

An Analysis Study on Korean Adolescents' Smartphone Overdependence from Demographic Perspectives

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Abstract: *Due to the rapid development of smart technology in the 21st century, the development and distribution of various smart devices are increasing. In particular, smartphones have made our lives prosperous in various aspects, and smartphones have become a necessity for modern people. However, due to the dysfunction of smartphones, the problem of overdependence on smartphones has emerged, causing various side effects in our lives. In this study, the current status of Korean adolescents' smartphone overdependence was analyzed from a demographic point of view. Specifically, it was analyzed by gender, grade, and parents' income style using national statistics on adolescents' smartphone overdependence for the last 4 years. As a result of the analysis, there was no significant difference between gender and parents' income type, but it was analyzed that middle school students had the highest rate of overdependence by grade. The results of this study are expected to be helpful in preventing and healing measures for Korean adolescents' smartphone overdependence in the future.*

Keywords: *smartphone overdependence; smart technology, Korean adolescents; smartphone addiction*

1. Introduction

Since the 1990s, the development of information and communication technology has had various effects on the lives of modern people. In particular, with the development of mobile technology, the spread of smartphones is affecting the lives of modern people richer. Smartphones are now becoming a necessity for modern people, and they provide various functions as well as simple phone communication, providing various conveniences in our lives.

However, with the spread of smartphones, various side effects are also occurring. The typical side effect is the smartphone overdependence. In other words, it is causing various problems such as physical and social problems to users due to the inability to control the use of smartphones. The phenomenon of smartphone overdependence occurs in various classes, and the problem of overdependence of adolescents is the most serious compared to other groups [1,2,3,4]. In particular, for adolescents, smartphone overdependence is causing not only physical problems such as weakening vision, but also various problems such as social isolation, poor academic performance, and discord at home. Here, adolescents mean the age group between the ages of 10 and 19.

Therefore, identifying and coping with the current status of adolescents' smartphone overdependence is becoming an important task to be solved not only at the social level but also at the national level. Accordingly, this paper deals with the problem of Korean adolescents' smartphone overdependence. In particular, based on national statistics on adolescents' smartphone overdependence over the past four years, the current status of Korean adolescents' smartphone overdependence is identified from a demographic perspective.

In this study, the current status of Korean adolescents' smartphone overdependence is investigated from the following three perspectives. First, it compares the overdependence of male and female students on smartphones. Second,

it statistically analyzes the ranking of smartphone overdependence in the three classes that make up adolescents: elementary, middle, and high school students. Third, it compares the smartphone overdependence for adolescents from double-income families and single-income families.

The composition of this paper is as follows. Chapter 2 introduces the definition and measurement method of smartphone overdependence, as well as related studies on smartphone overdependence for Korean adolescents. Chapter 3 introduces the current status of Korean adolescents' smartphone overdependence and also presents statistical analysis of smartphone overdependence. Chapter 4 describes discussions on the analysis results, and Chapter 5 presents conclusions and future research works.

2. Related Research

2.1. The Overall of Smartphone Overdependence

The Korea Information Society Agency(<http://www.nia.or.kr>) has provided statistical data on the current status of smartphone overdependence to the entire nation every year since 2017. According to the Korea Information Society Agency, the definition of smartphone dependence is as follows. Smartphone overdependence means "a state in which the salience of the smartphone increases due to excessive smartphone use and the self-control of use decreases, thereby experiencing serious consequences." In other words, smartphone overdependence is composed of three factors: self-control failure, salience, and serious consequences. Each factor means the following.

-Self-control failure

Lack of autonomous control over smartphone use compared to the user's subjective goals

-Salience

The life pattern of using a smartphone in an individual's life is more prominent and the most important than other activities

-Serious Consequences

Continuous use of smartphones despite experiencing negative physical, psychological, and social consequences due to the use of smartphones

Meanwhile, the scale of smartphone overdependence for adolescents, adults, and the elderly is as follows[1,2,3,4].

