçı & Sunar, 2008; Orji et al., 2017; Oyibo et al., 2017), and issue involvement (Cornelis et al., 2014) also influence persuasion. In particular, message-sidedness has been studied as a persuasive factor. Message-sidedness refers to the format in which a

persuasive message is presented, which can be one-sided or two-sided. One-sided statements include only positive or negative arguments about a topic or product. On the other hand, two-sided messages can consist of both favorable and unfavorable information about the issue in question. Research on message-sidedness has often led to ambiguous findings due to a lack of standard messages and operationalizations (Cleve, 2015). Each research area measures persuasion effectiveness in a particular way, such as advertising responsiveness, product evaluation, opinion change, behavioral intentions, etc. Therefore, the message-sidedness effect varies depending on the context and purpose of the communication.

Many studies in the commercial context found that two-sided messages are a more effective communication strategy than one-sided messages. Pechmann (1992) found that two-sided ads were more effective than one-sided ads that emphasized negatively correlated attributes. He argued that focusing on superior primary characteristics while acknowledging secondary negative attributes increased the advertiser's perceived honesty and enhanced the overall brand evaluation. Steinhart et al. (2013) experimented with cigarettes, artificial sweeteners, erectile dysfunction drugs, and hair loss prevention advertisements, which suggests that the inclusion of adverse side effects can be counterproductive over time. They concluded that including a warning message increases the number of products purchased when there is a temporal distance, such as buying a product the day after seeing the ad or ordering a future delivery. Cleve (2015) studied the impact of one-sided, two-sided unrelated attributes, and two-sided related attributes messages and issue involvement on the product source credibility, brand attitude, and behavioral intent. The findings revealed that two-sided messages that included related characteristics were significantly more effective in increasing source credibility, favorable

brand attitude, and purchase intentions at all involvement levels than the other two types of messages.

The field of opinion change also investigates the effect of message-sidedness. Rosnow (1968) studied the impact of awareness of the persuasive intent on opinion change using one-sided and two-sided communications. The studies concluded that awareness of the persuasive purpose could be a contaminating variable when studying attitude or opinion change as subjects may be motivated to please the communicator with their responses. Another research evaluated one-sided and two-sided communications' persuasiveness when participants were aware of the issue's two sides and not (Jones & Brehm, 1970). This study revealed that the overall one-sided communication style was more persuasive than the two-sided. The one-sided communication was less effective in the aware condition. The two-sided communication showed no difference between awareness conditions, probably because a two-sided message already shows both sides of the issue.

Health communication relies on persuasive strategies to implement prevention programs. In this context, the goal is not to promote a product but to promote desired behavior or discourage unwanted behavior. Therefore, different mechanisms come into play. According to Myers et al. (2010), negative cognitive and affective responses can be triggered when discouraging unhealthy behavior. However, the inclusion of positive arguments acknowledges that actions come with advantages and disadvantages, and the message is perceived as more assertive. Cornelis et al. (2014) assess two-sided messages' effectiveness as a strategy for health interventions. The authors investigated the effect of three different anti-binge drinking messages (one-sided, two-sided refutational, and two-sided non-refutational) on strongly and weakly issue-involved adolescents' binge drinking intentions. The results showed that when participants

have a strong issue involvement, two-sided messages, both non-refutational and refutational, have a more significant effect on reducing binge drinking intentions than one-sided messages.

Various investigations have demonstrated the importance of personalization for persuasive strategies to be effective. Research conducted by Orji et al. (2017) showed that adapting persuasive health games and gamified systems to personality traits increases their effectiveness. Similarly, Oyibo et al. (2017) modeled the influence of the Big Five personality traits in Cialdini's six persuasive principles. Their findings showed that participants' predominant characteristics affected their responsiveness to different influential principles. Hesapçı and Sunar (2008) studied the effect of message-sidedness in relation to self-esteem and persuasibility. This study compared one-sided, two-sided refuting, and two-sided nonrefuting messages. Their findings revealed that message-sidedness has an interaction with self-esteem. Participants with high relational self-esteem are the most influenceable, and people with low personal self-esteem are more responsive to one-sided messages. Two-sided messages were more effective on well-informed participants as they had a high issue involvement. Overall, one-sided messages were the most persuasive among the other styles of communication.

