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**Links of Personality Traits to Media Multitasking: Conscientiousness Predicts Mobile
Phone Use in the College Classroom**

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Declarations

Funding

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Conflicts of interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

Ethics approval

The institutional review board at the Pennsylvania State University reviewed the study protocol and deemed the study exempt.

Consent to participate

Informed consent was obtained from all individual participants included in the study.

Availability of data and material

The datasets generated and analyzed during the current study are available from the corresponding author on reasonable request.

Abstract

The present study investigated the relation among mobile phone use in the college classroom and Big Five personality traits, which had not been addressed in previous research. Undergraduate students (83 males and 92 females) whose average age was 20 ($SD = 5.1$) completed questionnaires on demographic characteristics, mobile phone use, impulse control, and Big Five personality traits. Hierarchical regression analyses were conducted to examine whether each personality trait made a unique contribution in predicting mobile phone use in the classroom after taking into consideration the contribution of impulse control in this prediction. The results show that impulse control and conscientiousness are significant, independent predictors of in-class mobile phone use over and above each other after controlling for demographic characteristics and general mobile phone use. These results suggest that some aspects of conscientiousness unexplained by impulse control may also be related to media multitasking in the college classroom, and the present study sheds light on the importance of continued research on the relation between conscientiousness and in-class media multitasking.

Keywords: media multitasking, in-class mobile phone use, conscientiousness, impulse control, college students

Links of Personality Traits to Media Multitasking: Conscientiousness Predicts Mobile Phone Use in the College Classroom

According to surveys conducted in the United States, more than 80% of college students have reported at least some usage of their mobile phone in the classroom for non-academic purposes (Baker et al., 2012; Bjornsen & Archer, 2015; Tindell & Bohlander, 2012). While such media multitasking includes texting, checking social networking sites, surfing the internet, and other online activities, Tindell and Bohlander (2012) reported that a majority of students believed that their instructors were unaware of how frequently students engaged in non-academic activities using their mobile phone. Previous research has indicated that media multitasking in the classroom is negatively associated with quiz and exam scores, final grades, and overall grade point average (GPA), after controlling for other relevant variables such as demographic characteristics, high-school GPA, ACT scores, and/or class attendance (Bellur et al., 2015; Bjornsen & Archer 2015; Lee et al., 2017; McDonald, 2013; Ravizza et al., 2014). Mobile phone use in the classroom involves multitasking, or, speaking more accurately, task switching in which individuals quickly shift between multiple cognitive tasks (Monsell, 2003). While students tend to overestimate their ability of multitasking (Williams et al., 2011), their cognitive performance would be deteriorated by working on multiple tasks at the same time due to the limited capacity of human brain (Marois & Ivanoff, 2005). Thus, as media multitasking in the classroom may result in negative academic consequences, it is important to identify potential factors that can lead to the problematic classroom behavior.

Previous research has identified multiple individual characteristics associated with media multitasking in the classroom. For example, as general usage of texting outside of the classroom is associated with the frequency of texting in the classroom (Wei & Wang, 2010), habitual

mobile phone use may be a contributor to phone use also in the classroom. In addition, as mobile phone use in the classroom (i.e., phone use in an inappropriate setting) may share some features of addictive or impulsive behaviors such as texting while driving and excessive use of internet (Hayashi & Nenstiel, 2019), impulse control is another important factor for such usage of mobile phone in inappropriate settings. For instance, impulse control has been found to be a significant predictor of the frequency of texting in the college classroom after controlling demographic characteristics and problematic mobile phone use (Hayashi & Nenstiel, 2019). Other cognitive factors, such as self-regulation (Wei et al., 2012), self-control, (Abel et al., 2012), and delayed gratification (Hayashi, 2020; Hayashi & Blessington, 2018), are also shown to predict media multitasking in the classroom. While previous research has identified other, various types of factors, such as instructional factors (e.g., Ledbetter & Finn, 2016) and social factors (e.g., Bolkan & Griffin, 2017), related to media multitasking in the classroom, further research is needed to study additional factors or characteristics of students underlying their classroom behaviors, which would help establish effective strategies to prevent such problematic behaviors and help students focus on their academic work.

In order to contribute to improving the knowledge in this area of research, the present study specifically addressed personality, which is closely related to various human behaviors (Fleeson & Gallagher, 2009). Personality is associated with general problematic mobile phone use (outside of the classroom) (e.g., Horwood & Anglim, 2018; Wilson et al., 2010), as discussed later in detail, and the aforementioned cognitive factors related to media multitasking in the classroom as well as academic motivation and achievement (Komarraju et al., 2009). Thus, personality may be another important component underlying media multitasking in the

classroom, and the present study focused on examining links between personality and problematic mobile phone use in the classroom.

