# Exploring the Effects of Smartphone Overuse and Emotional Skills on Student Well-Being

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**ABSTRACT:** Besides ushering in an unprecedented level of material convenience for humanity, mobile phones have inevitably led to numerous mental health issues. The phenomenon of psychological problems arising from dependence, addiction, and problematic usage of the internet and mobile phones has become increasingly widespread. Various social adversities stemming from mental health issues have garnered comprehensive attention across society. At a certain university in Henan Province, the degree of mobile phone dependence among college students is at a moderate level. Therefore, studying the students at this university is representative of higher education institutions throughout Henan Province and holds considerable research value. This study surveyed 335 individuals from a university in Henan Province and conducted empirical analysis. The findings indicate that mobile phone dependency negatively impacts mental health. The scale measuring mobile phone dependency demonstrates a significant negative correlation with emotional intelligence. Moreover, emotional intelligence positively influences mental health.

**KEYWORDS:** Henan University Students; Mobile Phone Dependency; Emotional Intelligence; Mental Health

## 1. INTRODUCTION

With the continuous development of the information age, the widespread adoption of smartphones, and the diversified growth of various online media, one encounters the phenomenon of 'smartphone zombies' everywhere, predominantly among the younger demographic. According to the 'Statistical Report on Internet Development in China' released by the China Internet Network Information Center at the beginning of 2023, as of December 2022, the scale of Chinese internet users reached 1.067 billion, surpassing the average levels in Asia and globally. Mobile internet users accounted for 95.1%, with a growth rate exceeding 10% for three consecutive years. The habit of using mobile phones for payments has also become ingrained. Consequently, mobile devices have displaced other personal internet access devices, becoming an essential part of Chinese people's lives.

While technological advancements have led to an unprecedented material standard of living, they've also inevitably caused numerous mental health issues. The prevalence of psychological problems stemming from dependence, addiction, and problematic use of the internet and smartphones is increasingly common. Various social issues originating from mental health problems have garnered comprehensive attention from all sectors of society.

Previous research in China on smartphone dependence and the relationship with emotional intelligence primarily focused on adult groups like university students, overlooking the high prevalence of smartphone usage among current university students, a notable segment among new mobile internet users (Mei et al., 2023). University students actively engage in major social and gaming apps (Li et al., 2020). Additionally, many psychological characteristics of Chinese university students differ from those of adults. External factors like school management, educational resources, and classroom atmosphere also influence students' emotional intelligence, mental health, and the extent of their reliance on smartphones (Shen et al., 2020). This study aims to establish a model that correlates smartphone dependence and emotional intelligence with the mental health of university students, thereby enhancing relevant theories and literature.

The issue of smartphone dependence has become a hotly debated topic across society. Previous studies (Barbar et al., 2021; Cheng et al., 2021; Li et al., 2020; Shen et al., 2020; Vezzoli et al., 2021) have shown that smartphone dependence affects people's mental health to varying degrees. There is a correlation between smartphone internet addiction, dependence, emotional intelligence, and mental health, with emotional intelligence significantly linked to psychological well-being. However, the precise nature of the relationship and mechanisms among smartphone dependence, emotional intelligence, and mental health require further exploration. Presently, academic studies in China on smartphone dependence or excessive smartphone use primarily concentrate on adult groups such as university students (Barbar et al., 2021; Kircaburun et al., 2020; Shen et al., 2020; Xiao & Huang, 2022). Thus, understanding

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the situation of smartphone use among university students and exploring the current status of smartphone dependence among them and its relationship with emotional intelligence and mental health holds significant practical significance.

A certain university in Henan Province is the only Double First-Class University and the only 211 Project University in the province. Both national-level distinctions attract students from across Henan Province. The university annually admits high-achieving students from Henan Province. Currently, the level of smartphone dependence among students at this university is moderate. Therefore, studying students from this university is representative of the entire higher education landscape in Henan Province and holds research value.

In summary, this study poses several questions: 1. Do students at a certain university in Henan Province have mental health issues? 2. Does smartphone dependence among students at a certain university in Henan Province affect their mental health? 3. Does emotional intelligence among students at a certain university in Henan Province affect their mental health? 4. Is there a correlation between smartphone dependence and emotional intelligence among students at a certain university in Henan Province?