In health science research, some diseases have been linked to specific personality factors. For instance, in the 50s, Meyer Friedman and Ray Rosenman coined the concept of "Type-A" personality after observing a relationship between heart disease incidences and personality type (Petticrew et al., 2012). This construct encompasses a series of attitudes that increase the chances of suffering a cardiac event. The Type-A personality outlines a spectrum of behaviors labeled as coronary prone, such as competitiveness, time-urgency, impatience, and stress; in contrast, the Type-B personality is described as relaxed, patient, and non-competitive (Rosenman et al., 1976). Various studies also linked coronary heart disease to depression and anxiety (Friedman &

Booth-Kewley, 1987). These findings suggest that having a Type-A personality might also be linked to other health conditions. Shaygannejad et al. (2013) investigated the prevalence of personality Type-A and B among patients with Multiple Sclerosis. Sixty-five percent of the patients reported having a Type-A personality. The majority reported high levels of stress, nervousness, anxiety, and demanding tendencies compared to Type-B individuals. On the other hand, people with Type-B behavior should show opposite trends and higher physical well-being rates. Korotkov et al. (2011) demonstrated that under stress, Type-B individuals engage in more health preventive and less risk-related behaviors than those who defined themselves as Type-A.

I hypothesize that there will be a main effect of message-sidedness in which two-sided messages produce higher Behavior Change Intent than one-sided messages. According to Myers et al. (2010), two-sided messages produce greater source credibility and claim acceptance than one-sided messages. Steinhart et al. (2013) found that when the consumer experiences a temporal distance, the inclusion of side effect warnings in advertising increases sales more than when this information is not included. In the same way, according to Cornelis et al. (2014), when participants have a high degree of issue-involvement, bilateral messages (with or without refutation) have a more significant effect in reducing binge drinking intentions than unilateral statements. In this study, the participants have high issue involvement since they all are smartphone owners. I also hypothesize that there will be a main effect of personality type in which people with personality Type-B will have a higher Behavior Change Intent. Previous studies have shown that Type-B individuals engage in health preventive behaviors more than participants with Type-A personalities (Korotkov et al., 2011). Type-A character is related to cardiac conditions, such as coronary heart disease (Friedman & Booth-Kewley, 1987). Finally, I hypothesize that message-sidedness will be more impactful for Type-A personalities. They are

more likely to experience stress when reading the one-sided article than Type-B individuals. One-sided messages focus on the negative consequences of smartphone use; therefore, they might elicit a greater sense of concern and urgency than two-sided messages. He (2016) found that under stress, perfectionists make inferior decisions compared to non-perfectionists. Taking into account that perfectionism is a Type-A personality trait (Friedman & Booth-Kewley, 1987), Type-A individuals' decision-making is likely to be impaired under stress. Therefore, when exposed to a one-sided persuasive message, a Type-A person may experience more adverse emotions such as urgency and anxiety and thus display a different response than a Type-B person who doesn't share the same stress tendency.

Method

Participants

The experiment involved Fifty-nine participants. Participants included 45 (71.4%) females and 17 (27%) males between 18 and 54 with a mean age of 21. All participants in this study were volunteers. Some participants were recruited using the Carroll University Cloud-based Participant Management Software SONA or through a message with the link to the survey published in a group chat of acquaintances. Participation in this study was voluntary. Most of the participants completed the study in exchange for extra credit for academic coursework. Participants described themselves as White or Caucasian (63.8%), Hispanic or Latino/a (23.8%), Asian/Pacific Islander (6.3%). Most participants first-year students (N = 26, 41.3%), and the vast majority of the participants were single (N = 54, 93.1%). Participants were randomly assigned to read a One-sided message (N = 30) or the Two-sided message (N = 33). Participants were attributed to a Type-A (N = 33) or Type-B (N = 30) personality by a median split based on their scores on the Jenkins Activity Survey. Of the participants with Type-A personality, fifteen read

the One-sided message, and eighteen read the Two-sided message. Of the participants with Type-B personality, fifteen read the One-sided article, and fifteen read the Two-sided article.