-Self-control Failure

- ①Every time I try to reduce my smartphone usage, I fail
- ②It is difficult to control the usage time of the smartphone
- ③It is difficult to keep proper smartphone usage time

-Salience

- ④ It's hard to concentrate on other things when my smartphone is next to you
- ⑤ I can't get my smartphone out of my head
- ⑥ I have a strong urge to use my smartphone

-Serious Consequences

- ⑦ I have had health problems because of the use of smartphones
- ⑧ I had a bad argument with my family because of the use of smartphones
- ⑨ I have experienced severe conflicts in friends, colleagues, and social relations because of the use of smartphones
- ⑩ I have difficulty in performing one's work (e.g., academic or occupation) because of my smartphone

On the other hand, the risk group of overdependence is classified into three types as follows.

-High-risk group

A state in which interpersonal conflicts, daily role problems, health problems, etc. have occurred seriously due to the loss of control over the use of smartphones

-Potential risk group

A stage in which interpersonal conflicts or problems with daily roles begin to occur while the control over smartphone use is weakened

-General user group

A form of using a smartphone in a controlled form

2.2. Literature Review

Kim's research explored the relationship between smartphone addiction and life satisfaction of adolescents, focusing on the role of mediating sleep quality[5]. As a result of the study, smartphone addiction showed negative correlations with sleep quality and life satisfaction, and sleep quality and life satisfaction showed positive correlations. It was also confirmed that the quality of sleep partially mediated the relationship between smartphone addiction and life satisfaction. This suggests that smartphone addiction hinders the quality of sleep of adolescents, and lower sleep quality can lead to a decrease in life satisfaction.

Ha's study examined the multiple mediating effects of negative parenting attitudes, adolescents' social atrophy and depression in the relationship between mother's smartphone addiction and adolescents' smartphone addiction[6]. As a result of the study, first, it was found that mother smartphone addiction affects negative parenting attitudes and adolescents' smartphone addiction, and negative parenting attitudes significantly affect adolescents' social atrophy and depression and adolescents' smartphone addiction. In addition, it was found that adolescents' social atrophy affects depression and smartphone addiction, and depression has a significant effect on adolescents' smartphone addiction. Second, as a result of

verifying the mediating model, the partial mediating effect of negative parenting attitudes was significant, especially in the relationship between mother smartphone addiction and adolescents' smartphone addiction, and the sequential mediating effect of negative parenting attitudes and youth social atrophy was significant. In addition, the sequential mediating effect of negative parenting attitudes and youth depression was significant in the relationship between mother smartphone addiction and adolescents' smartphone addiction, and the sequential mediating effect of negative parenting attitudes, youth social atrophy, and depression was significant. Finally, as a result of verifying the multi-group equivalence, path identity was secured in all channels, but there were significant differences between the male and female groups in the path from negative parenting attitudes to depression, social atrophy to depression, social atrophy to youth smartphone addiction, and depression to youth smartphone addiction.

Kim's research explored the effect of adolescents' smartphone addiction on the quality of peer relationships, focusing on the mediating role of depression[7]. As a result of the study, it was found that adolescents' smartphone addiction causes depressive symptoms, and accordingly, the quality of peer relationships decreases. The results of this study contribute to broadening academic understanding of the intersection between digital technology and adolescents' mental and social well-being and suggest the importance of monitoring and intervention programs for adolescents' excessive smartphone use to caregivers, teachers, counselors, policymakers, and practitioners in educational institutions.

Lee's study analyzed the structural relationship, direct and indirect effects between adolescents' peer attachment, self-resilience, academic stress, and smartphone addiction[8]. As a result of the study, children's peer attachment showed positive correlation with self-resilience, negative correlation with academic stress, and negative correlation with smartphone addiction. All channels except peer attachment and smartphone addiction were found to have a direct influence, and adolescents' peer attachment had an indirect effect on smartphone addiction through self-resilience and parental achievement pressure.

