Related Variables Affecting Korean Adolescents' Intention to Drop Out of School

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Abstract

In recent times, numerous Korean school students have been dropping out despite the decrease in the school-age population. This study aimed to determine whether smartphone addiction, peer relationships, school life satisfaction, and emotion regulation affect dropout intentions. The study participants were 823 adolescents (231 elementary, 267 middle, and 325 high school students) in Chungcheongnam-do province, South Korea. A survey was conducted using the Smartphone Overdependence Scale, Emotion Regulation Scale, Peer Relationship Scale, School Life Satisfaction Scale, and School Dropout Intention Scale. Data were analyzed using t-test, one-way ANOVA, post-hoc test (Scheffé), Pearson's correlation, and multiple regression analysis. The results showed that dropout intentions differed significantly according to school grade (elementary, middle, and high schools). Furthermore, smartphone overdependence, school life satisfaction, and emotion regulation significantly affected the intention to drop out. However, peer relationships did not have a significant effect. The explanatory power of the important variables expected to affect adolescents' intentions to drop out differed between the results for all students and those for each school grade. This study contributes to establishing programs or policies to lower dropout intentions in the future by identifying variables that significantly impact adolescents' intentions to drop out of school.

Keywords: *Dropout Intention, Smartphone Overdependence, Emotion Regulation, Peer Relationship, School Life Satisfaction, Multiple Regression Analysis, Korean Adolescents*

1. INTRODUCTION

Despite compulsory elementary to middle school education in South Korea, more than 30,000 students drop out of school every year, either voluntarily or involuntarily. While this is less than 1% of all students (1)—and the average dropout rate in secondary schools in 28 OECD countries is 13%—it is not negligible considering that most dropouts have few alternative education options outside of school (2). The number of dropouts did not decrease despite a steady decline in the school-age population. Moreover, the percentage of youths who had not yet dropped out of school but considered dropping out was as high as 23.6% (3), suggesting that the dropout rate was not easily reduced.

School dropouts are more likely to associate with delinquent youths outside school, run away from home, steal, engage in assaults and addictions, or develop insomnia and eating disorders than their peers who stay in school. In addition, some students attempt suicide due to depression, helplessness, and feelings of failure due to losing their student status; some may also engage in criminal behavior, such as delinquency, leading to probation (4). Although sometimes dropouts return to school, they often drop out again because they find it more challenging to continue school life because of the lack of motivation, lethargy, and irregular lifestyle (5). Considering the various psychological difficulties and social costs

experienced by students who drop out of school, efforts should be made to prevent them from dropping out.

A steady stream of research focuses on the factors leading to dropouts to prevent the phenomenon and help students. Summarizing the existing literature, we can categorize the factors as personal, family-related, school-related, or societal. Personal factors can be further categorized into personal and interpersonal. Personal psychological factors include low self-esteem, feelings of a lack of achievement, impulsive problem-solving, a strong need for recognition, sensitive or dependent personality, and low grades (6-7). In addition, some studies have identified emotional factors such as helplessness as important (8), and these at-risk adolescents choose not to attend school because they are not interested in school activities and find it difficult to follow strict rules. In contrast, they externalize their negative emotions and are often punished for illegal activities, such as delinquency or substance abuse.

Recent studies have explored the broader impacts of technology on adolescent behavior, particularly focusing on smartphone overdependence as an externalized behavior (62). According to the 2022 Smartphone Overdependence Survey, 23.6% of Korean smartphone users are at risk for smartphone overdependence, with adolescents having the highest overdependence rate among all age groups (40.1 %). Despite a decline in the overdependence rate among all age groups, the rate among adolescents continues to increase yearly. The most vulnerable to smartphone overdependence were middle schoolers (45.4%), followed by elementary (37.6%) and high school (36.6%) (10). Excessive smartphone use increases depression and aggression in adolescents, contributes to bullying, internalization, and externalization of mental health problems (11-14) [60], and affects interpersonal relationships, social development, and school adjustment (15-17). In the past, the typical pathway to school dropout was eloping; however, more recently, it has been reported that children who are immersed in computer games and cell phone use have significantly less energy to engage in or persist with schoolwork because they spend most of their energy on activities in the virtual world (8). The factors related to academic achievement contributing to school dropouts also significantly influence smartphone addiction. Low academic performance and high levels of school stress, including school adjustment difficulties, are associated with higher levels of smartphone addiction, and adolescent learning helplessness has a static effect on smartphone overdependence (18-19). However, to the best of our knowledge, no detailed studies have been conducted to determine whether smartphone addiction directly affects academic addiction.

