

The Era of COVID-19, Educational Recovery or Widening Disparities?

An Analysis Based on the 2016–2021 Adolescent Online Health Behavior Survey

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Abstract: This study aimed to analyze the impact of disasters, such as COVID-19, on adolescents. Specifically, it examined how the effects of COVID-19, one year after its outbreak in 2020, influenced school adjustment, including study time and psychological and emotional well-being, among adolescents from different income groups. For this analysis, data from the 2016–2021 Youth Health Behavior Online Survey, provided by the Korea Disease Control and Prevention Agency (KDCA), were utilized. This study employed the trend analysis and the difference-in-differences (DID) methodology to assess changes over time. The findings indicated that, after COVID-19, adolescents from middle-income (3) and lower-middle-income (4) groups exhibited shorter study hours compared to those from the upper-income (1) group. Additionally, the gap in study hours between the upper-income (1) and lower-income (5) groups reached its widest point in 2021 since 2016. Furthermore, in terms of psychological and emotional changes, adolescents from the lower-income (5) group were more likely to experience suicide-related factors, such as suicidal thoughts, suicide plans, and suicide attempts, than those from the upper-income (1) group. This effect was more pronounced in 2021 than in 2020. Based on these findings, this study highlights the need for continuous monitoring of post-COVID-19 impacts and the development of more comprehensive educational recovery policies to address differences in recovery rates among income groups.

Keywords: Disaster Inequality, COVID-19, School Adjustment, Income Groups, Adolescents

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Introduction

Has the COVID-19 pandemic truly ended? At some point, news about COVID-19 just gradually started fading from the forefront of media coverage. Similarly, discussions and research on the pandemic have decreased in the academic and educational fields. Like some other countries, South Korea demonstrated a successful pandemic response, particularly in implementing comprehensive online education through the concerted efforts of teachers, parents, and the government. However, as of 2022, has the impact of COVID-19 been entirely resolved? Are we fully on a path to educational recovery? These questions serve as the starting points for this study.

How have we changed since the outbreak of COVID-19 in 2020, and what role does COVID-19 continue to play, from a broader perspective? This study analyzes these aspects using empirical data, aiming to determine the consequences that must be addressed one year after the pandemic.

This study draws on Mutter's (2016) discussion of the differential impacts of disasters and his proposed economic growth model. Mutter (2016) suggests that disasters affect individuals differently, depending on their circumstances, and that disparities in recovery speed can lead to an exacerbation of socioeconomic inequality. Focusing on this perspective, this study emphasizes how the recovery process itself may widen pre-existing gaps between socioeconomic groups.

Accordingly, this study aims to:

1. Examine the impact of COVID-19 on school adjustment among adolescents from different income groups, and analyze the trends from 2016 to 2021.
2. Determine whether the impact of COVID-19 on school adjustment remains significant, even after controlling for other factors.

To achieve these objectives, this study conceptualizes COVID-19 as a social disaster, focusing on its impact on school adjustment (study time, and psychological and emotional well-being) among adolescents from different income groups. Using data from the 2016–2021 Youth Health Behavior Online Survey provided by the Korea Disease Control and Prevention Agency (KDCA), this study examines the impact of

COVID-19 and the temporal differences in its effects.

A cross-sectional analysis was conducted along with a pooled data approach by applying the difference-in-differences (DID) method, where the impact of COVID-19 was treated as the intervention variable.

Theoretical Background

Disasters and Inequality

In his book *Disaster Inequality*, Mutter (2016) discusses two key aspects of disasters. First, although disasters occur universally, their impact varies, depending on individual and societal circumstances. He compares earthquakes in Haiti and Japan, arguing that the effects of such disasters are highly context dependent, meaning that even identical crises can produce different consequences, based on national and personal conditions. Similarly, empirical studies indicate that economic crises such as recessions tend to disproportionately affect individuals with lower socioeconomic status, causing them to experience more severe negative consequences (Hoynes et al. 2012; Mutter 2015).

Considering the COVID-19 pandemic, previous research has also highlighted the differential effects across social groups. For instance, studies show that employment conditions deteriorated more significantly for individuals with lower educational attainment than for those with higher education levels (Furceri et al. 2020). Moreover, research conducted in South Korea indicates that households that are income-dependent on self-employment experienced greater income loss and increased poverty rates, compared with households with salaried jobs, during the pandemic (Nam and Lee 2020).

The second aspect of disaster inequality is the impact of disasters that extends beyond the immediate event; these factors influence the recovery process differently, in terms of both individual and structural conditions. Mutter (2016) illustrates this using the example of the Haitian earthquake, in which wealthier individuals managed to accumulate even greater financial assets in the aftermath of the disaster. He presents a socioeconomic model explaining how physical shocks transform into social shocks (Mutter 2016, 284–310), using economic growth models from development economics as a theoretical framework. According

to his model, there is a disparity in the post-disaster recovery speed of developing and developed nations. The key factors influencing recovery speed include the rate of economic growth and pre-existing welfare levels. Ultimately, these differences suggest that the wealthy tend to become wealthier while the poor become poorer, reinforcing and widening inequality in the wake of disasters.

