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Research Article

Cross-cultural Differences in the Relationship between Personality Traits and Mobile and Internet Addiction

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Background

The widespread use of the Internet and mobile phones has introduced significant addiction-related challenges.

Objective

This study investigates the role of personality in mobile phone and internet addiction across two cultural contexts.

Methods

A total of 1,075 Czech (84.9% female) and 710 Chinese (54.6% female) university students participated in this study. Data were collected using the Smartphone Addiction Scale, Internet Addiction Test, and Ten-Item Personality Measure, and analyzed using multiple regression models to assess cross-cultural differences.

Results

Significantly higher addiction rates were found among Chinese students. Among Czech students, internet addiction decreased with higher levels of conscientiousness (b=−1.11), emotional stability (b=−0.60), and openness (b=−0.42), explaining 16% of the variance. For Chinese students, only conscientiousness (b=−1.23) had a significant effect, explaining 6% of the variance. Openness differed significantly between groups (p=0.02). Regarding mobile phone addiction, both groups showed similar patterns, with addiction decreasing as agreeableness, conscientiousness, emotional stability, and openness increased. Conscientiousness had a stronger impact among Chinese students (difference=0.98, p=0.008).

Conclusion

Further analysis indicated that the influence of personality on addiction varied by sex and country. These findings underscore the importance of personality and cultural factors in understanding technology addiction.

1. INTRODUCTION

Although the widespread use of the internet and mobile phones has a long history, it was only in the past few decades – with their multifunctional capabilities meeting a wide range of user needs – that they became attractive to the point of potential addiction for some individuals.[1-4] With the rise of smartphones, nearly all internet functionalities merged with the basic functions of mobile phones. The smartphone became a convenient, readily available tool offering benefits such as advanced communication, social networking, studying, gaming, shopping, and mobile payments. However, this great convenience inevitably brought with it negative consequences. What became visible to casual observers in public spaces – people walking with their "heads down" – was eventually described in mainstream media as "netolism" (internet addiction in all its forms) or "nomophobia" (fear of being without a mobile phone). These phenomena soon

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attracted scholarly attention. Research into Internet and mobile phone addiction gained momentum in the first decade of the 21st century. Notably, Griffiths identified technological addictions as early as 1995 and later developed the components model of addiction.[5,6]

Among the many negative effects associated with excessive Internet and mobile phone use, researchers have studied issues such as impaired face-to-face communication and reduced interpersonal intimacy,[4,7] sleep disturbances, bedtime procrastination, fatigue,[8-10] declines in physical health and self-esteem,[11,12] increased stress,[13,14] higher prevalence of depression and anxiety,[15-18] diminished classroom attention and academic performance,[19,20] and experiences of bullying and childhood physical neglect.[21,22]

Naturally, with all the consequences of addictive internet and mobile phone use, the question arises regarding the predispositions and variables associated with addiction-related behavior. Age and gender have been examined as factors in addiction.[23-25] As suggested by one study,[24] age is a significant predictor of addiction – teenagers and young adults are clearly high-risk groups – while gender appears to be less significant. Other factors, such as self-compassion,[26,27] impulsivity and self-control,[28,29] attention deficit disorder,[30,31] stress,[32-34] sense of purpose and life satisfaction,[13,35] self-esteem, insecure attachment styles, unbalanced family functioning, social exclusion,[36-38] and psychiatric symptoms,[39-41] have also been studied. Many of these variables fall under the broader category of personality traits, which have themselves been researched as predictors of Internet and mobile phone addiction.[42] Contrary to this, one comprehensive study[43] that identified female gender as a contributing factor to smartphone addiction also suggested that personality traits might significantly influence predisposition to addiction. This highlights the potential for meaningful insights into how personal factors relate to internet and mobile phone addiction.