Another recent study by Na & Na (2024) has highlighted how predictive modeling techniques, particularly AI-powered approaches, could help in identifying and mitigating such risks by providing early warnings about students who are more susceptible to smartphone addiction and its negative consequences on academic performance (63).

Although an unstable emotional state may contribute to dropping out, an inability to regulate it may be associated with dropping out. Emotion regulation is the ability to alter emotional responses to stimulating situations and involves the strategic adjustment of internal states and external behaviors through self-regulation (20). In other words, appropriately regulating emotions lowers the risk of impulsively dropping out of school because it allows students to regulate negative emotions when they arise. It is also likely to prevent dropping out because good emotion regulation improves peer relationships and positively

influences school adjustment (21). Nevertheless, it remains to be seen whether emotion regulation prevents dropouts, as dropping out is a long-term journey, not a temporary or impulsive decision.

First, interpersonal factors included poor interpersonal relationships, relationship difficulties with teachers and peers, and associations with friends who dropped out. The worse the relationship, the more adolescents experience maladaptation to school life. Corporal punishment, discrimination, violence, and bullying are also risk factors for dropping out. Positive peer relationships that help adolescents adjust to school life are strong protective factors against dropping out (22-24). However, thus far, no study has compared the impact of peer relationships on dropout rates across age groups. This is because some adolescents who drop out of school have close peer relationships outside school but are maladaptive in school; as they age, the meaning of attending school may be influenced by many variables other than peer relationships. Peer relationships are likely to be important mediators of dropping out; however, it is necessary to examine the effects of age. Additionally, research into the influence of environmental factors on student behavior, such as the study by Semara et al. (2024) on tourism sites and environmental reservation, could offer insights into how different settings impact adolescent behavior and school engagement [65].

Finally, machine learning applications in tracking and analyzing adolescent behavior, such as the work by AlZubi (2023) in drone technology for tracking cattle movement, may also have potential applications in monitoring students' engagement levels in educational settings (64). This could be a crucial area for future research, particularly in developing interventions to prevent dropouts.

Second, family factors included socioeconomic status, family structure and functioning, educational support at home, parental indifference, lack of emotional support, marital discord, parents' excessive expectations, discrimination among siblings, and frequent moves. In addition to poverty, the absence of basic nurturing and caregiving contributed to the disintegration of the family community due to parental divorce and the mother's participation in the labor market; therefore, the lack of protection and caregiving mechanisms destroyed the primary conditions for adolescents to grow up (25). Furthermore, child maltreatment by parents has been reported to increase adolescents' levels of school maladjustment (26). In contrast, warm and accepting parent-child relationships (27), open communication (28), and experiences of being respected by parents (29) have been reported to have a positive impact on school adjustment. Research also highlights the impact of family stress on overall health, emphasizing the importance of supportive family environments in mitigating negative outcomes such as school maladjustment (Carles Hernandez et al., 2006) [66].

Third, school factors included a sense of school belonging, the number of students, the location of the school, levels of strictness in school rules—including school uniform-related regulations—entrance-oriented education, poor teacher-student interaction, teacher criticism and discipline, discrimination, unwanted enrollment in school, and complaints about nighttime self-study. These school factors determine adolescents' satisfaction with school life. School climate and teacher attitudes that discriminate against students based on their academic performance can undermine adolescents' satisfaction with school life and contribute to dropout (30). Moreover, the psychological and geographical aspects of school environments, as discussed in McAndrew's (2020) study on how places

can evoke specific emotional responses, may also play a role in how students perceive their school experience and their subsequent decisions to drop out (67).

Fourth, systemic factors related to dropout include community climate and community support systems. These may include a culture of nightlife and recreation, school hierarchy, and a lack of effective support groups such as counseling agencies, welfare offices, and churches (7). In fact, runaway youth living in shelters have been shown to have fewer risk factors and more protective factors than their peers who have run away from home (31). Additionally, cultural influences, such as those explored in Sesilia Seli's (68) study on how cultural context affects interpretation and behavior, could also influence dropout rates in various communities by shaping adolescents' attitudes toward education and their willingness to stay in school.