Previous research has demonstrated that personality traits including Big Five traits are associated with various academic and other (e.g., social, health) outcomes for college students (e.g., Harris & Vazire, 2016; Komarraju et al., 2009; Raynor & Levine, 2009). Big Five personality traits have been widely used to address different dimensions of human personality, which include agreeableness (i.e., “trusting, cooperative, helpful, caring behaviors and attitudes toward others”), extraversion (i.e., “social outgoingness, high activity, enthusiastic interest, and assertive tendencies”), neuroticism (i.e., “negative affect tendencies, especially fear, worry, and irritability”), conscientiousness (i.e., “tendencies to be responsible, task-oriented, and planful”), and openness to new experience (i.e., “how open one is to experience” as well as the degree of explicit expression of curiosity and intellect) (Bates et al., 2010, p. 212).

Previous research has also demonstrated links of Big Five traits to (general) problematic mobile phone use that can lead to negative consequences in multiple areas of one’s life, such as excessive use of, or “addiction” to, texting and social network services (SNSs) (Horwood & Anglim, 2018; Wilson et al., 2010). Although the findings are somewhat variable as to which personality traits predict such problematic behaviors (cf. Ehrenberg et al., 2008; Nikbin et al., 2020), a majority of studies collectively suggested that problematic use of mobile phone and SNSs are associated with extraversion (e.g., Bianchi & Phillips, 2005; Jenkins-Guarnieri et al., 2012; Nikbin et al., 2020; Wilson et al., 2010), neuroticism (e.g., Ehrenberg et al., 2008; Horwood & Anglim, 2018; Nikbin et al., 2020), and/or conscientiousness (e.g., Horwood & Anglim, 2018; Nikbin et al., 2020; Wilson et al., 2010). For extroverted individuals, their mobile phone may be a tool for communicating and connecting with others as well as sensation seeking,

which may lead them to use their phone even in inappropriate settings (Bianchi & Phillips, 2005; Wilson et al., 2010). In contrast, as those with high neuroticism tend to be moody, depressive, and less self-confident, they may use their mobile phone problematically by attempting to regulate their emotional stability, distracting themselves from worries, and seeking social and emotional reassurance from others (Demirhan et al., 2016; Horwood & Anglim, 2018; Nikbin et al., 2020; Roberts et al., 2015). Unlike extraversion and neuroticism, conscientiousness has positive implications for reduced problematic use of mobile phone. Conscientious individuals tend to have self-discipline, which may help them delay short-term gratification and concentrate on their important tasks without being distracted by other stimuli nor procrastinating (Horwood & Anglim, 2018; Nikbin et al., 2020; Wilson et al., 2010).

These characteristics of extraversion, neuroticism, and conscientiousness may be relevant to various settings, possibly including college classrooms. For example, conscientiousness has been found to be a consistent predictor of academic motivation and performance such as course grades and GPA (Komarraju et al., 2009; Duckworth & Carlson, 2013). However, there had been a dearth of research addressing personality traits relating to media multitasking in the context of college classroom, and to our knowledge, no previous studies had examined whether personality traits are related to problematic mobile phone use in the classroom. In order to fill in this gap in the literature, the present study addressed personality traits as potential predictors of media multitasking in the college classroom. Specifically, we investigated whether Big Five personality traits would predict the frequency of mobile phone use in the college classroom after controlling for general mobile phone use and impulse control as well as age, gender, and years of education. Because this was an exploratory investigation, we had no *a priori* hypothesis.

Method

Participants

One hundred and eighty seven undergraduate students enrolled in introductory psychology courses at a university in the northeastern United States participated in this study. They received course credit for their participation. Twelve students who did not complete all questionnaires were excluded and their data were not analyzed. The remaining sample consisted of 83 males and 92 females. Mean age and years of higher education were 20.0 ($SD = 5.1$), and 1.4 ($SD = 1.0$), respectively. The institutional review board at the university that the second author is affiliated with reviewed the study protocol and deemed the study exempt.

Procedure and Materials

Surveys were hosted online by Qualtrics (Provo, UT). After clicking the “Agree to participate” button as a part of the informed consent, the participants completed a demographic questionnaire and questionnaires on their mobile phone use, impulse control, and Big Five personality traits.