The Big Five Personality Traits – openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism – have long been established as a robust framework in personality psychology. When applied to drug addiction,[44] a significant relationship was found between these traits and susceptibility to addiction. Specifically, neuroticism (p = 0.031) and openness (p = 0.043) with regression coefficients of 0.584 and 0.586, respectively, showed positive and significant effects on addiction susceptibility. In contrast, extraversion (p = 0.023), agreeableness (p = 0.038), and conscientiousness (p < 0.001) with regression coefficients of −0.639, −0.186, and −1.342, respectively, had negative and significant effects. These findings suggest that the Big Five Personality Traits could also be applicable to the study of internet and mobile phone addiction. Supporting this view are studies on Instagram addiction and its relation to Big Five traits,[43] the mediating role of coping style between Big Five personality traits and adolescent internet addiction,[45] and the moderating role of gender in the relationship between Big Five personality traits and smartphone addiction.[46]

Although internet and mobile phone addiction has been studied extensively, population-level studies and cross-cultural comparisons focusing on the effects of personality traits on physical, social, and psychological health remain rare.[47,48] While numerous studies have been conducted in diverse cultural contexts – such as Korean, Turkish, Persian, and Chinese populations – comparative cross-cultural analyses are often lacking. Yet, as shown in the State of Mobile annual statistics on global technology use,[49] the intercultural aspect of internet and mobile phone addiction may offer valuable insights. To explore these mechanisms and address part of the gap in the present research, this study aims to examine the role of personality in mobile phone and internet addiction across two different cultural settings.

2. METHODS

2.1. STUDY DESIGN AND SAMPLE

This multicenter study was conducted at the Faculty of Education, Palacký University Olomouc (Czech Republic) and the Faculty of Educational Sciences, Chongqing Normal University in Sichuan (China). Participants were contacted via official university emails (Czech Republic) and the WeChat social app (China). Data were collected from February to April 2022 and from February to May 2023 using an online questionnaire (Google Forms in the Czech Republic and Wenjuanxing in China) administered in two identical versions in Czech and Chinese.

The sample consisted of 1,075 Czech (mean age ± standard deviation [SD]: 24.07 ± 6.7; 913 [84.9%] females) and 710 Chinese (mean age ± SD: 21.0 ± 2.3; 388 [54.6%] females) university students enrolled in teacher training programs. Most Czech participants were in their second (n=524, 48.7%) and first (n=326, 30.3%) year of study, while most Chinese participants were in their second (n=407, 57.3%) and 3rd year (n=191, 26.9%).

2.2. MEASURES AND INSTRUMENTS

Mobile phone addiction was measured using the Short Version of the Smartphone Addiction Scale.[50] The scale consists of 10 items rated on a six-point Likert scale (1 = Totally disagree to 6 = Totally agree), with higher scores indicating greater mobile phone addiction. Cronbach's alpha in this study was 0.91. Cross-country analysis of measurement invariance showed excellent model fit (Table 1).

Internet addiction was assessed using a six-item version of the Internet Addiction Test[51] (IAT; Young, 1998), a brief unidimensional scale. Items are rated on a six-point Likert Scale (0 = totally disagree to 5 = totally agree), with total scores ranging from 0 to 30. This instrument has demonstrated good psychometric properties in a previous study[52] and exhibited excellent reliability in the present research. Cross-country measurement invariance showed a very good comparative fit index (CFI) and standardized root mean square residual (SRMR), and an acceptable root mean square error of approximation (RMSEA) (Table 1).

Personality traits were assessed using the Ten Item Personality Measure (TIPI).[53] This brief, 10-item questionnaire evaluates five personality traits according to the Big Five model: extraversion, emotional stability (neuroticism), agreeableness, conscientiousness, and openness to experience. Cross-country measurement invariance analysis revealed borderline goodness-of-fit (Table 1). These fragile factor profiles and reduced psychometric properties have been noted previously,[54] often attributed to design limitations such as having only two items per factor.[53,55] However, due to its brevity, the TIPI has demonstrated utility and acceptable validity when compared to longer personality scales,[56,57] especially in contexts with constraints on questionnaire length.