To summarize, various personal, family, school, and society-related factors affect dropping out. However, smartphone overdependence, emotion regulation, peer relationships, and school life satisfaction have received increasing scholarly attention lately. Based on the previous literature, these variables are expected to influence dropout intentions, but it is necessary to confirm whether they actually have a significant impact on Korean adolescents. Furthermore, it would be meaningful to determine which factors are more important in influencing dropout intention so that we can know where to focus on preventing dropouts in the future. In addition, elementary, middle, and high school students may have different developmental issues that affect their dropout intentions. Therefore, it is essential to find out whether there are any differences in the variables affecting dropout intention among different school grades. Therefore, the research questions of this study are as follows: First, do dropout intentions differ according to demographic variables? Second, are smartphone dependence, emotion regulation, peer relationships, and school life satisfaction related to adolescent dropout intentions? Third, to what degree do smartphone overdependence, emotion regulation, peer relationships, and school life satisfaction influence adolescent dropout intentions by school grades (elementary, middle, and high school)? Furthermore, studies on job satisfaction, such as the one by Yadav & Sinha (69), suggest that satisfaction in specific life domains, like school or work, significantly impacts overall well-being, which in turn could affect dropout intentions. Finally, addressing these issues through effective interventions, such as those evaluated in workplace wellness programs by Sable et al. (70), may offer insights into how targeted support can mitigate dropout risks by improving overall well-being and satisfaction.

2. Method

2.1 Participants

The study participants were 823 students enrolled in elementary, middle, and high schools in Chungcheongnam-do Province, South Korea. The schools were selected using simple random sampling. The data was collected between October and November 2022. A total of 840 adolescents participated in the study; 17 samples were excluded because of incomplete data. The adolescents in this study ranged from the 4th grade of elementary school (10 years old) to the 3rd year of high school (18 years old). Of these, 231 (28.1%) were elementary school students, 267 (32.4%) were middle school students, and 325 (39.5%) were high school students (see Table 1). The study participants comprised 360 males

(43.7%) and 463 females (56.3%). Among the families living together, 82.8% were parents, followed by single parents (11.6%), others (2.5%), childcare facilities (2.2%), and grandparents (0.9%).

Table 1. Sociodemographic characteristics of the participants

Sample Characteristics				Family Types					Total
				Parents	Single parent	Grand parents	Child care facility	Others	
Elementary	Gender	Male	*n*	77	6	1	9	1	94
			(%)	(81.9)	(6.4)	(1.1)	(9.6)	(1.1)	(100)
		Female	*n*	100	11	3	13	4	131
			(%)	(76.3)	(8.4)	(2.3)	(9.9)	(3.1)	(100)
	Total		*n*	177	17	4	22	5	225
Middle			(%)	(78.7)	(7.6)	(1.8)	(9.8)	(2.2)	(100)
	Gender	Male	*n*	66	14	7	9	4	100
			(%)	(66.0)	(14.0)	(7.0)	(9.0)	(4.0)	(100)
		Female	*n*	114	37	1	5	4	161
			(%)	(70.8)	(23.0)	(0.6)	(3.1)	(2.5)	(100)
	Total		*n*	180	51	8	14	8	261
			%	(69.0)	(19.5)	(3.1)	(5.4)	(3.1)	(100)
High	Gender	Male	*n*	130	18	2	2	6	158
			(%)	(82.3)	(11.4)	(1.3)	(1.3)	(3.8)	(100)
		Female	*n*	135	19	1	5	2	162
			(%)	(83.3)	(11.7)	(0.6)	(3.1)	(1.2)	(100)
	Total		*n*	265	37	3	7	8	320
			(%)	(82.8)	(11.6)	(0.9)	(2.2)	(2.5)	(100)

Note. Others: relatives, siblings, neighbours

2.2. Procedure

Before the study, the purpose of the study was informed to all participants and written consent was obtained from parents/adolescents. Data were collected through face-to-face completion of a questionnaire consisting of self-report, Drop-out Intention (DI), Smartphone Overdependence (SO) Integrated, Emotion Regulation (ER), Peer Relationship (PR), and School Life Satisfaction (SLS) scales.

2.3 Data collection

2.3.1 Questionnaire

This form consists of questions on adolescents and their families, including gender, grade, family living together, and location.

2.3.2 Dropout Intention (DI)

The DI scale (32) was designed to measure the extent to which adolescents had thought of dropping out of school in the preceding month. The scale consists of four items that measure the intensity of one's thoughts about dropping out of school. The items are on a 5-point Likert scale ranging from "not at all" to "very much". Higher scores indicate more thoughts of dropping out. The reliability (Cronbach's α) of this study was .926.