Demographics and Mobile Phone Use

In addition to a basic demographic questionnaire that included questions on age, gender, and years of higher education, the participants answered two questions on their mobile phone use. The first question was about their general use of mobile phone: “On average, how many hours do you use your cellular phone per day?” and the participants answered this question by entering a number. The second question was about their use of mobile phone in the classroom: “How often do you engage in any cell phone activities (including but not limited to text, email, social media, web browsing, game, music, and any other apps) while you are in class?” and the

participants answered this question using a 5-point Likert scale ranging from 1 (*never*) to 5 (*always*).¹

Impulse Control

The Impulse Control subscale of the Executive Function Index (EFI; Spinella, 2005) was employed in the present study because the previous research demonstrated that only this subscale was a significant predictor of texting in the classroom (Hayashi & Nenstiel, 2019). The EFI is a self-reported measure of executive function developed with a non-clinical healthy adult population, and it demonstrated good content validity in clinical and neuroimaging studies (Miley & Spinella, 2006; Spinella, 2005). The Impulse Control subscale consists of five items with a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*very much*). The scores of negatively worded items are reversed, and higher scores indicate higher levels of Impulse Control. The Cronbach's alpha for the present sample was .62.

Big Five Personality Traits

The Big Five Inventory (BFI; John & Srivastava, 1999) is a self-reported measure of the Big Five personality traits (Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness). It consists of 44 items with a 5-point Likert-type scale ranging from 1 (*Disagree Strongly*) to 5 (*Agree Strongly*). The scores of negatively worded items are reversed, and higher scores indicate stronger tendencies of the traits. The BFI demonstrated good convergent and discriminant validity with other measures of the Big Five personality traits (Srivastava et al., 2003). Cronbach alphas for the present sample are .84 (Extraversion), .70 (Agreeableness), .79 (Conscientiousness), .77 (Neuroticism), and .71 (Openness).

Data Analyses

Correlational analyses were conducted by calculating Pearson correlation coefficients. Hierarchical linear regression analyses were conducted to examine whether each subscale of the BFI makes a unique contribution to the variance in the frequency of mobile phone use in the classroom over and above that explained by the Impulse Control subscale of the EFI after controlling for the demographic variables and hours of general mobile phone use. In Step 1, the demographic variables (age, gender, and years of education) and hours of general mobile phone use were entered, which was followed by the entries of the Impulse Control subscale and the subscales of the BFI in Steps 2 and 3, respectively. The assumptions of linear relationship, multivariate normality of residuals, homoscedasticity, and no multicollinearity were examined, and no violation to these assumptions was observed. All statistical analyses were performed with SPSS Version 26, and the statistical significance level was set at .05.

Results

Table 1 shows Pearson correlation coefficients of demographics, mobile phone use, impulse control, and Big Five personality traits. As shown in the table, the frequency of in-class phone use was significantly correlated with Age: $r(173) = -.20, p = .010$; General phone use: $r(173) = -.15, p = .044$; Impulse control: $r(173) = -.29, p < .001$; Agreeableness: $r(173) = -.21, p = .005$; Conscientiousness: $r(173) = -.31, p < .001$; and Neuroticism: $r(173) = .18, p = .015$.

Table 2 shows results of a hierarchical linear regression predicting the frequency of in-class phone use. In the first model, Age ($\beta = -.19, t = -2.45, p = .015$) was the only significant predictor of in-class phone use, and the model accounted for 6.2% of the variance, $F(4, 170) = 2.80, p = .028$. In the second model, Impulse control was entered and an additional 7.5% of the variance was accounted for, $\Delta F(1, 169) = 14.76, p < .001$. In this model, Age ($\beta = -.17, t = -2.33,$

$p = .021$) and Impulse control ($\beta = -.28, t = -3.84, p < .001$) were significant predictors of in-class phone use. In the third model, the subscales of the BFI were entered and an additional 6.5% of the variance was accounted for, $\Delta F(5, 164) = 2.65, p = .025$. In this model, Age ($\beta = -.15, t = -2.08, p = .039$), Impulse control ($\beta = -.22, t = -2.76, p = .006$), and the BFI subscale of Conscientiousness ($\beta = -.22, t = -2.54, p = .012$) were significant predictors. Overall, this model accounted for 20.2% of the variance in in-class phone use, $F(10, 164) = 4.14, p < .001$; adjusted $R^2 = .153$.

Discussion

Due to the lack of previous research on addressing personality traits relating to media multitasking in the college classroom, the present study investigated whether Big Five personality traits predicted the frequency of mobile phone use in the college classroom after controlling for demographic characteristics, general mobile phone use and impulse control.

Aligned with previous research (Hayashi & Nenstiel, 2019), the hierarchical regression analyses show that impulse control was an independent significant predictor for in-class mobile phone use. Additionally, and unique to the present study, conscientiousness, but not other Big Five traits, also significantly predicted in-class phone use after controlling for impulse control as well as demographic characteristics and general phone use.