This study focuses on the second aspect of disaster inequality: variations in recovery speed following disasters. Specifically, we sought to extend the discussion beyond the immediate impact of COVID-19 in 2020 by examining how its effects persisted in 2021, the year after the pandemic outbreak. We also investigate whether the rate of recovery varies across adolescent groups categorized by income level.

In applying these study aims, this study explores the long-term influence of disasters such as COVID-19, to provide insights into policy interventions that may support more vulnerable populations during disaster recovery.

COVID-19 and Adolescents' School Adjustment (Learning and Psychological Aspects)

This study utilizes the concept of school adjustment as a framework for analyzing the effects of COVID-19 on adolescents and schools. To achieve this, it is necessary to understand the concepts of adaptation and school adjustment.

The concept of adaptation originates in biology, where it refers to morphological and physiological changes that allow organisms to better fit into their environment. As discussions on adaptation expanded into the human domain, the differences between biological and human adaptations became evident. Unlike biological adaptation, where organisms merely conform to their environment, human adaptation involves not only adjusting to surrounding conditions, but also actively shaping those conditions, creating a bidirectional and proactive interaction with the environment (Lazarus 1976). In this sense, adaptation refers to individuals achieving balance and harmony within various situations and conditions of a given society by either adjusting themselves, or modifying their surroundings. Similarly, school adjustment can be understood as a process by which adolescents achieve balance and harmony while

navigating the school environment.

For adolescents, schools serve as a crucial environment for their development, and play a significant role in the socialization process (Shaffer 1999). Throughout their school career, adolescents develop intellectual abilities, experience competence and a sense of belonging, and interact with individuals beyond their families and parents (Vieno et al. 2007). Schools are not just places for intellectual development and skill acquisition, but also institutions that foster the ability to adapt to changing environments and integrate into society. Therefore, school adjustment plays a critical role, not only in adolescents' school lives, but also in their adaptation to social life in future adulthood; this makes it a highly significant concept in research (Bagwell et al. 1998; Chin and Yu 2008; Ladd et al. 1996).

The concept of school adjustment has been defined in various ways, often as a hypothetical construct, which makes measurement challenging (Missall 2002). Consequently, numerous researchers have proposed different subcategories of school adjustment. While this conceptual complexity may present difficulties in defining a singular, standardized measurement tool, it also provides a deeper understanding of school adjustment as a multidimensional phenomenon. This aspect is particularly important for the current study, which aims to examine COVID-19, schools, and adolescents by drawing on the existing literature. The various dimensions of school adjustment offer valuable insights into specific social phenomena.

Early research on school adjustment focused primarily on students' academic performance and acquisition of cognitive skills. However, recent studies have expanded this definition to include a broader range of school experiences that go beyond academics (Moon 2002). For instance, Berndt and Keefe (1995) identified positive participation in class activities and appropriate classroom behavior as key elements of school adjustment, in addition to academic achievement. In their school adjustment scale, Birch and Ladd (1997) included emotional and behavioral responses such as school preference, school avoidance, cooperative participation, and voluntary engagement. Roeser and Eccles (1998) assessed school adjustment along three dimensions: academic adjustment (self-concept, educational values, and absenteeism), psychological adjustment (self-esteem, anger, and depression), and school perception (autonomy, school

goal structures, and teacher support). Dubois et al. (1994) measured school adjustment using academic performance, school attendance, and self-perception of learning ability, whereas Kurdek et al. (1995) focused on academic achievement, fundamental knowledge acquisition, and problematic behaviors. Similarly, Jiao (1999) examined school adjustment in terms of positive class participation, school valuation, engagement, disruptive behavior, and academic performance.

Domestic studies on school adjustment have explored various aspects of the concept. Moon (1977, 1984) analyzed middle school students' adjustment to school life across five domains: cognitive skills, class participation, teacher relationships, peer relationships, and self-control (Moon 2002). Bong (1997) examined students' participation in academic activities, extracurricular activities, and school events, defining school adjustment as a harmonious state in which students effectively fulfill their needs and experience satisfaction. Kim (1998) identified class participation, school satisfaction, academic achievement, and behavioral issues as essential components of school adjustment, emphasizing active participation in class, overall school involvement, and the absence of problematic behaviors. Moon and Kim (2002) categorized school adjustment into academic, social, and affective adjustment, where academic adjustment involves class participation, effort in schoolwork, self-regulation of disruptive behaviors, and concentration on studies, social adjustment includes prosocial behaviors such as sociability, rule compliance, responsibility, and acceptance of teacher discipline, and affective adjustment represents general attitudes toward school, including school preference and overall satisfaction.