2.3.3 Smartphone Overdependence (SO)

The Smartphone Overdependence Integrated scale (33) was used to measure the degree of smartphone addiction among adolescents. It consists of 10 items, each rated on a 4-point Likert scale,

with higher scores indicating higher levels of smartphone overdependence. There were three subfactors (three items for "loss of control," three for "prominence," and four for "problematic consequences"). A score of 31 or more is classified as a "high-risk user" and indicates a loss of control over smartphone use. A score between 23 and 30 is classified as a "potential risk user, " indicating a weakened control over smartphone use. In this study, the overall item reliability (Cronbach's α) was .881, and the subscale reliability was .916 for "loss of control," .783 for "prominence," and .768 for "problematic consequences."

2.3.4 Emotion Regulation (ER)

ER was measured using two subscales of the emotional intelligence scale developed by Lee (34) based on emotional intelligence studies (35-36): self-regulation and other-regulation. Self-regulation (eight items) refers to the ability to change one's perceived emotions appropriately, with items such as "When I lose a game, I accept the result without becoming angry." Other-regulation (nine items) refers to the interpersonal ability to respond appropriately to the perceived emotions of others and includes statements such as "I know how to comfort a close friend when they are sad." In this study, self-regulation and other-regulation were combined into a single factor: emotion regulation. The reliability (Cronbach's α) of the total questionnaire was .881, while those of self-regulation and other regulation were .805 and .842, respectively.

2.3.5 Peer Relationship (PR)

To measure peer relationships, we used the peer relationships section of the Inventory of Parent and Peer Attachment-Revised (IPPA-R) scale (37). The Korean version of the scale, translated and reliably validated (38), was used after modifying it to be more accurate than the English version. The scale consists of 25 items and three sub-factors (9 items for "'trust," 9 for "communication," and 7 for "anger and alienation"). Each item is scored on a 5-point Likert scale. Higher scores indicate more positive relationships with peers. In this study, the overall item reliability (Cronbach's α) for peer relationship was .881.

2.3.6 School Life Satisfaction (SLS)

The SLS scale (39) consists of 25 items and six subscales (three items for overall school life, four items for interpersonal relationships, four items for teaching and learning activities, four items for educational environment, four items for school rules and special activities, and six items for social support). It is a 5-point Likert-type scale, and its reliability (Cronbach's α) in this study was .940.

***2.4.* Data Analysis**

The collected data were analyzed using SPSS 22.0. Descriptive statistics (frequency, percentage, mean, and standard deviation), t-test, one-way Analysis of Variance (ANOVA), and post-hoc test (Scheffé) were used to examine the effects of gender and age on dropout intention. Pearson's correlation analysis was performed to determine the correlation between variables. To determine the relationship between the variables that affect the intention to drop out of school, multiple regression analysis was conducted with the intention to drop out of school as the dependent variable and smartphone overdependence, peer relationships, school life satisfaction, and emotion regulation as independent variables. When conducting multiple regression analysis, each variable was entered stepwise, and multicollinearity was judged when the correlation coefficient (r) was greater than .9, tolerance (TOL) was less than 0.1, and the variance inflation factor (VIF) was greater than 10. The Durbin-Watson test result was considered normal if it was between 1.5 and 2.5.

3. RESULTS

3.1 Descriptive statistics and group difference analysis of Dropout Intention

Descriptive statistics of dropout intention and t-test results examining the effect of gender on dropout intention are shown in Table 2. T-test showed that there was no significant mean difference between the male and female groups in elementary and middle school; however, in high school, female students' dropout intention was significantly higher than their male counterparts.

Table 2. Descriptive statistics of dropout intention and the results of *t*-test by gender

Gender		School grades			
		E[a]	M[b]	H[c]	Total
Male	*M*	9.82	11.34	11.58	11.03
	SD	5.519	5.631	5.462	5.56
Female	*M*	8.71	10.85	13.55	11.20
	SD	4.908	5.772	5.764	5.86
Total	*M*	9.18	11.04	12.54	11.11
	SD	5.19	5.69	5.71	5.72
	t	1.60	.67	-3.15	-.43
	p	.111	.505	.002	.666

Note. E: Elementary school, M: Middle school, H: High school, na=231, nb=267, nc=325

A one-way ANOVA was conducted to examine school grade effectiveness on dropout intention. The ANOVA revealed a significant between-group effect, F(2, 820)=24.57, p<.001 (see Table 3). Post-hoc tests revealed significant differences between the groups. Dropout intention was of the highest among elementary school students, followed by middle and high school students. These results indicate that as the school grade increased, dropout intention gradually increased.