The English versions of the Smartphone Addiction Scale–Short Version and IAT were translated into Czech

Table 1. Cross-country measurement invariance of the applied tools

Measurement invariance	IAT	SAS-SV	TIPI
Comparative fit index	0.972	0.985	0.861
Root mean square error of approximation	0.081	0.054	0.104
Standardized root mean square residual	0.057	0.051	0.075

Abbreviations: IAT: Internet addiction test; SAS-SV: Smartphone addiction Scale–Short Version; TIPI: Ten-item personality measure.

using a standard double-blind approach: two independent translations into Czech, followed by two back-translations into English by a native-speaker and a psychologist. The original and back-translated versions were then compared. The Czech version of the TIPI and the Chinese versions of all questionnaires were obtained from previous studies.

2.3. STATISTICAL ANALYSIS

Cross-country measurement invariance was assessed using multi-group confirmatory factor analysis. Models were analyzed using the weighted least squares with mean and variance adjustment estimator and evaluated based on three goodness-of-fit indicators: CFI with an acceptable value of >0.09, RMSEA with an acceptable value of <0.08, and SRMR with an acceptable value of <0.08. Differences in mean scores between groups were analyzed using a two-way analysis of variance with Tukey *post hoc* tests. The effects of personality traits on different types of addiction were examined using a series of multiple regression analyses. Cross-cultural differences in regression coefficients (slopes) between the two countries were assessed by including interaction terms in the models. All statistical analyses were two-tailed, and all $p<0.05$ were considered statistically significant. Data analysis and visualizations were performed in RStudio (v.2022.07.2, Posit company, USA) using the R environment v.4.2.1.

2.4. ETHICAL STATEMENT

The authors assert that all of the procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation, and with the Helsinki Declaration of 1975, as revised in 2008. All participants were informed of the confidentiality of their responses and provided informed consent online before completing the questionnaire. No identifying information, such as internet protocol addresses, names, student identification numbers, or specific fields of study, was collected during the online data gathering. The research protocol was approved by the Ethics Committee of the Faculty of Education, Palacký University Olomouc, Czech Republic.

3. RESULTS

The results revealed significant cross-cultural and sex-based differences, but no significant interaction effect between country and sex (Table 2). Internet and mobile phone addiction were significantly higher among Chinese students (Figures 1A and 2A). Similarly, personality traits were associated with both types of addiction in both student groups. Internet addiction (Table 3 and Figure 1B) among Czech students decreased with higher levels of conscientiousness (b=-1.11), emotional stability (b=−0.60), and openness (b=−0.42), explaining 16% of the variance. In contrast, among Chinese students, only conscientiousness (b=−1.23) had a significant effect, accounting for 6% of the variance. A significant cross-cultural difference was found in the regression coefficients for openness (difference=−1.47, p=0.02). Including sex as a variable revealed further differences in the effects of personality traits depending on country and sex (Table 3). Among males, both Czech and Chinese, only conscientiousness had a significant negative effect on internet addiction, explaining 15% and 5% of the variance in Czech and Chinese male students, respectively. For females, the patterns differed by country. In Chinese females, alongside a negative effect of conscientiousness (b=−1.38), a significant positive effect of agreeableness (b=1.17) was observed. Among Czech females, the pattern mirrored the total Czech sample, with internet addiction decreasing with greater conscientiousness (b=−1.08), emotional stability (b=−0.54), and openness (b=-0.57).

Mobile phone addiction (Table 3 and Figure 2B) showed more similarity between groups. In both Czech and Chinese students, addiction decreased with higher agreeableness (b_{Czech}=−0.64, b_{China}=−1.02), conscientiousness (b_{Czech}=−1.18, b_{China}=−2.15), emotional stability (b_{Czech}=−1.30, b_{China}=−0.80), and openness (b_{Czech}=−0.68, b_{China}=−0.68), accounting for 12% and 17% of the variance in Czech and Chinese students, respectively. A significant cross-cultural difference was observed in the effect of conscientiousness (difference=0.98, p=0.008). When sex was considered, males in both countries showed a similar pattern: mobile phone addiction decreased with greater emotional stability (b_{Czech}=−1.44 and b_{China}=−1.29) and conscientiousness (b_{Czech}=−1.06 and b_{China}=−1.2), with Chinese males also showing a significant effect of openness (b=−0.79). For females, the effects of personality varied by country. Among Czech females, addiction decreased with higher emotional stability (b=−2.0), conscientiousness (b=−1.58), and openness (b=−1.34), similar to the male pattern. For Chinese females, a stronger effect of conscientiousness (b=−2.65) and a weaker effect of agreeableness (b=−0.91) were observed. In total, personality traits explained 12 – 20% of the variance in mobile phone addiction among men and 11 – 18% among women.