In contrast to previous findings on personality traits and general problematic mobile phone use (e.g., Ehrenberg et al., 2008; Nikbin et al., 2020), neither extraversion nor neuroticism was a significant predictor for in-class phone use in the present study. Possibly, the context of classroom differs from other environments and situations where students use their mobile phone. For example, while extraverted students may use their mobile phone to seek sensation and social contact in a general context (Bianchi & Phillips, 2005), they are also likely to actively participate

in the classroom (Caspi et al., 2006). Class activities may provide opportunities to satisfy their social desires, so they may not necessarily be inclined to use their mobile phone and connect with others outside of the classroom for sensation seeking. In contrast, while neurotic students may be less likely to actively participate in the classroom (Caspi et al., 2006) and more likely to use their mobile phone to attempt to reduce their anxieties (Roberts et al., 2015), they may also fear possible academic failure (Komarraju et al., 2009). Their fear of performing poorly may counteract the urge to use their mobile phone in the classroom to cope with other issues outside of the classroom. Thus, other factors than extraversion and neuroticism may account for media multitasking in the specific context of college classroom. However, as there has been a dearth of research addressing links of personality traits to in-class media multitasking, the findings of the present study should be replicated in future research while examining how uniquely each personality trait can be related to the student behavior in the classroom compared to that in other contexts.

Unlike the other personality traits, conscientiousness was found to be a significant predictor for in-class phone use in the present study. Similarly, previous research has shown the inverse association between conscientiousness and general problematic or excessive phone use (Horwood & Anglim, 2018; Nikbin et al., 2020; Wilson et al., 2010) and also has found that low conscientiousness is related to specific addictive or impulsive behaviors such as substance use (Bogg & Roberts, 2004; Martens et al., 2009) and mobile phone use while driving (Sween et al., 2017). The present study contributes to the literature by additionally indicating that such an association of conscientiousness was observed for mobile phone use in the context of college classroom.

Facets of Conscientiousness and Practical Implications for Future Research

Conscientiousness involves multiple aspects or relevant constructs, and impulse control, or the ability to inhibit prepotent responses (Spinella, 2005), is one such aspect of conscientiousness (Roberts et al., 2014). In addition to having ability to inhibit impulsive urge to use their mobile phone (e.g., desire to read and respond to a text received), therefore, conscientious students may have some other characteristics or abilities to keep themselves from using their phone during class. Specifically, major aspects of conscientiousness include self-control and self-regulation, both of which contain goal-directedness as a critical feature (Hofmann et al., 2012; Roberts et al., 2014). Besides the ability to inhibit the urge to use mobile phone in the classroom, the ability to direct one's behavior toward a long-term goal, such as better exam grade, should also play an important role in students' concentrating on their academic work in the classroom.

In essence, students' engaging in class without using their (possibly distracting) mobile phone can be understood as a matter of delayed gratification, which refers to ability to resist temptation for immediate but smaller rewards in order to obtain delayed but larger rewards, indicating one's capability for self-control or self-regulation (Roberts et al., 2014). Hayashi and Blessington (2018) specifically investigated texting in the classroom as a delayed-gratification problem by addressing the process called *delay discounting*, in which the decision maker subjectively devalues delayed or future rewards. This was based on the previous research demonstrating that delay discounting has been linked to various technology-related impulsive behaviors, such as internet addiction (e.g., Saville et al., 2010), texting while driving (Hayashi et al., 2015), and general media multitasking (Schutten et al., 2017). In the classroom, students face a trade-off between delayed but larger rewards (e.g., better exam and course grades) and

immediate but smaller rewards (e.g., social interaction through text messaging) (Hayashi & Blessington, 2018). Possibly, more conscientious students concentrate on class activities while not using their mobile phone because they are better at directing their behavior toward their long-term goals (e.g., maintaining good GPA, college graduation), whereas less conscientious students may use their mobile phone because they fail to direct their behavior toward the long-term goals.

Considering the possible involvement of these aspects of conscientiousness (i.e., impulse control and delayed gratification) in in-class media multitasking, an effective intervention strategy would be to identify less conscientious students and teach them skills to inhibit their urge to use a mobile phone in the classroom and/or to (re)appreciate the value of their long-term goals (e.g., good GPA). The former can be achieved by inhibition control training, in which participants learn to inhibit their urge to engage in an impulsive behavior (see Allom et al., 2016, for a meta-analysis). The latter can be achieved by Episodic Future Thinking (EFI), which extends one's temporal window over which the value of delayed reward is integrated, resulting in enhanced salience of the long-term outcomes (see Stein et al., 2016, for details). Although these kinds of training are expected to reduce students' in-class media multitasking and help them concentrate in classes to achieve their long-term goals, this area of research is lacking. Additional studies are needed to evaluate the effectiveness of the intervention strategies and provide more conclusive explanations on which specific aspects of conscientiousness are involved in the in-class student behavior.