Materials

The survey developed started with two versions of an informational article on a smartphone: One-sided (See Appendix A) and Two-sided (See Appendix B). The One-sided smartphone article included only the negative consequences of its excessive use. In comparison, the Two-sided version had the same information and also the benefits of smartphones. The Type-A or B personality measurement was an adaptation of the Jenkins Activity Survey (See Appendix C), where a higher score represented a stronger Type-A personality. This questionnaire had 20 target questions and no reverse scoring questions, from which participants selected the option that best describes them or their behavior. The second questionnaire measured the Behavior Change Intent (See Appendix D). The questionnaire included six items with actions aimed at reducing smartphone use. The participants responded with a Likert scale from 1 to 7 to indicate the probability of each statement. Lastly, a demographic page was also included (See Appendix E) at the end of the survey.

Procedure:

The experiment had a 2x2 between-subjects factorial design. Participants accessed the study link through the software SONA, directly through a text message. Then they individually completed an online survey on Qualtrics. First, they filled out the Research Consent Form, where they selected yes or no to proceed with their participation. Then they were randomly assigned to read one of the two versions of the article. Then, they completed the Jenkins Activity Survey. After that, they answer the Behavior Change Intent six items scale. Finally, they filled out the demographic's questionnaire.

Results

A 2X2 between-subject ANOVA was conducted to analyze the data. There was not a significant main effect of Personality Type, $F(1,59) < 0.01$, $p = 0.95$. Participants with Type-A personality ($M = 19.55$, $SD = 5.23$) and Type-B personality ($M = 19.60$, $SD = 4.77$) scored the same on the Behavior Change Intent scale. There was not a significant main effect of Message-sidedness, $F(1,59) = 1.46$, $p = 0.23$. Participants that read the One-sided message ($M = 20.40$, $SD = 4.87$) and the Two-sided message ($M = 18.82$, $SD = 5.03$) scored the same on the Behavior Change Intent scale. There was not a significant interaction between personality Type-And message-sidedness, $F(1,59) = 1.46$, $p = 0.23$ (see Figure 1). Participants with personality Type-A scored similarly on the Behavior Change Intent scale, whether they read the one-sided message ($M = 21.20$, $SD = 4.44$) or the two-sided message ($M = 18.17$, $SD = 5.55$). Participants with Type-B personality also had similar scores on the Behavior Change Intent scale whether they read the one-sided message ($M = 19.60$, $SD = 5.29$) or the two-sided message ($M = 19.60$, $SD = 4.37$; see Table 1).

Discussion

The hypothesis that there would be a main effect of message-sidedness in which two-sided messages produce a greater intention to change their behavior than one-sided messages was not supported by the results. Message-sidedness did not cause the participants to have more or less intention to reduce their smartphone use. The hypothesis that there would be the main effect of the personality type in which people Type-B personality would have a greater intention to change their behavior than Type-A was also not supported. People with Type-B and Type-A character had similar behavioral change intentions. Finally, the results did not support the hypothesis that there would be an interaction between message-sidedness and personality

type. Two-sided messages did not cause a greater intention to decrease smartphone use in participants with Type-A personality compared to Type-B personality. Message format did not affect the participants' intentions to reduce their smartphone use for either personality type.

Contrary to previous research, this study found that message-sidedness and personality type do not affect Behavior Change Intent and that there was no interaction between both variables. Previous studies affirm that personality traits affect persuasion. For example, Oyibo et al. (2017) found that different Big Five personality traits denote a preference for certain persuasive principles. Other authors who studied the relationship between message orientation and personality characteristics, such as self-esteem, found that the effect of message-sidedness varies according to the participant's level of relational self-esteem. Similarly, other investigations claim that message orientation affects persuasion. Cleve (2015) studied message orientation and its effect on behavioral intention. He concluded that two-sided messages that included related characteristics were significantly more effective in increasing purchase intentions than one-sided and two-sided messages with no related attributes. Similarly, (Cornelis et al., 2014) found that when participants have a strong issue involvement, two-sided messages, both non-rebuttal, and rebuttal, have a more significant effect on reducing binge drinking intentions, compared to one-sided messages. Contrariwise, Jones, and Brehm (1970) found that for opinion change, one-sided communications were more effective than two-sided communications, particularly when people did not know that there were two plausible sides to the issue.