4. DISCUSSION

The study aimed to analyze the effect of personality on internet and mobile phone addiction in relation to potential cross-cultural differences. This objective was grounded in previous findings on the association between addiction (specifically internet addiction) and personality traits.[44-46,58] Accordingly, our goal was to verify these findings and further specify them in the context of both Internet and mobile phone addiction, while providing evidence for potential cross-cultural differences.

The primary finding was a higher incidence of both types of addiction among Chinese students. This suggests greater usage and dependency on these technologies within this population. One possible explanation may be China's substantial technological boom in recent years,[59-62] which likely promotes widespread and active use of the Internet and mobile phones. Moreover, given the size of the country, many students are far from home, and technology often

Table 2. Two-way analysis of variance *F*-statistic for differences in internet and mobile phone addiction

Parameters	Descriptives[a]		Analysis of variance			
	Czech	China	Sum sq	Mean sq	*F*-value	*p*
Internet addiction						
Men	10.3±0.5	16.9±0.4	-	-	-	-
Women	9.2±0.2	17.2±0.4	-	-	-	-
Sex	-	-	3,406.74	3,406.74	119.33	<0.001
Country	-	-	11,073.25	11,073.25	387.87	<0.001
Sex×Country	-	-	92.35	92.35	3.23	0.072
Residuals	-	-	32,573.88	28.55	-	-
Mobile phone addiction						
Men	24.2±0.7	35.3±0.5	-	-	-	-
Women	24.7±0.3	35.3±0.4	-	-	-	-
Sex	-	-	4,975.41	4,975.41	65.76	<0.001
Country	-	-	43,817.81	43,817.81	579.14	<0.001
Sex×Country	-	-	16	16	0.21	0.646
Residuals	-	-	134,751.6	75.66	-	-

Note: [a]Data are presented as mean±standard error.
Abbreviation: sq: Square.

Table 3. Regression coefficients for the effects of personality traits on internet and mobile phone addiction, by country and sex