Limitations

Three limitations of the present study should be noted. First, due to the lack of previous research on personality traits and in-class mobile phone use, we addressed this research topic in an exploratory manner using a student sample from one university. However, findings for such a

sample may not be generalizable for the general college student population and can be limited. Future research is needed to examine whether the present findings can be replicated by using diverse samples from multiple universities.

Second, the present study used a correlational approach, which does not allow for making a causal conclusion on the direction of the associations of conscientiousness as well as impulse control with mobile phone use in the classroom. Although personality traits such as conscientiousness have been considered relatively stable and potentially influential for human behaviors, they are not static and can change with life experiences (Bates et al., 2010; Caspi & Shiner, 2006). Thus, it is possible that continued or habitual use of students' mobile phone in the classroom can influence their personality characteristics that can be observed beyond the classroom, rather than that personality traits affect in-class mobile phone use. In addition, there may be third variables not measured in the present study that can affect both personality traits and in-class mobile phone use. Due to its correlational nature, the present study cannot eliminate these possibilities in order to conclude that conscientiousness leads to mobile phone use in the classroom.

Finally, the present study used self-report measures for data collection. Particularly for mobile phone use, as students may have underreported their frequency of texting in the classroom (Wentland, 1993), it would be ideal to collect objective data by observing their actual texting behaviors. Measures of personality traits could also have been improved by supplementing them with other methods (e.g., reports from others who know participants well), though self-report measures are considered as valid as other methods of assessment for personality traits (Roberts et al., 2014). Adopting or adding more behavioral or objective measures for the variables of interest will help obtain more robust results in future research.

Conclusions

The present study investigated the associations of personality traits with media multitasking in the college classroom, which previous research had not addressed. The results of the present study indicate that conscientiousness predicted mobile phone use in the classroom above and beyond general phone use and impulse control as well as demographic characteristics. This finding suggests that future research may need to consider targeting less conscientious students to develop effective intervention strategies for reducing mobile phone use in the classroom. Future research should also investigate specific aspects of or factors related to conscientiousness predicting in-class media multitasking. Delayed gratification, particularly its underlying process of delay discounting, may be one such factor that warrants thorough investigations. The present study contributes to the literature by indicating such directions of future research as well as suggesting the potential role of conscientiousness in media multitasking in the college classroom, which can facilitate further investigations aimed at promoting students' academic success by reducing in-class media multitasking and minimizing its negative consequences.

References

- Abel, J. I., Buff, C. L., & Abel, J. P. (2012). Can they defer the cellular lure? College students' self-control and cell phone usage. *Review of Business Research, 12*(4), 101–106.
- Allom, V., Mullan, B., & Hagger, M. (2016). Does inhibitory control training improve health behaviour? A meta-analysis. *Health Psychology Review, 10*(2), 168-186. <https://doi-org.ezaccess.libraries.psu.edu/10.1080/17437199.2015.1051078>
- Baker, W. M., Lusk, E. J., & Neuhauser, K. L. (2012). On the use of cell phones and other electronic devices in the classroom: Evidence from a survey of faculty and students. *Journal of Education for Business, 87*(5), 275–289. <https://doi.org/10.1080/08832323.2011.622814>
- Bates, J. E., Schermerhorn, A. C., & Goodnight, J. A. (2010). Temperament and personality through the life span. In R. M. Lerner, M. E. Lamb, & A. M. Freund (Eds.), *The handbook of life-span development (Vol. 2)* (pp. 208–253). John Wiley & Sons.
- Bellur, S., Nowak, K. L., & Hull, K. S. (2015). Make it our time: In class multitaskers have lower academic performance. *Computers in Human Behavior, 53*, 63–70. <https://doi.org/10.1016/j.chb.2015.06.027>
- Bianchi, A., & Phillips, J. G. (2005). Psychological predictors of problem mobile phone use. *CyberPsychology & Behavior, 8*(1), 39–51. <https://doi.org/10.1089/cpb.2005.8.39>
- Bjornsen, C. A., & Archer, K. J. (2015). Relations between college students' cell phone use during class and grades. *Scholarship of Teaching and Learning in Psychology, 1*(4), 326–336. <https://doi.org/10.1037/stl0000045>