Further research by Lee (2005) identified four dimensions of school adjustment among middle school students: academic work, peer relationships, teacher relationships, and school life. Kim et al. (2008) examined high-school students' school adjustment using the same four dimensions: academic work, friends, teachers, and overall school life. Lee (2008) divided school adjustment into academic adaptation, teacher relationships, peer relationships, and school life, while Cho (2012) categorized it into academic engagement, adherence to school rules, peer relationships, and teacher relationships.

It can be seen that school adjustment has been analyzed by distinguishing between academic, psychological, and emotional

adjustments. Academic adjustment encompasses aspects related to learning, such as study time and engagement in academic activities, whereas psychological and emotional adjustment focuses on factors such as self-esteem, depression, and emotional well-being. Utilizing this framework, this study sought to examine how COVID-19 influenced adolescents' academic engagement and psychological well-being across different income groups.

COVID-19 and Vulnerable Adolescents

If crises of infectious diseases, such as COVID-19, have differential impacts on different social classes, or on children and adolescents, it is necessary to clearly identify which adolescents are disproportionately affected—the so-called “disadvantaged” youths. From a policy perspective, budget constraints require the selection of the most efficient policy measures (Jeong et al. 2020). In other words, to effectively design optimal policy alternatives for disadvantaged adolescents, it is necessary to precisely identify who these adolescents are, and the specific difficulties they face.

Kim et al. (2020) defined disadvantaged adolescents as those who are socially and educationally underprivileged youth. Socially disadvantaged students face socioeconomic disadvantages due to economic (low income, poverty), cultural (multicultural backgrounds, North Korean defectors, refugees), regional (rural areas, underdeveloped urban areas), family (single-parent families, neglect, abuse), personal (gender, age, disability, illness), and digital factors (digital media access and utilization gaps) (Kim et al. 2020). Educationally disadvantaged students, however, are those who, in addition to the aforementioned external socioeconomic factors, experience educational disadvantages. These include school-related (school stratification, differences in school culture, and discriminatory mechanisms within schools) or internal factors (lack of learning ability and effort) (Kim et al. 2020, 31, cited).

Lee et al. (2007) further categorized exclusion into social and educational exclusion and classified disadvantaged youth into economically excluded (children in poverty), culturally excluded (children of international marriages, North Korean defectors), historically/regionally excluded (rural youth, descendants of independence activists),

nationally excluded (international students), and specifically (temporarily) excluded (youth in crisis, institutionalized youth). Kim (2020) defined educationally disadvantaged students as those who are excluded or marginalized in education, and further classified them into students excluded from educational opportunities (out-of-school children, school dropouts), students facing educational crises (students experiencing school maladjustment, victims of school violence), and students failing to meet the minimum educational standards.

Existing studies have focused on disadvantaged youth in the context of COVID-19. First, research analyzing the economically disadvantaged class includes the work of Jeong et al. (2020), who conducted a 10-day web-based survey in April 2020—a period when school openings were delayed due to a surge in COVID-19 cases. The study surveyed 1,009 children and adolescents aged 10–19 years (4th–11th grades) and analyzed changes in their daily lives and emotional states (sleep, exercise, study, and media usage). The results showed that study time had increased by an average of 56 minutes, compared to pre-COVID-19 levels, and the proportion of children engaging in excessive studying also increased. Additionally, students who previously had higher academic performance tended to increase their study hours even more after the COVID-19 pandemic. The study also found that excessive media use increased, that children who met the recommended exercise levels had lower levels of future anxiety, and that children from lower social classes had fewer meals per day. Based on these findings, the study posited that the widening care gap due to COVID-19 has affected daily routines (sleep, study, exercise, and media use), as well as psychological and emotional well-being. It also highlighted that difference in family economic status and structure (two-parent vs. single-parent households) contribute to disparities in daily life and overall well-being.

Another study conducted by Lee Si-hyo (2020) analyzed how different residential environments affect learning, gaming, family relationships, and playtime among 449 elementary school students (grades 3–6) from three schools in Bucheon. The results showed that students in low-income residential areas exhibited poorer academic performance and concentration. Additionally, the lower the parents' educational level, the more the students increased their gaming time. The same study also found that while parent–child relationships improved, the proportion

of elementary school students spending daytime hours without adult supervision reached 32.3%, a significantly high figure. Furthermore, low-income residential areas lack sufficient play spaces for elementary school students.

Kim (2021) examined support measures implemented by local governments and education offices for vulnerable students during the COVID-19 pandemic. Meanwhile, a study by Shin et al. (2021), using survey data collected by the child welfare NGO Kia Community Welfare Center, analyzed the effects of COVID-19 on low-income adolescents from families with incomes below 100% of the median income (415 children and adolescents aged 11–19). This study examined how changes in personal life (exercise time, sleep time, and regular sleep patterns), emotional changes (peer relationship anxiety and academic performance anxiety), and family life (parental physical threats and time spent alone) affect happiness. The results indicated that exercise time decreased among adolescents from low-income families, and approximately one-third of the students reported irregular sleep patterns. Regarding emotional changes, peer relationships and academic anxiety increased, with more students reporting an increase than a decrease. In terms of family life, approximately a quarter of the students reported an increase in parental physical threats, and the proportion of students spending time alone more than doubled, compared to those who reported a decrease.