Parameter	Internet addiction			Mobile phone addiction		
	Czech	China	Difference	Czech	China	Difference
Country						
Model[b]	31.44[5,787] ***/0.16	5.42[5,346] ***/0.06		29.62[5,1069] ***/0.12	30.5[5,704] ***/0.17	
Extraversion[c]	−0.17[0.13]	−0.12[0.24]	−0.04[0.27]	0.3[0.2]	0.27[0.23]	0.02[0.31]
Aggreeableness[c]	−0.28[0.19]	0.05[0.34]	−0.32[0.39]	−0.64[0.28]*	−1.02[0.33]**	0.38[0.44]
Conscientiousness[c]	−1.11[0.15]***	−1.23[0.28]***	0.12[0.32]	−1.18[0.22]***	−2.15[0.27]***	0.98[0.37]**
Emotional stability[c]	−0.6[0.14]***	−0.33[0.29]	−0.27[0.33]	−1.3[0.2]***	−0.8[0.28]**	−0.5[0.36]
Openness[c]	−0.42[0.17]*	0.39[0.3]	−0.81[0.35]*	−0.68[0.26]**	−0.68[0.29]*	0.01[0.4]
Men						
Model[b]	5.47[5,121] ***/0.15	3.4[5,202] **/0.05		5.27[5,156] ***/0.12	17.23[5,316] ***/0.2	
Extraversion[c]	−0.64[0.33]	0.04[0.33]	−0.67[0.46]	−0.2[0.47]	0.39[0.22]	−0.45[0.6]
Aggreeableness[c]	0.33[0.53]	−0.62[0.43]	0.95[0.67]	−1.22[0.78]	−0.56[0.3]	−0.32[0.92]
Conscientiousness[c]	−0.96[0.36]**	−1.21[0.36]***	0.25[0.51]	−1.06[0.54]*	−1.2[0.25]***	0.52[0.68]
Emotional stability[c]	−0.54[0.34]	0.06[0.4]	−0.6[0.53]	−1.44[0.48]**	−1.29[0.22]***	0.56[0.69]
Openness[c]	−0.57[0.44]	0.17[0.42]	−0.74[0.61]	−0.06[0.66]	−0.79[0.28]**	1.28[0.81]
Women						
Model[b]	27.19[5,660] ***/0.16	3.87[5,138] **/0.09		24.67[5,907] ***/0.11	17.89[5,382] ***/0.18	
Extraversion[c]	−0.04[0.14]	−0.44[0.35]	0.4[0.38]	0.25[0.38]	0.31[0.28]	0.08[0.39]
Aggreeableness[c]	−0.3[0.2]	1.17[0.55]*	−1.47[0.59]*	−0.9[0.52]	−0.91[0.41]*	0.35[0.56]
Conscientiousness[c]	−1.08[0.17]***	−1.38[0.45]**	0.3[0.48]	−1.58[0.44]***	−2.65[0.34]***	1.45[0.46]**
Emotional stability[c]	−0.74[0.16]***	−0.82[0.44]	0.08[0.48]	−2[0.5]***	0.07[0.33]	−1.36[0.44]**
Openness[c]	−0.38[0.19]*	0.49[0.42]	−0.8710.46]	−1.34[0.49]**	−0.26[0.34]	−0.53[0.48]

Notes: [a]Presented as difference[standard error] significance; [b]Presented as *F*[df] significanc/adjusted R^2; [c]Presented as *b*[standard error] significance.
*p<0.05, **p<0.01, ***p<0.001.

serves as the primary means of staying socially connected. On the other hand, although technology use is also on the rise in the Czech Republic and increasingly integrated into everyday life, its necessity may be lower, and cultural norms still emphasize in-person interactions and physical activity, especially among young people. It is also relevant to consider that shyness, which can limit face-to-face communication, is more prevalent among Chinese adolescents and young adults.[63-66] In such cases, the Internet and mobile phones may serve as tools to mitigate social anxiety, thereby increasing the risk of addiction. As previous studies suggest,[4,7] extensive use of online tools can hinder personal interaction and reduce interpersonal intimacy. However, for shy individuals, these consequences may be perceived as benefits rather than drawbacks. While the shift toward online communication is not a traditional aspect of Chinese