- Bogg, T., & Roberts, B. W. (2004). Conscientiousness and health-related behaviors: A meta-analysis of the leading behavioral contributors to mortality. *Psychological Bulletin*, *130*(6), 887–919. <https://doi.org/10.1037/0033-2909.130.6.887>
- Bolkan, S., & Griffin, D. J. (2017). Students' use of cell phones in class for off-task behaviors: The indirect impact of instructors' teaching behaviors through boredom and students' attitudes. *Communication Education*, *66*(3), 313–329. <https://doi.org/10.1080/03634523.2016.1241888>
- Caspi, A., Chajut, E., Saporta, K., & Beyth-Marom, R. (2006). The influence of personality on social participation in learning environments. *Learning and Individual Differences*, *16*(2), 129–144. <https://doi.org/10.1016/j.lindif.2005.07.003>
- Caspi, A., & Shiner, R. L. (2006). Personality development. In W. Damon & R. Lerner (Series Eds.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology, Vol. 3. Social, emotional, and personality development* (6th ed., pp. 300–365). Wiley.
- Demirhan, E., Randler, C., & Horzum, M. B. (2016). Is problematic mobile phone use explained by chronotype and personality? *Chronobiology International*, *33*(7), 821–831. <https://doi.org/10.3109/07420528.2016.1171232>
- Duckworth, A. L., & Carlson, S. M. (2013). Self-regulation and school success. In B. W. Sokol, F. M. E. Grouzet, & U. Müller (Eds.), *Self-regulation and autonomy: Social and developmental dimensions of human conduct* (pp. 208–230). Cambridge University Press
- Ehrenberg, A., Juckes, S., White, K. M., & Walsh, S. P. (2008). Personality and self-esteem as predictors of young people's technology use. *Cyberpsychology & Behavior*, *11*(6), 739–741. <https://doi.org/10.1089/cpb.2008.0030>

Ellis, D. A., Davidson, B. I., Shaw, H., & Geyer, K. (2019). Do smartphone usage scales predict behavior?. *International Journal of Human-Computer Studies*, *130*, 86-92.

<https://doi.org/10.1016/j.ijhcs.2019.05.004>

Fleeson, W., & Gallagher, P. (2009). The implications of Big Five standing for the distribution of trait manifestation in behavior: Fifteen experience-sampling studies and a meta-analysis. *Journal of Personality and Social Psychology*, *97*(6), 1097–1114.

<https://doi.org/10.1037/a0016786>

Harris, K., & Vazire, S. (2016). On friendship development and the Big Five personality traits. *Social and Personality Psychology Compass*, *10*(11), 647–667.

<https://doi.org/10.1111/spc3.12287>

Hayashi, Y. (2020). Attitude moderates the relation between frequency of media multitasking in the classroom and delay discounting. *The Psychological Record*. Advance online publication.

Hayashi, Y., & Blessington, G. P. (2018). A behavioral economic analysis of media multitasking: Delay discounting as an underlying process of texting in the classroom.

Computers in Human Behavior, *86*, 245–255. <https://doi.org/10.1016/j.chb.2018.04.049>

Hayashi, Y., & Nenstiel, J. N. (2019). Media multitasking in the classroom: Problematic mobile phone use and impulse control as predictors of texting in the classroom. *Current Psychology*. Advance online publication.

<https://doi.org/10.1007/s12144-019-00395-7>

Hayashi, Y., Russo, C. T., & Wirth, O. (2015). Texting while driving as impulsive choice: A behavioral economic analysis. *Accident Analysis & Prevention*, *83*, 182–189.

<https://doi.org/10.1016/j.aap.2015.07.025>

- Hofmann, W., Schmeichel, B. J., & Baddeley, A. D. (2012). Executive functions and self-regulation. *Trends in Cognitive Sciences*, *16*(3), 174–180.
<https://doi.org/10.1016/j.tics.2012.01.006>
- Horwood, S., & Anglim, J. (2018). Personality and problematic smartphone use: A facet-level analysis using the Five Factor Model and HEXACO frameworks. *Computers in Human Behavior*, *85*, 349–359. <https://doi.org/10.1016/j.chb.2018.04.013>
- Jenkins-Guarnieri, M. A., Wright, S. L., & Hudiburgh, L. M. (2012). The relationships among attachment style, personality traits, interpersonal competency, and Facebook use. *Journal of Applied Developmental Psychology*, *33*(6), 294–301.
<https://doi.org/10.1016/j.appdev.2012.08.001>
- John, O. P., & Srivastava, S. (1999). The Big Five Trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John, *Handbook of personality: Theory and research* (pp. 102–138). Guilford Press.
- Komarraju, M., Karau, S. J., & Schmeck, R. R. (2009). Role of the Big Five personality traits in predicting college students' academic motivation and achievement. *Learning and Individual Differences*, *19*(1), 47–52. <https://doi.org/10.1016/j.lindif.2008.07.001>
- Ledbetter, A. M., & Finn, A. N. (2016). Why do students use mobile technology for social purposes during class? Modeling teacher credibility, learner empowerment, and online communication attitude as predictors. *Communication Education*, *65*(1), 1–23.
<https://doi.org/10.1080/03634523.2015.1064145>
- Lee, S., Kim, M. W., McDonough, I. M., Mendoza, J. S., & Kim, M. S. (2017). The effects of cell phone use and emotion-regulation style on college students' learning. *Applied Cognitive Psychology*, *31*(3), 360–366. <https://doi.org/10.1002/acp.3323>