## 2. LITERATURE REVIEW

### 2.1 Mobile Phone Dependency

According to Choliz's (2012) research, the application of mobile phone addiction aligns with the diagnostic criteria outlined in the 'Diagnostic and Statistical Manual of Mental Disorders' concerning substance dependence. It presents several phenomena:

A. Needing to increase the frequency or duration of mobile phone use to achieve previous effects.

1. Experiencing distress and impairments in various areas upon stopping or reducing mobile phone use.

2. Sacrificing or reducing important work or leisure activities due to mobile phone use.

3. Despite being aware of psychological and physiological problems caused by mobile phones, being unwilling to give up their use.

Additionally, based on the aforementioned, individuals addicted to mobile phones commonly exhibit the following behaviors:

1. Feeling anxious or insecure when the phone is not nearby or running low on battery.

2. Becoming completely absorbed when using the phone, disregarding appropriateness and ignoring others' feelings.

3. Frequently checking for messages or calls, fearing the possibility of missing something important.

4. Relying on the phone for all life tasks; feeling unable to function without it.

5. Using the phone to access the internet, check data, or handle emails. Therefore, this study referred to and modified the contents of addiction assessment questionnaires related to internet addiction and incorporated them into the checklist compiled by the researcher based on relevant literature.

### 2.2 Emotional Intelligence

The concept of emotional intelligence was developed by Mayer and Salovey (1993). It refers to 'the ability of individuals to recognize, utilize, and manage their own and others' emotions and feelings, and to use this information to guide their thinking and behavior, as well as to effectively interact with others in the surrounding environment.' It is a cognitive ability. This study defines emotional intelligence as 'the ability to recognize one's own and others' emotions, use all possible communication methods to express and manage one's own and others' emotions, and further solve problems or make appropriate decisions.' In this study, the focus is on counseling psychologists, defining their emotional intelligence as the ability to recognize their own and their clients' emotions, use all possible communication methods to express and manage emotions between themselves and their clients, and subsequently solve problems or make appropriate reflections or responses.

Shi and Wang (2007) proposed the concept of the self-quadrinity of the Chinese, which includes two main interaction modes with life domains and others: individual orientation and social orientation. Emmerling and Goleman (2003) further integrated the theory of emotional intelligence and formulated the construct of emotional intelligence scales for college students. This includes four main aspects: emotional awareness and understanding, self-emotional application and management in terms of individual orientation, and social interaction awareness and application, social interaction understanding and management in terms of social orientation. Below are detailed explanations of these four aspects.

In summary, researchers of emotional intelligence seek to understand how individuals recognize and manage their own and others' emotional capabilities and traits. By understanding how individuals perceive, understand, utilize, and manage emotions, it is possible to accurately predict an individual's effectiveness.

### 2.3 Mental Health

Entering university marks a significant and often stressful period of development for individuals (Prinstein & Giletta, 2020). For most young adults in early adulthood, the shift from reliance on family to independent living can be sudden, intense, and challenging, a transition experienced by many during their university years (Abes et al., 2023). Students undergoing this transitional phase often face difficulties such as lack of family support, academic pressure, financial constraints, and handling new responsibilities. These challenges may lead to symptoms of depression among students (Genç, 2021). Significant changes in culture, demographics, society,

and technological advancements are additional factors contributing to the development of issues in university students, including emotional, psychological, and mental challenges.

Cage et al. (2021) suggest that issues related to identity development, relationships, sexuality, and interpersonal problems are among the most common developmental issues affecting personal growth and academic success in university students. Regardless of the specifics, individuals undergoing developmental transitions often experience a reshaping of their identity (Okano et al., 2020), which can lead some students to feel uncertainty, confusion, and acute anxiety (Cage et al., 2021).

**2.4 Research on the Relationship between Mobile Phone Dependency, Emotional Intelligence, and mental health**

Li et al. (2020) found that some college students deeply engaged in mobile gaming and severe mobile phone dependency disrupted their daily routines, leading to physiological issues that in turn caused various psychological problems (Shen et al., 2020). Additionally, mobile phone dependency tends to make students overlook normal interactions with the outside world (Vezzoli et al., 2021). Earlier studies have also indicated that text messaging behaviors via mobile phones significantly affect students' psychological well-being (Cheng et al., 2021). Therefore, this study suggests that mobile phone dependency among students at a certain university in Henan Province would negatively impact their mental health. Hence, the study proposes Hypothesis H1: Mobile phone dependency negatively affects mental health.