Meanwhile, Jung's research investigated the protective factors that can prevent smartphone addiction in the relationship between depression, anxiety, impulsiveness and smartphone addiction[9]. The results of the study are as follows. First, adolescents' depression and anxiety negatively affected smartphone addiction, and self-resilience and social support negatively affected smartphone addiction. Second, in the relationship between depression, anxiety, and smartphone addiction of adolescents, self-resilience showed a moderating effect. Third, social support showed a moderating effect in the relationship between depression, anxiety, and smartphone addiction of adolescents. The effect of impulsiveness on smartphone addiction, self-resilience, and social support was not significant, and the moderating effect of impulsiveness on self-resilience and social support was not verified.

In addition, Ji and Son conducted a meta-path analysis to comprehensively examine the variables affecting adolescents' internet and smartphone addiction and their relationship[10]. Based on previous studies, the variables affecting adolescents' internet and smartphone addiction were selected as anxiety, depression, stress, self-esteem, and self-control, and the average effect size on the correlation between these variables and the path between the variables were examined. The average effect size for correlation data between each variable was calculated, and internet and smartphone addiction, depression, anxiety, and stress showed significant positive correlations, and self-esteem and self-control showed significant negative correlations. In addition, as a result of analyzing the path between variables,

anxiety, depression, and stress showed a sequential double mediating effect affecting internet and smartphone addiction through self-esteem and self-control. In addition, anxiety and stress had a partial mediating effect that directly affects internet and smartphone addiction, while depression showed a complete mediating effect through self-esteem and self-control.

3. The Current Status and Analysis of Smartphone Overdependence of Adolescents

3.1. The Current Status of Smartphone Overdependence

According to the report on the status of smartphone overdependence surveyed and published by the Korea Information Society Agency for the past four years, that is, from 2021 to 2024, the status of Korean adolescents' smartphone overdependence is as follows. The following statistics show the status of smartphone overdependence risk groups(both of high-risk and potential risk groups).

First, Table 1 shows the status of smartphone overdependence by gender.

Table 1. The Status of Smartphone Overdependence by Gender

Year	Male	Female
2021	37.0	37.1
2022	39.3	41.1
2023	40.5	39.6
2024	44.5	40.6

(Unit: %)

Table 2 shows the status of smartphone overdependence by grade.

Table 2. The Status of Smartphone Overdependence by Grade

Year	Elementary School Students	Middle School Student	High School Students
2021	33.9	41.0	36.4
2022	37.6	45.4	36.6
2023	42.1	42.1	36.0
2024	43.8	41.8	41.5

(Unit: %)

On the other hand, Table 3 shows the status of smartphone overdependence by parents' income style.

Table 3. The Status of Smartphone Overdependence by Parents' Income Style

Year	Double Income	Single Income
2021	41.0	31.0
2022	42.3	36.8
2023	40.8	38.1
2024	42.4	43.4

(Unit: %)

Based on the above statistics, the following hypothesis is established.

Hypothesis 1) Men have higher smartphone overdependence rates than women

Hypothesis 2) Middle school students have the highest smartphone addiction rate, followed by elementary and high school students.

Hypothesis 3) The smartphone overdependence rate of children from double-income families is higher than that of single-income families.

3.2. Smartphone Overdependence Analysis

The above statistical data were analyzed using the SPSS (Statistical Package for the Social Science) WIN 27.0 program. As analysis methods, t-test (verification) and One-way ANOVA (one-way univariate analysis) were adopted. In addition, Scheffe test was adopted as post-test.

We have the following analysis results.

The results of analyzing smartphone overdependence by gender of adolescent are shown in Table 4.

Table 4. Analysis Results of Smartphone Overdependence by Gender

Gender	Mean	Standard Deviation	F	p
Male	40.33	3.14	0.40	0.705
Female	39.60	1.78		

By gender, the average of male adolescents was 40.33, higher than the average of 39.60 of female adolescents, but there was no statistically significant difference. Therefore, it can be seen that adolescents do not differ in their dependence on smartphones according to gender.

Meanwhile, the results of examining adolescents' smartphone overdependence according to school level are shown in Table 5.