- Marois, R., & Ivanoff, J. (2005). Capacity limits of information processing in the brain. *Trends in Cognitive Sciences*, 9(6), 296–305. <https://doi.org/10.1016/j.tics.2005.04.010>
- Martens, M. P., Karakashian, M. A., Fleming, K. M., Fowler, R. M., Hatchett, E. S., & Cimini, M. D. (2009). Conscientiousness, protective behavioral strategies, and alcohol use: Testing for mediated effects. *Journal of Drug Education*, 39(3), 273–287. <https://doi.org/10.2190/de.39.3.d>
- McDonald, S. (2013). The effects and predictor value of in-class texting behavior on final course grades. *College Student Journal*, 47(1), 34–40.
- Miley, W. M., & Spinella, M. (2006). Correlations among measures of executive function and positive psychological attributes in college students. *The Journal of General Psychology*, 133(2), 175–182. <https://doi.org/10.3200/GENP.133.2.175-182>
- Monsell, S. (2003). Task switching. *Trends in Cognitive Sciences*, 7(3), 134–140. [https://doi.org/10.1016/S1364-6613\(03\)00028-7](https://doi.org/10.1016/S1364-6613(03)00028-7)
- Nikbin, D., Iranmanesh, M., & Foroughi, B. (2020). Personality traits, psychological well-being, Facebook addiction, health and performance: Testing their relationships. *Behaviour & Information Technology*. Advance online publication. <https://doi.org/10.1080/0144929X.2020.1722749>
- Ravizza, S. M., Hambrick, D. Z., & Fenn, K. M. (2014). Non-academic internet use in the classroom is negatively related to classroom learning regardless of intellectual ability. *Computers & Education*, 78, 109–114. <https://doi.org/10.1016/j.compedu.2014.05.007>
- Raynor, D. A., & Levine, H. (2009). Associations between the five-factor model of personality and health behaviors among college students. *Journal of American College Health*, 58(1), 73–82. <https://doi.org/10.3200/JACH.58.1.73-82>

- Roberts, B. W., Lejuez, C., Krueger, R. F., Richards, J. M., & Hill, P. L. (2014). What is conscientiousness and how can it be assessed? *Developmental Psychology, 50*(5), 1315–1330. <https://doi.org/10.1037/a0031109>
- Roberts, J. A., Pullig, C., & Manolis, C. (2015). I need my smartphone: A hierarchical model of personality and cell-phone addiction. *Personality and Individual Differences, 79*, 13–19. <https://doi.org/10.1016/j.paid.2015.01.049>
- Saville, B. K., Gisbert, A., Kopp, J., & Telesco, C. (2010). Internet addiction and delay discounting in college students. *The Psychological Record, 60*(2), 273-286. <https://doi.org/10.1007/bf03395707>
- Schutten, D., Stokes, K. A., & Arnell, K. M. (2017). I want to media multitask and I want to do it now: Individual differences in media multitasking predict delay of gratification and system-1 thinking. *Cognitive Research: Principles and Implications, 2*(8), 1–10. <https://doi.org/10.1186/s41235-016-0048-x>
- Spinella, M. (2005). Self-rated executive function: Development of the executive function index. *International Journal of Neuroscience, 115*(5), 649–667. <https://doi.org/10.1080/00207450590524304>
- Srivastava, S., John, O. P., Gosling, S. D., & Potter, J. (2003). Development of personality in early and middle adulthood: Set like plaster or persistent change? *Journal of Personality and Social Psychology, 84*(5), 1041–1053. <https://doi.org/10.1037/0022-3514.84.5.1041>
- Stein, J. S., Wilson, A. G., Koffarnus, M. N., Daniel, T. O., Epstein, L. H., & Bickel, W. K. (2016). Unstuck in time: Episodic future thinking reduces delay discounting and cigarette smoking. *Psychopharmacology, 233*, 3771–3778. <https://doi.org/10.1007/s00213-016-4410-y>