In recent years, research on the relationship between mobile phone dependency and emotional intelligence has been increasing. Xiao and Huang (2022) discovered a significant negative correlation between mobile phone dependency and emotional intelligence among middle school students. The more severe the symptoms of mobile phone dependency, the lower their emotional intelligence scores. Studies by Kircaburun et al. (2020), Shen et al. (2020), and Barbar et al. (2021) showed a significant negative correlation between emotional intelligence and internet addiction among university students. Given that the primary way people access the internet nowadays is through mobile phone usage, previous studies on internet addiction can be extrapolated to mobile internet addiction and even mobile phone dependency. Consequently, this study proposes Hypothesis H2: There is a negative correlation between mobile phone dependency and emotional intelligence.

In recent years, many scholars have discovered that the lower the self-emotional regulation ability and the ability to perceive others' emotions among high school students, the lower their mental health levels (Martins et al., 2024). Conversely, higher self-emotional management ability and stronger emotional perception correlate with higher mental health levels among high school students (Moeller et al., 2020). One way for high school students to achieve mental health is by enhancing their emotional regulation and management abilities (Nogaj, 2020). Therefore, this study suggests that emotional intelligence positively influences mental health among students at a certain university in Henan Province. Thus, the study proposes Hypothesis H3: Emotional intelligence positively affects mental health.

# 3. MATERIALS AND METHODS

## 3.1 Research Framework

This study delves into the intricate relationship between mobile phone dependency, emotional intelligence, and their collective influence on mental health. The focal point lies in unraveling the intricate interplay among these variables, seeking to comprehend their correlations and consequential effects on an individual's psychological well-being.

Mobile phone dependency has become a pervasive aspect of modern life, often intertwined with various facets of our daily routines. The investigation here delves deep into the consequences of such dependency, particularly on emotional intelligence. Emotional intelligence, a crucial cognitive ability, forms a significant aspect of this study, probing its potential sway over an individual's mental health, especially in the context of mobile phone reliance.

The framework, as delineated in Figure 1, serves as a guiding map for this exploration. It lays the groundwork for dissecting and understanding the intricate connections between these variables. Mobile phone dependency, when excessive, might disrupt emotional intelligence by altering communication patterns or attention spans. This, in turn, might intricately affect an individual's mental health, leading to various psychological ramifications.

Understanding these connections is crucial in the contemporary digital age. With the ubiquity of mobile devices, comprehending their impacts on emotional intelligence and mental health becomes imperative. By shedding light on these associations, this study endeavors to provide insights that could aid in designing interventions or strategies aimed at fostering healthier relationships with technology, enhancing emotional well-being, and fortifying mental health resilience among individuals navigating a digitally immersive world. The research framework is illustrated in Figure 1.

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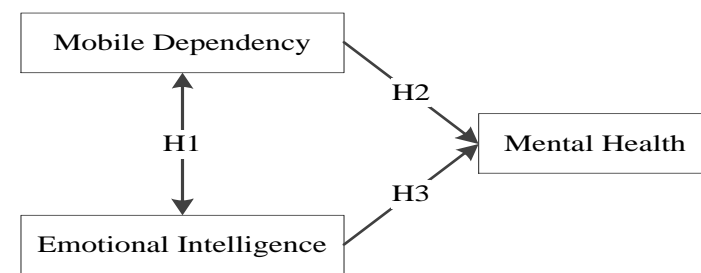

**Figure 1. Figure lable.**

This study focuses on undergraduate students at a university in Henan Province, which is the only 'Double First-Class' university and the sole university under the '211 Project' in Henan Province. These two national-level designations hold considerable appeal for students across the entire province. Moreover, the university annually admits high-achieving students from Henan Province. Therefore, studying students at this university is representative of higher education institutions in Henan Province and holds significant research value.

**3.2 Research Tools**
The Mobile Phone Dependency Scale, developed by Choliz (2012), comprises 15 items across 3 dimensions: withdrawal, salience, and compulsion. This questionnaire assesses mobile phone dependency among high school students.

The Emotional Intelligence Scale is referenced from Shi and Wang's (2007) work, specifically the 'Development of Emotional Intelligence Scale for College Students' as outlined in their research paper. This scale was designed for university students and has demonstrated high reliability and validity among local university students. It consists of 21 items, and the total score indicates the level of emotional intelligence, with higher scores denoting better emotional intelligence.

For mental health assessment, this study employs a brief version of the Positive Mental Health Scale (PMH-scale) derived from Lukat et al.'s (2016) paper titled 'Psychometric Properties of the Positive Mental Health Scale.' This scale comprises 9 items, and a higher total score indicates a healthier psychological state.