Research has also been conducted on adolescents in other cultures. Lee et al. (2021) conducted three interviews at selected Multicultural International Innovation Schools in multiculturally dense areas of Gyeonggi Province, examining remote learning plans and curriculum documents. The study identified challenges in remote learning for multicultural students, including declining basic academic proficiency, widening care gaps, limitations in multiculture-specific curricula, exclusion from online learning, teacher fatigue, and difficulties in parent-school communication. Koo (2021) surveyed 12 Family and Multicultural Family Support Centers in Province J to examine the impact of COVID-19 on their operations. The study found that business operations were disrupted, transitioned, or downsized because of the pandemic. Additional challenges included uncertainty in program implementation, difficulties in adhering to health guidelines, problems with activity kits and video lessons, online learning issues, budget constraints, and

performance pressures. The study emphasized the need for training in digital tools for both staff and users, granting greater autonomy in emergency situations, and restructuring and prioritizing projects to prepare for future pandemics.

Kim (2021) conducted in-depth interviews with six elementary school students with migrant backgrounds, five parents, and two teachers in Gyeonggi Province. The results revealed that COVID-19 has led to care-related issues, socialization difficulties, and digital addiction problems among migrant children. In terms of learning, the study found academic underachievement, widening academic disparities, a lack of self-directed learning, and an absence of parental involvement.

As highlighted by Kim et al. (2020), the category of disadvantaged youths is highly diverse and overlapping. Therefore, this study categorizes disadvantaged youths according to both theoretical discussions and the empirical data available for analysis.

Most previous studies used data collected at specific time points in 2020, or focused on specific regions or target groups (Shin and Kwon 2021; Choi and Kim 2021; Lee and Jang 2021; Lee 2020; Jeong et al. 2020; Kim et al. 2020). Additionally, studies comparing academic achievement levels in 2019 and 2020 often fail to adequately control for various influencing factors (Seoul Educational Policy Research Institute 2021). To address these limitations, this study aimed to provide a more rigorous estimation of the effects of COVID-19, by comparing pre- and post-pandemic outcomes.

Focusing on 2020 and 2021 as distinct time periods, this study seeks to examine whether COVID-19 has exacerbated educational inequality, or whether all groups are on a common path to recovery, using empirical analysis to derive policy implications.

Research Methodology

Data for Analysis

To analyze changes in adolescents' school adjustment following the COVID-19 outbreak, we used data covering both the pre- and post-pandemic periods. Specifically, this study employs data from the 2016 (12th wave) to 2021 (17th wave) Youth Health Behavior Online Survey,

conducted by the KDCA under the Ministry of Health and Welfare.

The Youth Health Behavior Online Survey is a nationwide survey jointly conducted by the Ministry of Health and Welfare and the Ministry of Education aimed at middle- and high-school students across South Korea. The sampling framework was based on the Education Basic Statistics Survey and stratified by factors such as province, district type, school level, urban scale, geographic proximity, population density, apartment ratio, smoking and drinking rates, and other variables. Each year, approximately 60,000 students from 800 schools (400 middle and 400 high schools) participate, to ensure nationwide representativeness.

The survey, conducted annually in June and July, covers 15 domains and includes 105 questionnaire items (as of 2019), addressing topics such as smoking, drinking, physical activity, obesity, mental health, Internet addiction, and violence. Owing to the impact of COVID-19, the 16th survey (2020) was postponed and conducted from August 3 to November 13 (KDCA 2020). The survey was administered online in computer labs under the supervision of designated teachers at each school.

Variables for Analysis

Dependent Variables

To analyze the changes in adolescents' school adjustment before and after COVID-19, this study categorized school adjustment into academic adjustment and psychological/emotional adjustment, using relevant survey items as dependent variables.

For academic adjustment, the survey included questions on study and non-study sedentary times. Specifically, students were asked to report their average daily sedentary time (in minutes) over the past seven days. This item distinguishes weekday and weekend usage.

- Study time includes activities such as school and private academy classes, homework, studying using television or computers, and watching educational programs (e.g., Elementary Behavior Support).
- Non-study sedentary time includes activities such as watching TV, gaming, Internet browsing, chatting, and sitting while commuting.

For psychological and emotional adjustment, the survey items

measured stress levels, depression, suicide ideation, suicide planning, and suicide attempts. However, a limitation of these items is that questions related to sadness/despair, suicidal thoughts, and experiences of violence refer to events within the past 12 months, which means that the responses from the 2020 survey may only partially reflect experiences during the pre-pandemic period.