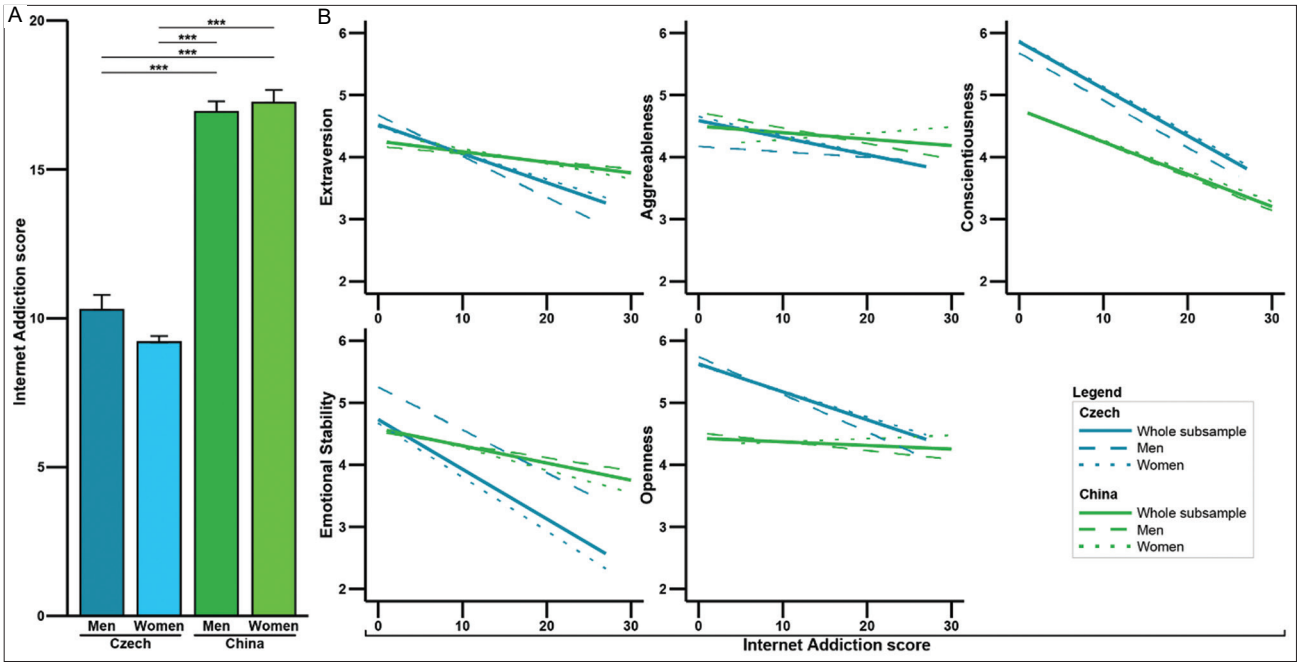

Figure 1. The effect of personality traits on internet addiction. (A) Bar plot shows mean values and standard error of internet addiction scores for males and females in both countries. Top brackets with asterisks indicate significant differences between groups (based on Tukey's *post hoc* test, ***$p<0.001$). (B) Regression lines show the effect of individual personality traits on internet addiction. Color distinguishes countries, while line style indicates effects across subsamples and sexes.