Table 3. ANOVA table of dropout intention by school grade

Source of variation	*SS*	*df*	*MS*	*F*	Scheffé
Intercept	96254.56	1	96254.56	3111.02***	
Group	1520.27	2	760.14	24.57***	E<M<H
Error	25370.67	820	30.94		
Total	*128486.00*	*823*			

Note. E: *Elementary school, M: Middle school, H: High school* ***p<.001*

A one-way ANOVA was conducted to examine the effect of family type effectiveness on dropout intention. The ANOVA revealed no significant between-group effect, F(4, 802)=1.06, p>.05 (see Tables 4 and 5). This result indicates that family type is not an important variable in explaining dropout intentions.

Table 4. Descriptive statistics of family types

	Family types					
	Parents	Single parent	Grand parents	Child care facility	Others	Total
N	623	105	15	43	21	807
M	10.99	11.92	9.20	11.44	11.38	11.12
SD	5.63	6.14	4.69	6.14	6.42	5.73

Note. *Others: relatives, siblings, neighbors*

Table 5. ANOVA table of dropout intention by family types

Source of variation	*SS*	*df*	*MS*	*F*

Intercept	20302.792	1	20302.792	618.242***
Group	138.961	4	34.740	1.06
Error	26337.322	802	32.840	
Total	126180.000	807		

Note. E: Elementary school, M: Middle school, H: High school ***p<.001*

Finally, a one-way ANOVA was conducted to examine whether smartphone overdependence was an effective variable for explaining dropout intention. ANOVA showed significant differences between groups at risk of smartphone overdependence, F(2, 820)=9.21, p<.001 (see Tables 6 and 7). Post-hoc tests revealed that the general group showed significant mean differences between the potential- and high-risk groups. These results indicate that the higher the degree of smartphone overdependence, the greater the intention to drop out of school.

Table 6. Descriptive statistics of smartphone overdependence risk level

		Risk level		
	Normal	Potent risk	High risk	합계
N	567	229	27	823
M	10.58	12.09	13.93	11.11
SD	5.783	5.046	7.765	5.720

Table 7. ANOVA table of dropout intention by smartphone overdependence risk level group

Source of variation	*SS*	*df*	*MS*	*F*	Scheffé
Intercept	31023.65	1	31023.65	967.28***	
Group	590.90	2	295.45	9.21***	G<P, G<H
Error	26300.04	820	32.07		
Total	128486.00	823			

Note. *G: General group, P: Potential risk group, H: High-risk group,* ***p<.001*

3.2 Descriptive statistics and group difference analysis of variables related to Dropout Intention

A one-way ANOVA was conducted to examine differences by school grade in variables related to dropout intention (smartphone overdependence, peer relationships, school satisfaction, and emotion regulation) (see Tables 8 and 9). First, there were significant mean differences in Smartphone Overdependence by school grade, with post-hoc tests showing that middle school students scored significantly higher than elementary school students, but high school students were not significantly different from either group.

Table 8. Descriptive statistics of dropout intention-related variables

Variable		School grades			
		E[a]	M[b]	H[c]	Total
Smartphone Overdependence	*M*	19.15	20.66	20.22	20.06
	SD	5.91	5.52	5.44	5.63
Peer Relationships	*M*	88.34	87.83	90.70	89.10
	SD	14.89	13.52	11.60	13.27
School Life Satisfaction	*M*	92.36	86.68	86.14	88.06
	SD	17.53	15.41	14.42	15.88

Emotion Regulation	*M*	65.45	64.70	65.17	65.10
	SD	10.68	8.77	7.99	9.06

Table 9. ANOVA table of dropout intention-related variables by school grades

Variable	Source of variation	*SS*	*df*	*MS*	*F*	Scheffé
Smartphone Overdependence	Intercept	323101.07	1	323101.07	10301.66***	
	Group	296.49	2	148.25	4.73**	E<M
	Error	25718.47	820	31.36		
	Total	357218.00	823			
Peer Relationships	Intercept	6386252.08	1	6386252.08	36558.45***	
	Group	1393.64	2	696.82	3.99**	M<H
	Error	143242.58	820	174.68		
	Total	6678758.00	823			
School Life Satisfaction	Intercept	6306207.05	1	6306207.05	25697.00***	
	Group	5984.60	2	2992.30	12.19***	M<E, H<E
	Error	201233.24	820	245.41		
	Total	6589509.00	823			
Emotion Regulation	Intercept	3421127.43	1	3421127.43	41625.18***	
	Group	72.52	2	36.26	0.44	
	Error	67394.90	820	82.19		
	Total	3554920.00	823			

*Note. E: Elementary school, M: Middle school, H: High school, **p<.01, ***p<.001*