There are several explanations for why the results of this study differ from the previous literature. Although message-sidedness and personality type were also independent variables in the studies mentioned above, each experiment used a different construct to measure persuasion

effectiveness. For example, Jones and Brehm (1970) measured a change of opinion, while this study measured Behavior Change Intent indicators of the level of persuasion. On top of that, most of the studies reviewed measured behavioral intentions rather than the desired behavior itself. For example, Cornelis et al. (2014) measured people's binge drinking intentions rather than the actual frequency of binge drinking episodes. Similarly, Cleve (2015) measured the intention to buy a product rather than the number of products purchased. Using an indirect measure of persuasion is a limitation because people's purpose differs significantly from their actual behavior.

Overall, the results did not support the theory that one-sided messages would produce an adverse emotional response in people with Type-A personalities. People in this condition had the same intentions to change their behavior as people in other conditions. Therefore, perchance unilateral messages generate similar emotional responses than bilateral messages. This experiment evaluated persuasion effectiveness by measuring the increase in intentions to undertake behavior change. Contrary to previously proposed theories, the results showed that at the level of intentions, both people with Type-A and B personalities have the same intention to reduce their smartphone use after reading any of the persuasive articles. However, what remains unknown is whether both personality types are equally effective in taking their intentions to actions.

Given that researchers have found that Type-A personality participants have more health problems than people with Type-B personality (Friedman & Booth-Kewley, 1987; Shaygannejad et al., 2013) , a possible explanation is that Type-A individuals are less efficient in executing desired change. This will mean that people of both personality types have the same intentions to

maintain healthy behaviors. However, people with Type-B personalities might be better at carrying out their intentions.

This study arises from the need to discover more effective ways to promote health and preventive behaviors. The findings of this study are particularly useful for designing strategies to reduce the use of smartphones. The analysis of possible factors that moderate persuasion makes it easier to identify which elements are most influential in the persuasion process. This research studied message-sidedness and personality type, revealing that these two variables did not significantly impact the degree of persuasion of health communications. This information will guide future initiatives to regulate problematic smartphone use in the workplace, schools, and the wider community.

This study has potential limitations. The number of participants depended on the availability of volunteers, and the sample size was small. Most of the participants were young adults and women. Therefore, conclusions do not apply to people of different age and gender profiles. The survey used for data collection did not include attention checks and reversed scoring questions. Therefore, the responses were not filtered, which could have affected the quality of the data. Also, using a dichotomous personality classification limited the number of traits evaluated and grouped many in the same category. The theory of Type-A and Type-B personality could oversimplify the construction of human personality. Using a dual approach to personality limited the amount of information on the personality profiles of the participants. Besides that, the scale used to measure the dependent variable had limited reliability. The Behavior Change Intent Scale was a self-designed instrument containing only six items and had not yet been revised for internal consistency.

In terms of methodology, the study measured the participant's intention to decrease their smartphone use rather than their behavior. Initially, this decision was made due to the complexity of measuring each participant's smartphone screen time. However, considering that the articles promote an actual behavior change, self-reported intentions may not be an appropriate element to evaluate the message's effectiveness. Instead, measuring screen time could assess the effectiveness of persuasion more accurately. Finally, the experiment did not include a third control condition where participants read an article on an unrelated topic. Therefore, it was not possible to assess whether persuasion occurred for the two persuasive messages condition (one-sided and two-sided) in comparison to a control condition (non-persuasive).