**3.3 The Minimum Sample Size**
At a university in Henan Province, there are over 55,000 full-time undergraduate students, more than 15,000 graduate students, and approximately 1,800 international students, totaling over 70,000 students. The formula used to calculate the sample size, based on Dillman's (2000) sampling method, is: $n = p(1-p) / (e^2 / z^2 + p(1-p) / N)$. Given N (population size) is 70,000, the specific value for p cannot be determined precisely. Therefore, it's commonly assumed to be 0.5 for calculation purposes. Considering a confidence interval of 90%, the value of Z is 1.645 to maintain an error range within +/- 0.05. Consequently, the calculated sample size should be 269. This indicates that a study involving students at this university in Henan Province requires at least 269 samples. Hence, considering practical questionnaire distribution rates and effectiveness, this survey aims to distribute over 300 questionnaires.

**4. RESULTS AND DISCUSSION**
**4.1 Descriptive Statistical Analysis**
This study received a total of 350 questionnaires, out of which 335 were deemed valid, yielding an effective rate of 95.71%. Among the sample, males accounted for 54.6%, while females accounted for 152% of the sample, indicating a disparity in gender proportions. Regarding academic year, freshmen comprised 6.3% of the sample, sophomores 13.7%, juniors 31.9%, seniors 31.9%, and first-year graduate students 5.4%. In terms of majors, students from humanities accounted for 13.4% of the sample, engineering students constituted 20%, science students 28.4%, and agricultural science students 38.2%. These results align with the structure of the surveyed population, indicating that the data collected in this survey is representative.

**4.2 Confirmatory Factor Analysis**
For the mobile phone dependency variable, CMIN = 176.946, DF = 74, $\chi^2$/df = 2.391, SRMR = 0.033 (less than 0.05), RMSEA = 0.065, GFI = 0.930, AGFI = 0.901, PGFI = 0.656, IFI = 0.967, CFI = 0.967, PCFI = 0.786. Regarding emotional intelligence, CMIN = 290.672, DF = 113, $\chi^2$/df = 2.572, RMR = 0.047, RMSEA = 0.069, GFI = 0.905, AGFI = 0.871, PGFI = 0.668, IFI = 0.941, CFI = 0.941, PGFI = 0.668. For mental health, CMIN = 20.758, DF = 5, $\chi^2$/df = 4.152, RMR = 0.028, RMSEA = 0.097, GFI = 0.976, AGFI = 0.976, IFI = 0.981, CFI = 0.981, PGFI = 0.325. The CFA tests for mobile phone dependency, emotional intelligence, and mental health show factor loadings above 0.5 for each observed variable, composite reliabilities above 0.6, and average variance extracted (AVE) values exceeding 0.5, indicating convergent validity among mobile phone dependency, emotional intelligence, and mental health.

Internal consistency reliability analyses for the scales-both quantitative and aggregate-showed strong results. The Cronbach's α coefficient for mobile phone dependency was 0.926. For emotional intelligence, the Cronbach's α coefficient was 0.874, and for mental health, it was 0.881, demonstrating excellent internal consistency reliability for these scales.

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## 4.3 Correlation Analysis

As shown in Table 1, there exists a significant negative correlation between mobile phone dependency and emotional intelligence ($r = -0.322$, $p < 0.05$), supporting research hypothesis H1, thereby confirming its validity. Additionally, a significant negative correlation was found between mobile phone dependency and mental health ($r = -0.337$, $p < 0.05$). Furthermore, there is a significant positive correlation between emotional intelligence and mental health ($r = 0.146$, $p < 0.05$).

**Table 1. Correlation Analysis.**

| Variables | Mobile Phone Dependency | Emotional Intelligence |
|---|---|---|
| Mobile Phone Dependency | - | |
| Emotional Intelligence | -.322** | - |
| Mental Health | -.337** | .146** |

Note: **$p<0.01$

## 4.4 Regression Analysis

This section aims to explore the impact of mobile phone dependency and emotional intelligence on the mental health of university students. SPSS software was used for regression analysis. Two research models were constructed in the regression analysis. Initially, gender, academic year, and three dummy variables representing majors (Humanities, Engineering, Agricultural Sciences) were included in Model 1. Subsequently, Model 2 introduced the independent variables of mobile phone dependency and emotional intelligence based on Model 1 to investigate their impact on the mental health of university students.