The specific survey items used are as follows:

- Stress level: This item asked respondents how often they experienced stress in their daily lives. Responses were measured on a reverse-coded five-point Likert scale, meaning that higher values indicated higher levels of perceived stress.
- Depression experience: This item asks whether the respondent has felt so sad or hopeless for at least two consecutive weeks during the past 12 months, that they were unable to continue their usual activities. This was coded as a binary variable (1 = experienced; 0 = not experienced).
- Suicide ideation. This item asked whether the respondent had seriously considered suicide in the past 12 months. This was coded as a binary variable (1 = experienced; 0 = not experienced).
- Suicide planning. This item asked whether the respondent had made a specific plan to commit suicide within the past 12 months. This was coded as a binary variable (1 = experienced; 0 = not experienced).
- Suicide attempts: This item asks whether the respondent has attempted suicide in the past 12 months. This was coded as a binary variable (1 = experienced; 0 = not experienced).

Independent Variables

To estimate the effects of COVID-19, this study constructs a time dummy variable that distinguishes between the pre- and post-pandemic periods. The interaction terms were then created by multiplying this time dummy by the treatment and control groups. In this approach, the interaction term between the post-COVID-19 period and the comparison group served as the key estimator of the COVID-19 effect.

The income groups were categorized into five levels: upper, upper-middle, middle, lower-middle, and lower-income groups. The upper-income group, which was assumed to have been the least affected by

Table 1. Composition of Dependent Variables

Dependent Variable		Item
Study	Study (Weekday/Weekend)	Average daily sedentary time (minutes) in the past 7 days ※ Study: Attending class, doing homework, watching educational broadcasts, etc. ※ Non-Study: Watching TV, playing games, etc.
	Non-Study (Weekday/Weekend)	
Psychological and Emotional Well-being	Stress level	Perceived stress level (5-point scale)
	Depression experience	Experienced sadness/despair for two consecutive weeks in the past 12 months (=1)
	Suicide ideation	Thought about suicide in the past 12 months (=1)
	Suicide planning	Made a suicide plan in the past 12 months (=1)
	Suicide attempt	Attempted suicide in the past 12 months (=1)

COVID-19, was used as the reference group, and the effects on the other income groups were analyzed accordingly.

Control Variables

To examine the impact of COVID-19 on school adjustment, we controlled for factors beyond COVID-19 that may influence school adjustment and income levels. The control variables included regional size (county, small/medium city, metropolitan city), school level (middle school, general high school, vocational high school), sex, academic performance, parental education level, subjective health status, and stress level.

Analytical Method and Estimation Strategy

To estimate the effects of COVID-19, this study employed the DID estimation technique. DID is widely used in causal inferences to assess the impact of policy interventions or programs. This method compares

the pre- and post-treatment differences between a treatment group (affected by the policy/program) and a control group (unaffected). By considering the difference between the two, the pure treatment effect can be isolated, removing any unobserved individual characteristics shared by both groups.

For DID analysis, it is essential to have data for both the pre- and post-intervention periods for both the treatment and control groups. The estimated effects are obtained using the following regression model:

$$Y_{it} = \alpha + \beta \text{Tit} + \gamma \text{Di} + \delta (\text{Tit} \times \text{Di}) + \text{X}_{it}'\theta + \varepsilon_{it} Y_{\{it\}}$$

where:

- Y_{it} represents the dependent variable (school adjustment measures) for individual i at time t .
- Di is a dummy variable indicating whether the individual belongs to the treatment group.
- Tit is a time dummy variable that distinguishes between the pre- and post-pandemic periods.
- δ is the causal estimate of the policy intervention effect (i.e., the impact of COVID-19).
- X_{it}' represents a vector of control variables.
- ε_{it} is the error term.

The treatment groups included lower-income, lower–middle-income, middle-income, and upper–middle-income groups; the upper-income group served as the control group, as it was assumed to have experienced relatively less of an impact from the COVID-19 pandemic.

Additionally, this study divided the post-COVID-19 period into three distinct phases, to allow for a more detailed comparison of the effects over time. The periods analyzed are as follows:

1. Overall COVID-19 period (T) – Including both 2020 and 2021.
2. Early COVID-19 period (T2) – Focusing on 2020 only.
3. Later COVID-19 period (T3) – Focusing on 2021 only.

By analyzing these different time periods, this study allows for comparisons of how the effects evolved over time. In the actual analysis,

the model was estimated separately using T, T2, and T3 as key time variables for the COVID-19 effects.

This study has certain methodological limitations that must be noted. To reflect the causal impact of COVID-19 on the estimated DID effects accurately, a parallel trend assumption must hold. This assumption requires that, in the absence of COVID-19, the treatment and control groups follow a similar trajectory in their school adjustment outcomes. To verify this hypothesis, sufficient pre- and post-COVID-19 data are required. However, due to the limited availability of post-COVID-19 data, confirming the assumption of parallel trends presents a challenge. Consequently, this study proceeded with the implicit assumption that parallel trends hold when conducting the analysis.

Analysis Results

Trends in Study Time Changes Among Adolescents by Income Level—Before and After COVID-19

To analyze changes in school adjustment, this study first examined the study time trends across different income groups, from 2016 to 2021, focusing on the mean values before and after the COVID-19 outbreak.