Overall, the results show that people with different personalities, when exposed to one-sided or two-sided messages, have similar intentions to reduce smartphone use. Therefore, it can be concluded that assessing personality traits and adapting persuasive communications to the resulting data would be of little importance. Instead, the findings suggest that, especially in health prevention, the research focus should shift toward actions rather than behavioral intentions. There is a notable difference between persuading to buy a product or persuading to reduce unhealthy behaviors. When the promoted behavior is the purchase of a product, limited factors hinder the desired response.

Conversely, when the promoted behavior involves reducing alcohol consumption or smartphone use, many external and internal reinforcers work against the persuasive intention. Therefore, future research in health promotion should focus on studying behavior execution rather than intentions after exposure to a persuasive message. Potentially behavioral focused research might explain the connection between personality Type-A, message-sidedness, and health preventive practices. Future research should evaluate the emotional responses to one-sided

and two-sided messages. Employing a test that measures the emotional and affective response to each message makes it possible to discover whether the unilateral messages generate more significant negative affective responses than bilateral messages. From this information, the researcher can conclude the presence of adverse reactions and whether they are reflected in the Behavior Change Intent and the desired behavior itself. Future research can directly assess emotional responses to one-sided and two-sided messages. Using a test that measures the emotional and affective response to each message format will allow discovering if unilateral messages generate greater negative affective responses than bilateral messages. Based on this information, it can be concluded whether unilateral messages cause adverse reactions and whether this phenomenon affects behavioral intention and, ultimately, behavior.

Table 1

Means and standards deviation for Behavior Change Intent as a function of 2 (Sidedness) X 2 (Personality Type) design

	Message-sidedness				Marginal	
	One-sided		Two-sided			
Personality Type	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Type-A	21.20	4.44	18.17	5.55	19.55	5.23
Type-B	19.60	5.29	19.60	4.37	19.60	4.77
Marginal	20.40	4.87	18.82	5.03		

Table 2*Tests of Between-Subjects Effects*

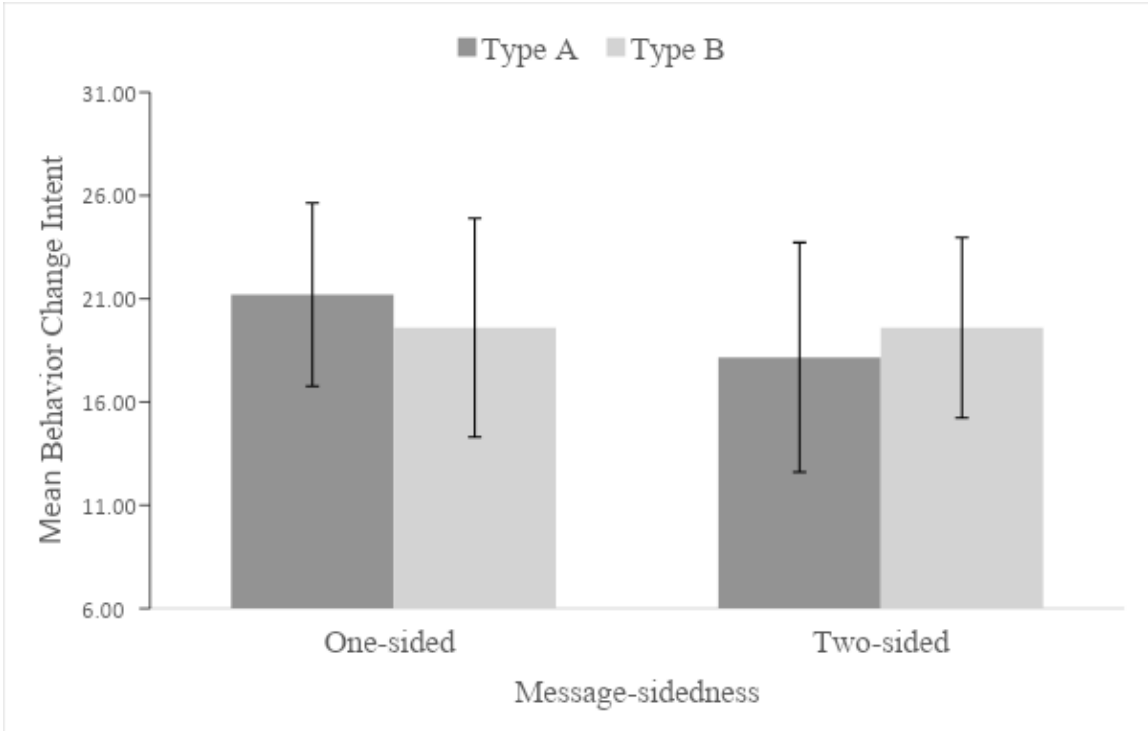
Dependent Variable: Behavior Change Intent