Further examination of the $R^2$ values, F-values, and regression coefficients was conducted to assess the significance of the regression models. The results obtained from the regression analysis are as follows: Model 1 exhibited a fitness of 3.8%, with an F-value of 2.616, indicating statistical significance at a level less than 0.05. Model 2 displayed a fitness of 21.1%, adjusted fitness of 19.4%, presenting a 17% increase in explanatory power compared to Model 1. The F-value was 12.495, demonstrating statistical significance below 0.05 for Model 2. In Model 2, mobile phone dependency showed a negative impact on mental health ($\beta = -404$, $p < 0.05$), aligning with research hypothesis H2, confirming its validity. Meanwhile, emotional intelligence exhibited a positive impact on mental health ($\beta = 304$, $p < 0.05$), supporting research hypothesis H3. All Variance Inflation Factors (VIFs) in Table 2 were below 10, indicating an absence of multicollinearity issues within the models.

**Table 2. Regression Analysis.**

| | | Model 1 | | | Model 2 | | |
|---|---|---|---|---|---|---|---|
| | | B | β | VIF | B | β | VIF |
| | (Constant) | 3.673 | | | 3.396 | | |
| | Male | 0.010 | 0.006 | 1.016 | 0.030 | 0.017 | 1.017 |
| Control Variable | Grade | -0.114 | -0.128 | 2.364 | -0.127 | -0.143 | 2.398 |
| | Liberal Arts | -0.492** | -0.193** | 1.749 | -0.378* | -0.148* | 1.801 |
| | Engineering | 0.022 | 0.010 | 1.597 | -0.020 | -0.009 | 1.601 |
| | Agriculture | -0.114 | -0.064 | 1.789 | -0.087 | -0.048 | 1.791 |
| Independent Variable | Mobile Dependency | | | | -0.590*** | -0.404*** | 1.161 |
| | Emotional Intelligence | | | | 0.755*** | 0.304*** | 1.136 |
| | $R^2$ | 0.038 | | | 0.211 | | |
| | Adj $R^2$ | 0.024 | | | 0.194 | | |
| | $\triangle R^2$ | - | | | 0.170 | | |
| | F | 2.616* | | | 12.495*** | | |

Note: *$p<0.05$; **$p<0.01$; ***$p<0.001$; Female and Science as reference groups. Dependent Variable: Mental Health

## 5. DISCUSSION

The findings of this study reveal a negative relationship between mobile phone dependency and mental health, which aligns with the results of Li et al. (2020), Shen et al. (2020), Vezzoli et al. (2021), and Barbar et al. (2021).

The significant negative correlation between mobile phone dependency and emotional intelligence among students at a university in Henan Province is consistent with the research outcomes of Xiao and Huang (2022), Kircaburun et al. (2020), Shen et al. (2020), and Barbar et al. (2021). Furthermore, the positive relationship observed between emotional intelligence and mental health among students at the same university corresponds with findings by Martins et al. (2024), Moeller et al. (2020), and Nogaj (2020). The correlation analysis of mobile phone dependency, emotional intelligence, and mental health suggests a direct relationship between emotional intelligence and mental health, while mobile phone dependency exhibits an inverse relationship with mental health.

## 6. CONCLUSION

The use of smartphones is a double-edged sword, and it is essential for parents and educational institutions to guide its reasonable use. Students should strive for self-awareness, effective time management, and setting realistic goals, both short-term and long-term. While utilizing smartphones can be beneficial, excessive dependency should be avoided.

The impact of family on children's emotional intelligence remains crucial regardless of differences in family backgrounds. Schools, as the primary platform for fostering and enhancing students' emotional intelligence, can offer mental health education courses and group counseling to elevate emotional intelligence and promote psychological well-being. Organizing group outdoor activities can enhance communication, cooperation, and self-expression, diverting attention from smartphones and fostering emotional intelligence to improve mental health.

The development of psychological well-being among university students requires support from various sectors of society, including the acknowledgment and support of social media and the general public. Reading is an excellent way to maintain a balanced mindset and regulate emotions. Engaging in collective activities or hobbies helps divert attention from smartphones, regulating emotions, and promoting mental health.

## 7. LIMITATIONS AND FUTURE PROSPECTS

Due to constraints in time, funding, and other factors, this study report has several limitations that require further improvement: A. In the comparative analysis of factors, there was a lack of in-depth differentiation among different academic levels. B. While the survey sample covered a specific university in Henan Province, the questionnaire did not specify this, which wasn't reflected in the analysis results. C. Limited scope of the survey: The questionnaire primarily targeted a university in Henan Province, without including samples from other regions or provinces, which limits the study's generalizability. Future studies should aim to gather data from various regions for comprehensive comparative analysis, thereby enhancing the study's applicability.

**Conflict of interest:** The authors declare no conflict of interest.

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