Peer relationships were found to have significant mean differences by school grade, and post-hoc test results showed that students in high school scored significantly higher than students in middle school. Elementary school students showed no significant differences in any group. Satisfaction with school life also appeared to have significant mean differences according to school grade. The post-test results showed that elementary school students had significantly higher scores than middle school students, and elementary school students had significantly higher scores than high school students; however, there was no significant difference between middle school and high school students. Moreover, emotion regulation showed no significant mean differences according to school grade. Second, there were significant differences in the means of peer relationships according to the school grade. Post hoc tests showed that high school students scored significantly higher than middle school students, but elementary school students were not significantly different from either group. Third, School Life Satisfaction also showed a significant difference in mean by school grade. Post hoc tests showed significantly higher scores for elementary students than for middle school students, and significantly higher scores for elementary students than for high school students, but middle school and high school students did not differ significantly. Finally, emotion regulation did not show any significant differences between school grades.

3.3 Relevance of dropout intention and related variables

Students' intentions to drop out of school were positively correlated with smartphone overdependence and negatively correlated with peer relationships, school life satisfaction, and emotion regulation (see Table 10). School life satisfaction was moderately related to peer relationships and positively related to emotion regulation. However, when examined by school grade, the results differed from those of all

students. First, dropout intention was significantly correlated with smartphone overdependence in elementary and high school students but not in middle school students. Second, dropout intention was significantly correlated with peer relationships in the order of elementary, middle, and high school. This indicates that peer relationships and dropout intentions decrease with age. Third, the correlation between satisfaction with school life and dropout intention remained regardless of age. Fourth, the correlation between emotion regulation and dropout intention was lower in middle and high school students than in elementary school students.

Table 10. The correlation between dropout intention and related variables

School Grades	Factors	DI	SO	PR	SLS
Elementary	SO	.278***			
(*n*=220)	PR	-.432***	-.222**		
	SLS	-.474***	-.278***	.707***	
	ER	-.271***	-.375***	.458***	.639***
Middle	SO	.092			
(*n*=259)	PR	-.335***	.012		
	SLS	-.319***	.008	.655***	
	ER	-.138*	-.122*	.384***	.503***
High	SO	.151**			
(*n*=345)	PR	-.135*	-.264***		
	SLS	-.411***	-.228***	.509***	
	ER	-.126*	-.283***	.398***	.510***
Total	SO	.179***			
(*n*=823)	PR	-.262***	-.157***		
	SLS	-.417***	-.184***	.607***	
	ER	-.171***	-.265***	.414***	.551***

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

DI: dropout intention; SO: smartphone overdependence; PR: peer relationships; SLS: School Life Satisfaction

Multiple regression analysis was conducted to determine the relevant variables affecting dropout intention. The results of the multiple regression analysis for all students showed that the variables selected in this study explained 19.0% (R^2_{adj}=.190) of the intention to drop out of school and there was no problem with multicollinearity (see Table 11). School life satisfaction (β = -.46, p<.001), smartphone overdependence (β = .13, p<.001), and emotion regulation (β = .11, p<.01) were significant predictors of dropout intention, but peer relationship was not a significant predictor.

Table 11. Results of a multiple regression analysis of variables affecting dropout intention among all students.

	Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics	
	Beta	*SE*	β	*T*	*TOL*	*VIF*
	18.36	1.70				
	-0.17	0.01		10.81	-.42	-.39
	0.13	0.03	-.46	-12.14***	.18	.13
	0.07	0.02	.13	3.84***	-.17	.10
			.11	2.98**		
F	65.42***					
R^2_{adj}	.190					

Durbin-Watson	1.85

Note: *Dependent variable: dropout intention. *p<.05, **p<.01, ***p<.001*

SO: *Smartphone Overdependence, PR: Peer relationships, SLS: School Life Satisfaction*

Next, a multiple regression analysis was used to examine whether the significant variables explaining dropout intention differed by grade (See Table 12). The results of the multiple regression analysis for elementary school students showed that SO (β = -.30, p<.001), PR (β = .15, p<.05), and SLS (β = -.19, p<.05) were significant variables in explaining intention to drop out of school, explaining 25.6% (R^2_{adj} =.256). However, ER was not a significant variable (See Table 1). The results of the multiple regression analysis for middle school students showed that PR (β = -.22, p<.01) and SLS (β = -.18, p<.05) explained 12.3% (R^2_{adj} =.123) of the intention to drop out, but SO and ER were not significant. Finally, in the analysis of high school students, none of the variables, except school life satisfaction, had significant explanatory power.