Figure 1 presents the weekday study time trends. The first notable finding is that the gap in study time between the upper- and lower-income groups increased significantly in 2021, compared with 2016. Specifically, the study time gap between upper- and lower-income adolescents was 29 min in 2016, 24 min in 2017, 55 min in 2017 and 2018, and 26 min in 2019. In 2020, during the COVID-19 pandemic, the gap increased to 40 min, and in 2021, one year after the pandemic, the gap widened further to 65 min, with the largest difference observed from 2016 to 2021.

The second key finding is the difference in the study time between 2020 and 2021, particularly among different income groups. In 2020, the upper-income group reported an average weekday study time of 414 min, which increased to 452 min in 2021, representing an increase of 38 min. In contrast, the lower-income group had a weekday study time of 374 min in 2020, which increased to 387 min in 2021, an increase of only 14 min. Notably, other income groups (lower-middle, middle, and upper-middle) experienced an increase of 30–40 minutes in weekday study time

between 2020 and 2021, whereas the increase in the lower-income group was relatively smaller.

Similarly, Figure 2 presents trends in weekend study time. The study time gaps between the upper- and lower-income groups were 92 minutes, 82 minutes, 99 minutes, and 78 minutes in 2016, 2017, 2018, and 2019, respectively. During the COVID-19 period, the gap remained at 78 min in 2020 but increased to 94 min in 2021, indicating a larger gap in study time in 2021 than in 2020. Similar to the weekday trends, the increase in weekend study time from 2020 to 2021 was approximately 25 minutes for the upper-income group, while the lower-income group only experienced an increase of 9 minutes.

In contrast, [Figures 3] and [Figure 4], which show the non-study sedentary time, reveal the opposite trend. From 2016 to 2021, the lower-income group will consistently have a longer non-study period than the upper-income group. This means that adolescents from lower-income families spend more time on non-study activities than their higher-income counterparts.

Examining the gap in the non-study sedentary time between the two groups on weekdays and weekends further highlights this disparity. On weekdays, the differences in non-study time between the upper- and lower-income groups were 27 minutes, 32 minutes, 38 minutes, and 27 minutes in 2016, 2017, 2018, and 2019, respectively. In 2020, the gap decreases slightly, to 25 minutes; however, in 2021, it increases significantly, to 36 minutes. A similar pattern was observed on weekends;

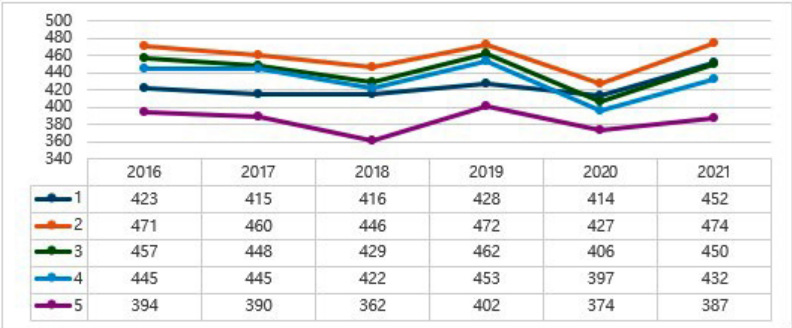


Figure 1. Changes in Weekday Study Time by Income Level (2016–2021)

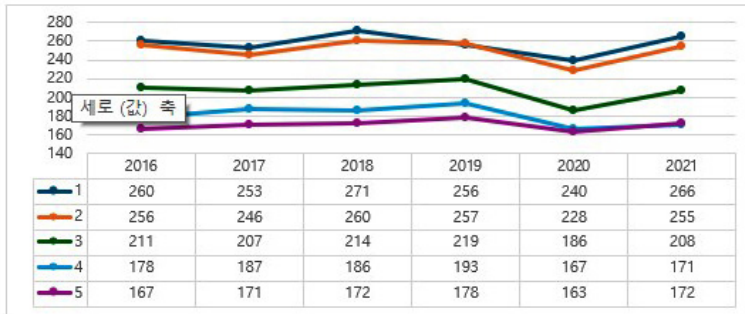


Figure 2. Changes in Weekend Study Time by Income Level (2016–2021)

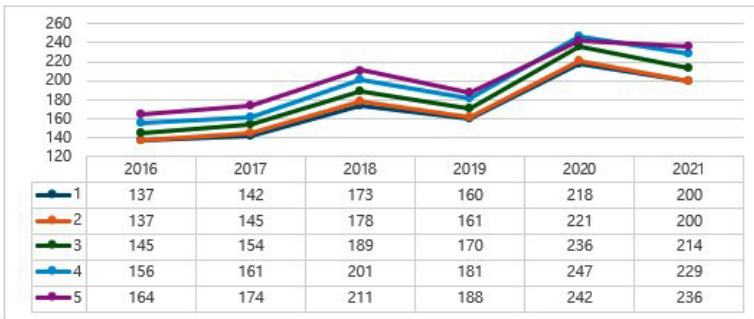


Figure 3. Trends in Weekday Non-Study Time by Income Level (2016–2021)