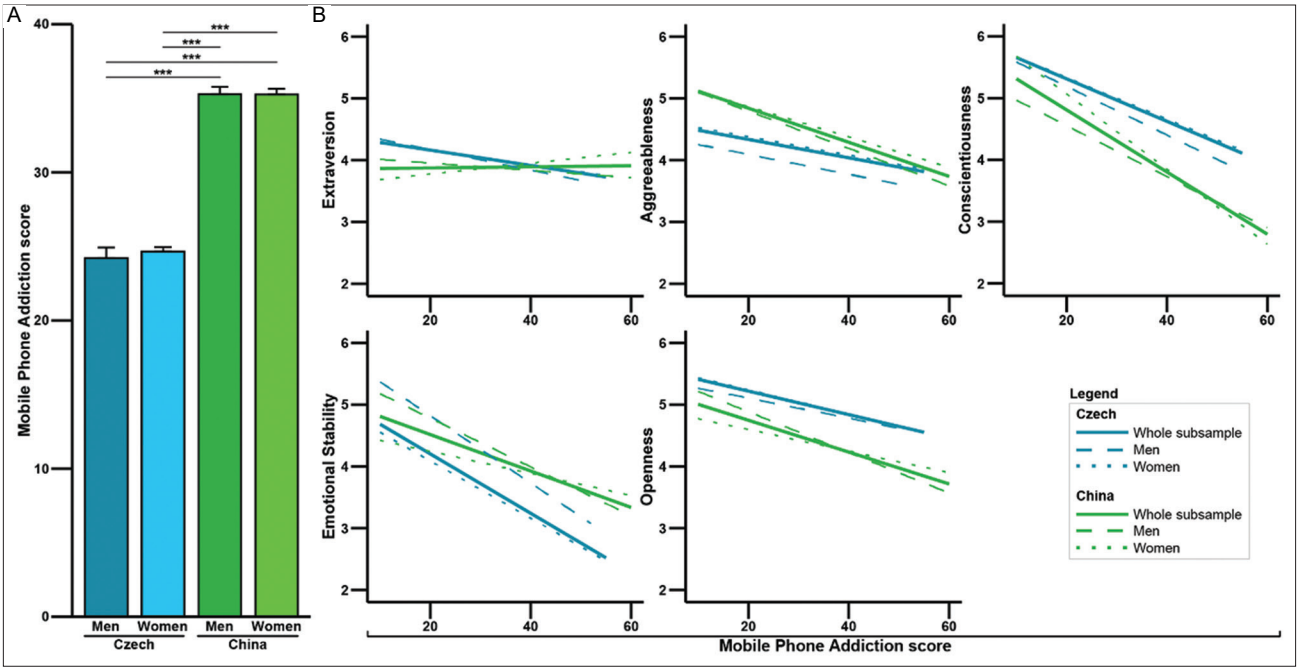

Figure 2. The effect of personality traits on mobile phone addiction. (A) Bar plot shows mean values and standard error of mobile phone addiction score for males and females in both countries. Top brackets with asterisks indicate significant differences between groups (based on Tukey's *post hoc* test, ***$p<0.001$). (B) Regression lines show the effect of individual personality traits on mobile phone addiction. Color distinguishes countries, while line style indicates effects across subsamples and sexes.

culture, it appears to be increasingly integrated into China's collectivist society.[67-70] In such cultural contexts, peer influence among adolescents and young adults may exert stronger pressure to participate in the digital space than in more individualistic societies like the Czech Republic.[71,72] This could also amplify the risk of social exclusion, a known consequence of smartphone addiction.[38] Overall, it is evident that for the younger generation, which has grown up with digital technology, dependence on these tools can result in a range of negative impacts across various areas of life.

For this reason, it was important to explore the extent to which personality influences these addictions. The general conclusion is that such a relationship does exist.[46,73-75] Specifically, internet addiction in Czech students was negatively associated with conscientiousness (b=−1.11),

emotional stability (b=−0.60), and openness (b=−0.42), collectively explaining 16% of the variance. Among Chinese students, only conscientiousness (b=−1.23) was a significant predictor, accounting for 6% of the variance. These findings for Czech students are consistent with previous research.[44] However, for Chinese students, personality traits played a less prominent role, suggesting that other contextual or cultural factors may be more influential. A notable cross-cultural difference was noted for openness (difference=−1.47, p=0.02), supporting the findings from Lingfeng *et al.*,[76] although their findings related specifically to mobile phone addiction. Nonetheless, their interpretation, that cultural differences between individualistic (Western, including the Czech Republic) and collectivist (Eastern, including China) environments shape these associations, appears applicable here as well.

In the case of mobile phone addiction, the two student groups showed greater similarity. Mobile phone addiction was negatively associated with agreeableness (b_{Chezh}=−0.64, b_{China}=−1.02), conscientiousness (b_{Chezh}=−1.18, b_{China}=−2.15), emotional stability (b_{Chezh}=−1.30, b_{China}=−0.80), and openness (b_{Chezh}=−0.68, b_{China}=−0.68), explaining 12% and 17% of the variance for Czech and Chinese students, respectively. These results are consistent with previous studies (e.g., Lingfeng *et al.*[76]). It may be that mobile phones are used more frequently than the Internet alone, as mobile devices integrate Internet access and are often highly personalized through features, such as design, brand, user interface, and applications. This personalization may strengthen the connection between mobile phone use and personality. Regression coefficients differed significantly across cultures for conscientiousness (difference=0.98, p=0.008).