Table 12. Results of a multiple regression analysis of variables affecting dropout intentions by school grade

School Level	Predictors	Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics	
		Beta	*SE*	β	*T*	*TOL*	*VIF*
Elementary	(Constant)	20.53	2.36		8.71***		
	SO	-0.09	0.02	-.30	-3.68***	.48	2.07
	PR	0.14	0.05	.15	2.59*	.92	1.09
	SLS	-0.07	0.03	-.19	-2.30*	.50	2.01
	F	27.35***					
	R^2_{adj}	.256					
	Durbin-Watson	1.91					
Middle	(Constant)	24.79	2.23		11.13***		
	PR	-.093	.03	-.22	-2.90**	.57	1.75
	SLS	-.065	.03	-.18	-2.30*	.57	1.75
	F	19.68***					
	R^2_{adj}	.123					
	Durbin-Watson	1.89					
High	(Constant)	26.54	1.75		15.14		
	SLS	-.16	.02	-.47	-8.10	1.00	1.00
	F	65.59***					
	R^2_{adj}	.166					
	Durbin-Watson	1.90					

Note: *Dependent variable: dropout intention. *p<.05, **p<.01, ***p<.001,*

SO: *Smartphone Overdependence, PR: Peer Relationships, SLS: School Life Satisfaction*

4. DISCUSSION AND CONCLUSION

This study aimed to identify the variables expected to influence adolescent dropout intentions. The results are summarized below, and the implications of the findings are discussed.

First, dropout intentions differed significantly according to school grade. This result is consistent with a survey in South Korea in 2022, which found that the percentage of students who thought about dropping out of school was 21.6% for elementary school students, 25.9% for middle school students, and 39.2% for high school students (3). This suggests that high school students are more likely to drop out of school than elementary and middle school students because of the increased academic stress of college entrance exams and specific career concerns. This is consistent with a study comparing the academic pressures of middle school and high school students, which found that high school students had higher academic pressures (40). Or it may be possible that one of the significant differences between education up to middle school and high school is that middle school is compulsory, meaning that you are required

to attend school. In addition, female high school students had significantly higher dropout intentions than male students. Unlike male adolescents, among whom school maladjustment itself is a factor in dropping out of school, female adolescents tend to be more susceptible to various school maladjustment phenomena linked to psychological problems, such as bullying, anxiety, and poor health (41).

Second, smartphone overdependence was significantly higher among middle school students than elementary school students. This is consistent with research showing that smartphone use continues to increase with age, with the greatest increase from 6th to 1st grade (42). During the transition from elementary to middle school, students face changes in the school environment and experience academic stress, anxiety, and pressure as their social status changes; with a subsequent change in social expectations and demands, they are more likely to use their smartphones. This period is characterized by increased sensitivity to social influences, a sense of belonging to a peer group, and an increase in sympathetic smartphone use to avoid exclusion from peer culture (43), which is interpreted as an increase in smartphone use as a medium to fulfill middle school students' sociocultural needs and stimulation seeking. The fact that the time spent on smartphones decreases when alternative content is provided suggests that adolescents use smartphones to cope with stress (10).

The results of the comparison of PR, ER, and SLS by school grade showed that peer relationships were significantly higher in high schools than in middle schools, and school life satisfaction was significantly higher in elementary schools than in middle and high schools; however, ER did not show significant differences at the school grade. The higher level of school life satisfaction in elementary schools than in middle and high schools is interpreted to be because elementary school students are less pressured by entrance exams and career issues than high school and middle school students, and the school curricula offer variable experiences. In addition, the finding that peer relationships were a protective factor for high school students is consistent with the results of a study that showed that the role of peer groups increased as school grades increased (43) and that 64% of high school students say friends are most helpful in stressful situations (44). This suggests that friends play an important role in maintaining psychological health to protect drop out of school during adolescence. This suggests that friends play an important role in maintaining psychological health to protect drop out of school during adolescence.

Third, the explanatory power of important variables expected to affect adolescents' intentions to drop out differed between the results for all students and those at each school grade. First, the results for all students showed that smartphone overdependence, school satisfaction, and emotion regulation were significant predictors of dropout intention, whereas peer relationships were not. This finding contradicts previous studies that have found peer relationships to be a very important protective factor against dropping out. Further research is needed to clarify these conflicting findings and to explore the impact of peer relationships at different developmental levels and stages of adolescence.