Source	Type III Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	Sig.
Corrected Model	75.329 ^a	3	25.11	1.02	0.39
Intercept	24154.13	1	24154.13	976.03	0.00
Personality type	0.11	1	0.11	0.00	0.95
Sidedness	36.00	1	36.00	1.46	0.23
Personality type * Sidedness	36.00	1	36.00	1.46	0.23
Error	1460.10	59	24.75		
Total	25667.00	63			
Corrected Total	1535.43	62			

a. R Squared = .049 (Adjusted R Squared = .001)

Figure 1

Mean Behavior Change Intent as a function of Message-sidedness and Personality Type



Appendix A

One-sided Message

Please carefully read the following article about smartphones and their impact on our lives.

The use of smartphones has revolutionized the way we interact with the world. This technology is ubiquitous in everyday life, the reason why we must pay attention to its impact. Although the comforts that this new technology brings to our lives are evident, its constant use can also bring negative consequences. Smartphones can prevent us from reaching states of flow at work (Montag & Walla, 2016). In a state of flow, we can get absorbed by an activity to the point that we forget space and time, and we can be very productive. But this level of engagement could not be achieved if we get distracted by our phones. Y. H. Lin et al. (2015) found that frequent short-period smartphone use decreases work efficiency. In a recent study, Markowitz (2015) found that participants check their smartphones every 18 minutes. The "checking habit" is driven by the intermittent reinforcement we get from smartphones every time we scan them for new content (Oulasvirta et al., 2012). Like the diagnosis criterion of substance-related disorders, the checking behavior is maintained even in physically hazardous situations (American Psychiatric Association, 2013). Car accidents are an unfortunate consequence of this careless behavior. Texting, using the Internet, and reaching to check your phone all increase the risk of a vehicle crash or near-crash (Klauer et al., 2014).

The global penetration of smartphones has led to unusual addictive behaviors. Problematic smartphone (PSU) use was associated with time distortion (Y. H. Lin et al., 2015), disrupted sleep patterns (Demirci et al., 2014), depression, and anxiety (Elhai et al., 2019). Additionally, PSU is associated with adverse physical consequences such as worse physical fitness (Lepp et al., 2013) and musculoskeletal hand, shoulder, and neck pain (İnal et al., 2015). In conclusion, there is an

underestimation of the addictive nature of smartphones and their effects. Therefore, people should increase their efforts to regulate the time and frequency of their daily use.

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Appendix B

Two-sided Message

Please carefully read the following article about smartphones and their impact on our lives.

The use of smartphones has revolutionized the way we interact with the world. This technology is ubiquitous in everyday life, the reason why we must pay attention to its impact. Although the comforts that this new technology brings to our lives are evident, its constant use can also bring negative consequences. Smartphones can prevent us from reaching states of flow at work (Montag & Walla, 2016). In a state of flow, we can get absorbed by an activity to the point that we forget space and time, and we can be very productive. But this level of engagement could not be achieved if we get distracted by our phones. Y. H. Lin et al. (2015) found that frequent short-period smartphone decreases work efficiency. In a recent study, Markowitz (2015) found that participants check their smartphones every 18 minutes. The "checking habit" is driven by the intermittent reinforcement we get from smartphones every time we scan them for new content (Oulasvirta et al., 2012). Like the diagnosis criterion of substance-related disorders, the checking behavior is maintained even in physically hazardous situations (American Psychiatric Association, 2013). Car accidents are an unfortunate consequence of this careless behavior. Texting, using the Internet, and reaching to check your phone all increase the risk of a vehicle crash or near-crash (Klauer et al., 2014).