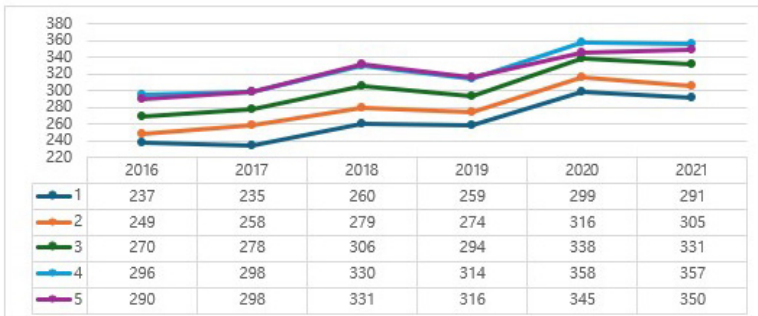


Figure 4. Trends in Weekend Non-Study Time by Income Level (2016–2021)

the gap was 53 minutes, 62 minutes, 71 minutes, and 51 minutes in 2016, 2017, 2018, and 2019, respectively. In 2020, the gap narrowed to 47 minutes; however, in 2021, it increased again to 59 minutes.

In summary, the gap in study time between the upper- and lower-income groups increased after COVID-19 and widened even further in 2021. Additionally, the study time disparity was greater on weekends than on weekdays, indicating that income-based differences in study behaviors became more pronounced over time.

Trends in Psychological and Emotional Changes Among Adolescents by Income Level Before and After COVID-19

Next, we examined changes in psychological and emotional well-being, the second domain of school adjustment, by analyzing the mean values from 2016 to 2021 across different income groups before and after the outbreak of COVID-19.

[Figure 5] presents the trends in stress levels according to income group. Stress levels were highest in the lowest-income group and lowest in the highest-income group. During the COVID-19 period in 2020, stress levels declined overall, and in 2021, stress levels increased among the upper-income group, reducing the gap between the upper- and lower-income groups. Examining the annual differences between these two groups, the gap was 0.60 points, 0.67 points, 0.59, and 0.59 points in 2016, 2017, 2018, and 2019, respectively. In 2020, during the COVID-19 pandemic, the gap increased to 0.65 points, while in 2021, it narrowed to 0.51 points. Comparing 2020 and 2021, the upper-income group's stress level increased by 0.19 points, whereas that of the lower-income group increased by only 0.06 points, contributing to a reduction in the gap.

[Figure 6] illustrates the trends in depression experiences across different income groups. This trend followed a pattern similar to that of stress levels, where the gap between income groups narrowed during the pandemic.

[Figures 7] to [Figure 9] present the trends in suicide-related variables, including suicide ideation, suicide planning, and suicide attempts. Unlike stress and depression, suicide-related variables showed more abrupt shifts during the COVID-19 pandemic. Specifically, in 2020, suicidal thoughts, suicide planning, and suicide attempts declined in the

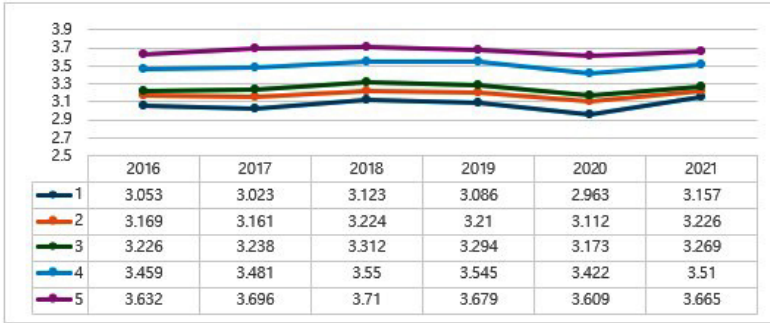


Figure 5. Trends in Stress Levels by Income Level (2016–2021)

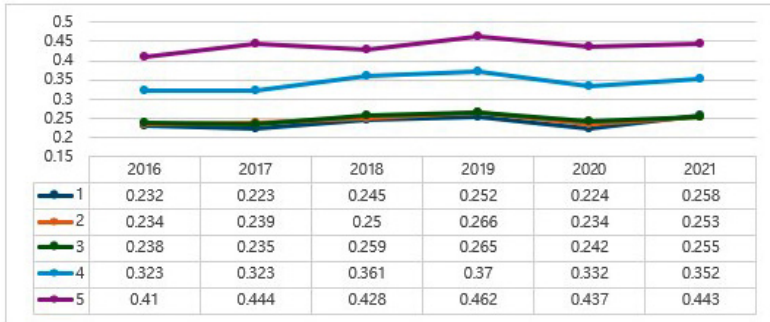


Figure 6. Trends in Depression Experience by Income Level (2016–2021)