The results for elementary school students showed that smartphone overdependence, peer relationships, and school life satisfaction were significant variables, but emotion regulation was not. For middle school students, peer relationships and school life satisfaction were significant variables, but smartphone overdependence and emotion regulation were not. In other words, among middle school students, protective factors were found to be significant, but risk factors were not. In the analysis of high

school students, none of the variables, except school satisfaction, had significant explanatory power. This is similar to a study that found differences in the perceived protective and risk factors for dropping out (45). According to this study, elementary school students perceived personal, family, school, and community as the most protective factors, whereas high school students perceived risk factors higher than elementary and middle school students. Students who are school dropouts differed in their perceptions of protective factors from those who are not. Furthermore, it is likely that the variables that influence dropping out of school, such as emotional and peer relationships, academic stress, and adjustments to school life, differ depending on each individual's developmental stage. Therefore, it would be effective to further investigate the psychosocial needs and important variables of each student's developmental stage to organize programs or interventions to prevent dropouts according to developmental stage. For example, peer relationship programs should be developed for elementary school students to prevent dropouts, and interventions to change schools and educational environments should be developed for high school students to increase school satisfaction. Although several studies (46-47) have found that close peer relationships are associated with lower dropout intentions, this study shows that peer relationships are highly correlated with school life satisfaction and emotion regulation but are not significant predictors of dropout intention. This suggests peer relationships may indirectly influence dropout intentions through school adjustment or satisfaction. Second, several studies (48-50) propose that social support or peer acceptance mediates dropout intention, indicating that social or emotional support from peers, rather than simply good or bad peer relationships, may lower dropout intention. Third, the causes of dropout identified thus far are diverse, including personal, family, school, peer, and community factors, and these variables interact to influence dropout rather than acting as individual factors (51-52). In other words, although the most important cause of dropping out in the past was involuntary dropout due to delinquency, in recent years, voluntary dropout has become increasingly common, and the reasons for dropping out have also diversified, such as a decline in academic interest, conflict with teachers and peers, and the choice to pursue certification or employment.

However, in this study, school life satisfaction was the most influential variable in reducing dropout intentions, and smartphone overdependence was positively related to dropout intentions and negatively related to school satisfaction. This suggests that students at a high risk of smartphone use are less satisfied with their overall school life, which puts them at risk of dropping out. Therefore, specialized interventions for high-risk smartphone users are needed to reduce their risk of dropping out of school. However, a recent study found that 84.2% of the education provided to high-risk students was mainly lecture-style prevention education, while professional counseling and therapeutic programs, which they needed the most, were almost nonexistent (53). In addition to the problem of smartphone overdependence, high-risk students have secondary emotional and psychological difficulties, such as depression, anxiety, delinquency, gambling, and gaming addiction, which are emerging as social problems and academic disruption (61-65). Therefore, specialized personnel who can intervene in psychological difficulties faced by high-risk groups are required. However, when looking at the situation in schools and counseling centers, there is a lack of a professional training curriculum and a shortage of professional manpower due to a lack of budget. For this reason, there is a problem that professionals

have a large workload and cannot provide high-quality counseling and programs due to professional burnout.

By revealing the variables that significantly affect adolescents' intention to drop out of school, this study can contribute to the establishment of programs and policies to reduce future dropout intentions. However, there are several limitations to this study, and we suggest some future research that could be conducted. First, this study was conducted among adolescents living in small and medium-sized cities and rural areas in South Korea; therefore, it may not reflect all the characteristics of adolescents living in large cities. Those surveyed were typical of the general student population, which means that although this study can inform programs and policies that focus on to prevent students from becoming more intentional about dropping out, it may not be appropriate specifically for students at risk of dropping out. In this case, it is worth noting that one study (52) found that parental monitoring was the most important protective factor for delinquent youth and that neither family type nor school factors were protective. Second, although this study only examined the variables that had the greatest impact, it is necessary to examine the mediating or moderating effects of each variable, as variables that cause dropouts often interact. For example, several studies (54-57) have shown that academic achievement is the most important factor in causing dropout. The factors (ex., cultural factors, psychological factors, school-level factors, household factors, economic factors) known to cause dropout may directly and indirectly affect dropout. It means that those factors may cause low academic achievement, and this low academic achievement increases the dropout rate (58). Thus, when considering the relationship between these variables, it is important to consider both internal and external variables. This is because the decision to drop out may be driven by exogenous factors rather than endogenous factors related to the decision to drop out or may be caused by systemic deficiencies (59). Research is then needed to synthesize these findings, develop a model to predict student dropout, and validate the model's effectiveness with real-world data. Third, this study used a variable of dropout intention rather than dropout. Although dropout intention increases the likelihood of actual dropout, having the intention to drop out does not necessarily mean that students will drop out. Further research is needed to explore the process by which students with dropout intentions actually drop out and to identify the determinants of dropout.

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Declarations

Authors declare that all works are original and this manuscript has not been published in any other journal.

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