Table 5. Analysis Results by Subfactors of Smartphone Overdependence by School Level

School	Mean	Standard Deviation	F	p	Scheffe
Elementary School Student ^a	39.60	1.78	5.45*	0.028	b>c
Middle School	42.58	1.94			

Student ^b					
High School Students ^c	37.63	2.60			

* $p < 0.05$

By school level, the average of middle school students was the highest at 42.58, followed by 39.60 for elementary school students and 37.63 for high school students, showing a statistically significant difference ($F=5.45$, $p < 0.05$). In addition, as a result of post-verification, there was a significant difference between middle and high school students. Therefore, it can be seen that middle school students are more dependent on smartphones than elementary and high school students.

Table 6 shows the results of analyzing smartphone overdependence according to the age of children.

Table 6 shows the results of examining smartphone overdependence of children according to the parents' income style.

Table 6. Analysis Results of Smartphone Overdependence by Parents' Income Style

Income Type	Mean	Standard Deviation	F	p
Double Income	41.63	0.84	1.67	0.190
Single Income	37.33	5.09		

By the parents' income style, the average of adolescents of double-income family was 41.63, higher than the average of 37.33 for adolescents of single-income family, but there was no statistically significant difference. Therefore, it can be seen that adolescents do not depend on smartphones according to their parents' income style.

4. Discussions

This chapter describes the interpretation and implications of the analysis results of Korean adolescents' smartphone overdependence in Chapter 3 as follows.

First, as shown in Table 4, gender differences in Korean adolescents' overdependence on smartphones were not statistically significant. In other words, the fact that there is no significant difference between male and female students' smartphone overdependence over the past four years means that there is no difference in the type and usage time of adolescents. Therefore, it means that there is no need to make gender differences in preventing and healing adolescents' smartphone overdependence.

Meanwhile, the results of Table 5 showed that the severity of smartphone overdependence was statistically significant in the order of middle school students, elementary school students, and high school students. In other words, middle school students are more dependent on smartphones than elementary and high school students, which can be said to be the biggest cause of 'self-control failure' among the three factors

of smartphone overdependence [1]. In particular, it is understood that controlling the usage time is the most difficult for middle school students. When guiding middle school students in the future, it is important to develop the ability to control the usage time well.

In addition, the results of Table 6 showed that the overdependence of children from double-income families and single-income families on smartphones was not statistically significant for each parent's income. This shows that adolescents' ability to control smartphone use has nothing to do with their parents. In other words, regardless of the type of income of parents, the ability to control smartphone use is given a greater responsibility to adolescents.

5. Conclusions and Further Research Works

In the modern smart society, knowledge and use of smartphones are an important means of improving the prosperity of individuals' lives. In addition, it is becoming increasingly important as an important communication tool at the social level. The use of such smartphones gives us tremendous benefits, but on the contrary, they are causing various side effects, and the representative side effect is overdependence on smartphones. Currently, among the four major classes by age in Korea, children, adolescents, adults, and the elderly, the class with a highest rate of smartphone overdependence is the youth, according to the latest research[1]. Therefore, the correct understanding and solution to the adolescents' smartphone overdependence is a very important issue both socially and nationally.

In this study, the status of Korean adolescents' smartphone overdependence was analyzed from a demographic point of view. Specifically, it was analyzed by gender, school level, and parental income type. For this, the report on the smartphone overdependence from 2021 to 2024 by the Korea Information Society Agency was used. As a result of statistical analysis, there was no statistically significant difference in smartphone overdependence by gender, and by school level, middle school students, elementary school students, and high school students were analyzed in order. On the other hand, there was no statistically significant difference in smartphone overdependence on children from double-income and single-income families by type of income of parents.

The future research works of this study are as follows. First, it is necessary to clarify the specific cause of Korean adolescents' smartphone overdependence, beyond analysis from a simple demographic point of view, and to analyze the causal relationship for various factors of overdependence. Second, adolescents are still minors and are influenced by their parents. Therefore, it is necessary to analyze in-depth the dependence of adolescents on smartphones through analysis of various relationships with their parents in adolescent families.

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