The global penetration of smartphones has led to unusual addictive behaviors. Problematic smartphone use was associated with time distortion (Y. H. Lin et al., 2015), disrupted sleep patterns (Demirci et al., 2014), depression, and anxiety (Elhai et al., 2019). Additionally, PSU is associated with adverse physical consequences such as worse physical fitness (Lepp et al., 2013) as well as musculoskeletal hand, shoulder, and neck pain (İnal et al., 2015).

Up to this point, the article has focused on the excessive use of smartphones and its negative consequences. However, the great benefits that this technology has brought to society cannot be ignored. Its widely used can be attributed to its great adaptability and utility in everyday life. Smartphones are a very versatile tool. It is a single device that can perform a variety of functions. One of the things that make smartphones so vital to our daily lives is their efficiency. The speed with which you can perform tasks on a smartphone is almost unmatched. In addition to saving time and simplifying processes, smartphones can increase productivity through mobile access to calendars, reminders, emails, video conference, etc.

With the incorporation of all types of sensors, smartphones are being used as a source of information in the health sciences. The GPS, accelerometer, gyroscope, and magnetometer are used to measure satellite position and physical and biological activities. Thanks to Global Positioning System technology, people with smartphones can track friends and family, get directions, find the most convenient routes, be informed about traffic and accidents, and find available parking spots. Various types of data are being recorded with the sensors of smartphones: location, object proximity, audio, ambient light, number of steps, heart rate, temperature, among others. And all this information can be used to develop new technologies that will make actual processes more effective.

There is almost nothing that cannot be done with a smartphone. Smartphones are gaining an essential role in social media, green initiatives, global environmental monitoring (Ferster & Coops, 2013), human health monitoring (Ferster & Coops, 2013), smart cities (M. Lin & Hsu, 2014). And even space-related initiatives such as: Searching for ultra-high energy cosmic rays (Whiteson et al., 2016). The potential of smartphones is vast. They are mini laptops that put information at your fingertips. People should take advantage of the benefits that smartphones offer. However, the addictive nature of smartphones and their effects is underestimated.

Therefore, people should increase their efforts to regulate the time and frequency of their daily use.

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Appendix C

Jenkins Activity Survey

Adaptation of the Personality Type-A/B questionnaire is a modified version of the Jenkins Activity Survey (Jenkins, Zyzanski, & Rosenman, 1971).

Please answer the questions by marking the answers that are true for you. Each person is different, so there are no "right" or "wrong" answers. So, for each of the following questions, please circle the letter of the ONE best answer.

1. When you are faced with an unfamiliar problem, what do you usually do?
 - a) Address the problem immediately
 - b) Think about what to do and then take action
 - c) Go with the flow and address only the necessary.
 - d) Sit back and let things work out for themselves
2. Compared with other students, how quickly do you usually complete your class assignments?
 - a) I am usually finished before everyone else
 - b) I finish faster than most of my classmates
 - c) I finish right on time
 - d) I frequently turn in assignments late

3. Has anyone ever told you that you talk too much
 - a) Yes, often
 - b) A couple of times
 - c) Once
 - d) No, never
4. During normal conversation, how quickly do you speak?
 - a) I am the one who speaks the fastest
 - b) Faster than most people
 - c) At an average pace
 - d) Slower than most people
5. How often do you finish other people's sentences because they speak too slowly?
 - a) Always
 - b) Often
 - c) Rarely
 - d) Never
6. Have you ever been waiting at the doctor's office 30 minutes past your appointment time and have several chores to do when you get home. What do you do?
 - a) Complain to the nurse
 - b) Get impatient and somewhat angry
 - c) Check messages or play with your phone
 - d) Read a magazine
7. How often are you late for appointments?
 - a) Never
 - b) Rarely
 - c) Sometimes
 - d) Most of the time
8. When you are playing a game, how important is it for you to win?
 - a) Very important
 - b) Important
 - c) Somewhat important
 - d) Not important at all
9. How would your classmates and friends rate you?
 - a) Always hardworking and serious
 - b) Sometimes hardworking and serious
 - c) Rarely hardworking and serious
 - d) Carefree
10. How would your parents (or previous guardians) rate you?
 - a) Always helpful