In the context of gender, other interesting findings emerged. In general, it appears that women, more specifically, Czech female students, show higher levels of personality-related associations with both internet and mobile phone addiction (notably openness, conscientiousness, and emotional stability). These findings broadly align with the study by Arpaci and Unver,[46] which confirmed higher levels of association between personality and mobile phone addiction in women, albeit in relation to different traits (agreeableness, conscientiousness, and emotional stability).[46] On the other hand, the association between mobile phone addiction and personality showed a higher number of significant relationships for Chinese male students (openness, conscientiousness, and emotional stability) compared to their female counterparts (conscientiousness only). Thus, our findings suggest that sex and country of origin (i.e., cultural background) play a moderating role in the relationship between personality and internet/mobile phone addiction. However, other studies may not always confirm this pattern. For example, one study[24] found that gender was not a significant factor in connection with smartphone addiction. Another study, based on a cross-cultural comparison, suggests that it may be meaningful to differentiate between generalized internet addiction and specific types of addiction.[77] This perspective led to the question, within a meta-analysis framework, of whether men are more prone to internet gaming addiction, while women are more susceptible to internet-related social media addiction.[78] Hence, while our findings are clear and supported by previous research, further attention to gender as a predictor of internet and smartphone addiction – especially in a cross-cultural context, using larger and more diverse populations and distinguishing among specific forms of addiction – may be needed.

A number of research studies[46,73-75,79-81] suggest that certain personality traits (particularly neuroticism and conscientiousness) are significantly associated with addictive behaviors, with several important implications. Although personality traits are generally stable and enduring, very likely with a neural basis (e.g., DeYoung[82]), they can nonetheless be influenced, strengthened, or weakened. This suggests that aspects of personality that can contribute to or protect against addiction could be targeted for intervention. In addition, more focused prevention or aftercare strategies could be developed for individuals showing signs of technological addiction. These addictions, although differing in some ways from substance addictions and often less immediately visible, may have a significant and damaging impact on individuals and society precisely due to their subtlety and social acceptability.

The present study has several limitations. First, the research population was predominantly female, especially within the Czech sample, which may have influenced the observed relationships. This imbalance reflects the fact that education faculties consist of more women. Second, the sample consisted of education students, which may limit the generalizability of the findings to broader populations. Third, the cross-sectional design of the study does not allow for causal inferences between variables. Although we followed standard assumptions in treating personality traits as predisposing factors and addictions as an outcome, we acknowledge that the reverse or reciprocal influence cannot be ruled out – problematic behaviors may also shape personality traits. In addition, the measurement invariance of the TIPI was borderline, which may have affected the robustness of some results. Future studies should validate these findings using more comprehensive personality assessment tools. Finally, both Internet and mobile phone addiction are likely influenced by other factors not captured in this study. Future research with more balanced gender representation, more diverse samples, an expanded range of variables, and preferably a longitudinal design is needed to further explore and confirm our findings.

5. CONCLUSION

This cross-cultural study is one of the few to examine the interaction between personality traits and internet and mobile phone addiction. Several noteworthy findings emerged: Chinese students showed significantly higher levels of both internet and mobile phone addiction and personality traits were found to influence both types of addiction across all groups. Another important observation was that the inclusion of country as a variable revealed further differences in these relationships.

Given that our present reality, and very likely the future, cannot be separated from technological advancement and the pervasive use of smartphones and the internet, the issue of addiction to these technologies, along with the variables influencing them (including key socio-cultural differences), is of vital importance. This holds not only for ongoing research but also, especially, for the development of educational strategies and health prevention policies at the national and international levels.

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CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

AUTHOR CONTRIBUTIONS

Conceptualization: Pavel Veselský
Data curation: Hongyang Liu
Methodology: Pavel Veselský
Resources: Jana Kvintová
Writing – original draft: Pavel Veselský, Lucie Váchová, Jana Kvintová
Writing – review & editing: Hongyang Liu, Vojtech Rege

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The research protocol for this study was approved by the Ethics Committee of the Faculty of Education, Palacký University Olomouc, Czech Republic (Approval ID: GFD_ Pdf_ 2025_02, Date: [March, 2025]). Ethical approval was also obtained from the Ethics Committee of Chongqing Normal University, China. All participants were informed of the confidentiality of their responses and provided informed consent online before completing the questionnaire.

CONSENT FOR PUBLICATION

All participants provided informed consent for the publication of anonymized data collected during the study.

DATA AVAILABILITY STATEMENT

Data from this study are available from the corresponding author upon reasonable request.

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