- Sween, M., Ceschi, A., Tommasi, F., Sartori, R., & Weller, J. (2017). Who is a distracted driver? Associations between mobile phone use while driving, domain-specific risk taking, and personality. *Risk Analysis*, *37*(11), 2119–2131. <https://doi.org/10.1111/risa.12773>
- Tindell, D. R., & Bohlander, R. W. (2012). The use and abuse of cell phones and text messaging in the classroom: A survey of college students. *College Teaching*, *60*(1), 1–9. <https://doi.org/10.1080/87567555.2011.604802>
- Wei, F.-Y. F., & Wang, Y. K. (2010). Students' silent messages: Can teacher verbal and nonverbal immediacy moderate student use of text messaging in class? *Communication Education*, *59*(4), 475–496. <https://doi.org/10.1080/03634523.2010.496092>
- Wei, F.-Y. F., Wang, Y. K., & Klausner, M. (2012). Rethinking college students' self-regulation and sustained attention: Does text messaging during class influence cognitive learning? *Communication Education*, *61*(3), 185–204. <https://doi.org/10.1080/03634523.2012.672755>
- Wentland, E. J. (1993). *Survey responses: An evaluation of their validity*. Academic Press.
- Williams, J. A., Berg, H., Gerber, H., Miller, M., Cox, D., Votteler, N., et al. (2011). “I get distracted by their being distracted”: The etiquette of in-class texting. *Eastern Educational Journal*, *40*(1), 48–56.
- Wilson, K., Fornasier, S., & White, K. M. (2010). Psychological predictors of young adults' use of social networking sites. *Cyberpsychology, Behavior, and Social Networking*, *13*(2), 173–177. <https://doi.org/10.1089/cpb.2009.0094>

Footnote

¹Although users may underreport their mobile phone use (cf. Wentland, 1993), previous research has shown that self-reported mobile phone use is moderately correlated with the objective measure collected through a mobile phone application ($r = 0.48$; Ellis et al., 2019). Because the primary analysis of the present study was correlational in nature (i.e., not investigating the exact duration of mobile phone use in the classroom), we believe the use of the self-reported data was acceptable for this exploratory study.

Table 1

Pearson Correlation Coefficients of Demographics, Phone Use, Impulse Control, and Big Five Traits

	1	2	3	4	5	6	7	8	9	10	11
1. Age	-										
2. Gender (F = 0)	.03	-									
3. Education	.22**	.11	-								
4. General phone use	-.06	-.25**	-.06	-							
5. Impulse control	.09	.03	.16*	-.05	-						
6. Extraversion	-.08	-.09	-.08	.07	-.16*	-					
7. Agreeableness	.12	-.11	.10	.05	.23**	.11	-				
8. Conscientiousness	.06	.01	.09	-.14	.23**	.28**	.38**	-			
9. Neuroticism	-.20**	-.37**	-.08	.11	-.20**	-.17*	-.17*	-.33**	-		
10. Openness	.02	.05	.06	.02	-.17*	.36**	.25**	.27**	-.06	-	
11. In-class phone use	-.20**	-.10	-.05	.15*	-.29**	.04	-.21**	-.31**	.18*	-.08	-

Note. * $p < .05$. ** $p < .01$.

Table 2

Hierarchical Linear Regression Predicting In-Class Phone Use

Variable	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>R</i> ²	<i>F</i>	ΔR^2	ΔF
Model 1					.062	2.80*		
Age	-.04	.01	-.19	-2.45*				
Gender	-.13	.15	-.07	-0.86				
Education	.01	.07	.01	0.13				
General phone use	.03	.02	.12	1.62				
Model 2					.137	5.37***	.075	14.76***
Age	-.03	.01	-.17	-2.33*				
Gender	-.13	.15	-.07	-0.90				
Education	.05	.07	.05	0.69				
General phone use	.03	.02	.11	1.55				
Impulse control	-.07	.02	-.28	-3.84***				
Model 3					.202	4.14***	.065	2.65*
Age	-.03	.01	-.15	-2.08*				
Gender	-.14	.16	-.07	-0.87				
Education	.07	.07	.07	1.02				
General phone use	.02	.02	.09	1.18				
Impulse control	-.05	.02	-.22	-2.76**				
Extraversion	.01	.01	.08	0.97				
Agreeableness	-.01	.02	-.07	-0.90				
Conscientiousness	-.04	.01	-.22	-2.54*				
Neuroticism	.00	.01	.01	0.06				
Openness	-.01	.01	-.07	-0.83				

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.