- b) Mostly helpful
 - c) Sometimes helpful
 - d) Never helpful
11. How would your closest friends rate your general activity level?
- a) Too active - should slow down
 - b) Average - reasonable busy
 - c) Slow - but gets things done
 - d) Too slow - never gets anything done
12. How often do you worry about future events?
- a) All the time
 - b) Frequently
 - c) Sometimes
 - d) Never
13. When you have free time, what would you prefer to do?
- a) Catch up on work or household chores
 - b) Go Shopping
 - c) Watch TV
 - d) Sleep
14. Looking back now, how would you rate your behavior as a child?
- a) I was a little angel
 - b) I was an ordinary child
 - c) I was difficult to discipline
 - d) I was a problem child
15. You have a large amount of homework to do, but your closest friends are having a party. What do you do?
- a) Finish all of your homework and miss the party
 - b) Try to finish as early as possible and join the party
 - c) Do some homework and then join the party
 - d) Join the party
16. Do you keep a daily schedule or calendar of your plans?
- a) Yes, always
 - b) Most of the time
 - c) Sometimes
 - d) No, never
17. When you are in a group situation (like completing a group project), how do you usually act?
- a) I am the leader
 - b) I act as an active participant
 - c) I participate just when I have to
 - d) I avoid participating

18. How far in advance would you study for a major test?
 - a) Two weeks ahead or more
 - b) About one week before the test
 - c) A day or two beforehand
 - d) I usually don't study
19. What is an ordinary day in your life like?
 - a) Full of problems
 - b) Full of fun
 - c) A mixture of problems and fun
 - d) There are never enough things to keep me busy
20. How many days per week do you engage in physical exercise?
 - a) Four or more
 - b) Two or three
 - c) One
 - d) I don't exercise

Appendix D

Behavioral Change Intent Scale

Please answer the following questions with the probability of each statement.

1. I will do my best to limit my cell phone use.
 - a) Extremely likely
 - b) Somewhat likely
 - c) Neither likely nor unlikely
 - d) Somewhat unlikely
 - e) Extremely unlikely
2. I will try to spend less time on social media on my phone.
 - a) Extremely likely
 - b) Somewhat likely
 - c) Neither likely nor unlikely
 - d) Somewhat unlikely

- e) Extremely unlikely
- 3. I will try to avoid binge-watching tv shows on my phone.
 - a) Extremely likely
 - b) Somewhat likely
 - c) Neither likely nor unlikely
 - d) Somewhat unlikely
 - e) Extremely unlikely
- 4. I will try to avoid using my device before bed.
 - a) Extremely likely
 - b) Somewhat likely
 - c) Neither likely nor unlikely
 - d) Somewhat unlikely
 - e) Extremely unlikely
- 5. I will avoid using a smartphone immediately after I wake up.
 - a) Extremely likely
 - b) Somewhat likely
 - c) Neither likely nor unlikely
 - d) Somewhat unlikely
 - e) Extremely unlikely
- 6. I am going to try to cut my cell phone use in half.
 - a) Extremely likely
 - b) Somewhat likely
 - c) Neither likely nor unlikely
 - d) Somewhat unlikely
 - e) Extremely unlikely

Appendix E

Demographic Questionary

- 1. What is your age?
- 2. What is your gender?
 - a) Male
 - b) Female
 - c) Transgender M-F
 - d) Transgender F-M
 - e) Other
- 3. What is your ethnicity?
 - a) White or Caucasian
 - b) Hispanic or Latino

- c) Black or African American
 - d) Native American or American Indian
 - e) Asian / Pacific Islander
 - f) Other:
4. What is your year in school?
- a) Freshman
 - b) Sophomore
 - c) Junior
 - d) Senior
 - e) Graduate Student
 - f) Not enrolled
5. What is your marital status?
- a) Single, never married
 - b) Married or domestic partnership
 - c) Widowed
 - d) Divorced
 - e) Separated

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