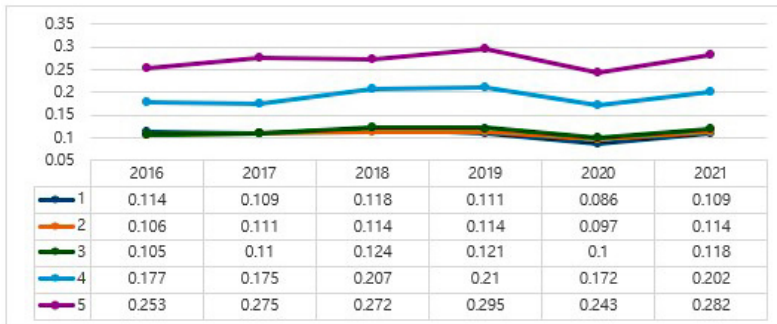


Figure 7. Trends in Suicide ideation Experience by Income Level (2016–2021)

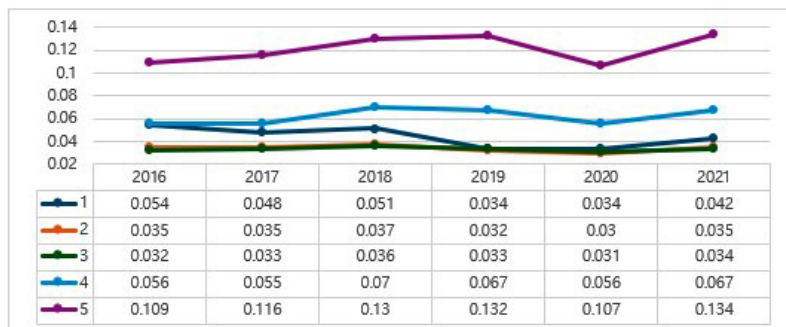


Figure 8. Trends in Suicide Planning Experience by Income Level (2016–2021)

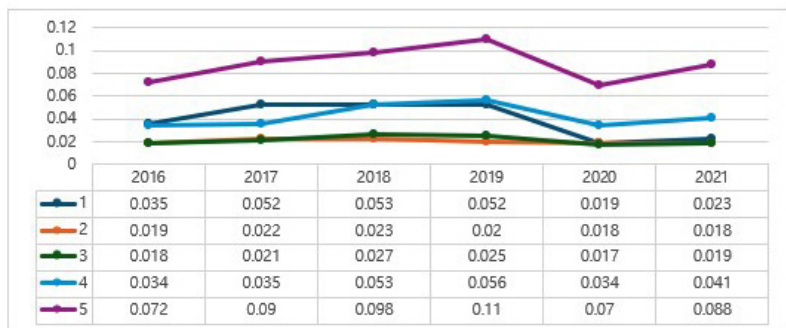


Figure 9. Trends in Suicide Attempt Experience by Income Level (2016–2021)

lower-income group, while it increased sharply in 2021. While other income groups exhibited a gradual increase from 2020 to 2021, the lower-income group showed a distinct surge in suicide-related experiences in 2021.

In summary, the psychological and emotional impact of COVID-19 was not as clearly observed in stress levels or depression experiences, when comparing the pre- and post-pandemic periods. However, for the three suicide-related indicators, a significant increase was detected in the lower-income group in 2021 compared with 2020, highlighting a notable psychological impact among adolescents in lower-income families.

The Impact of COVID-19 on Study Time Among Adolescents by Income Level

Considering that the previous trend analysis did not control for other factors (control variables) that may influence school adjustment, this study employed the DID method to conduct a more rigorous analysis of the impact of COVID-19.

The results of the analysis focusing on study time were as follows:

First, the difference in study time between the income groups was statistically significant when comparing the upper-income group (1) with the lower-middle-income (4), middle-income (3), and upper-middle-income (2) groups. This trend is confirmed in Tables 2, 3, and 4. Specifically, in Table 2, when 2020 and 2021 were considered, the COVID-19 period (T), the study time for the lower-middle-income group (4) was 36 min lower, the middle-income group (3) was 32 min lower, and the upper-middle-income group (2) was 24 min lower than the upper-income group (1).

Second, the differences in the study time between the income groups varied between 2020 (T2) and 2021 (T3). When considering 2020 as the COVID-19 period (T2), the study time gap was relatively large, whereas in 2021 (T3), the gap was small but remained statistically significant. This suggests that the study time disparity was more pronounced in 2020, whereas in 2021, the gap narrowed slightly, but was still statistically meaningful.

In 2020 (T2), the largest gap in study time was observed between the upper-income group (1) and the middle-income group (3). However, in 2021 (T3), the largest gap shifts to the upper-income group (1) and the lower-middle-income group (4)—this difference is relatively large. This indicates that the pattern of study time disparity varied across different periods.

Similar results are shown in Table 4, which presents the results on non-study sedentary time on weekdays. In 2020 (T2), non-study time increased more significantly for the middle-income group (3) than for the upper-income group (1). However, in 2021 (T3), the lower-middle-income group (4) showed a greater increase in non-study time than the upper-income group (1).

Table 2. Impact of COVID-19 on **Weekday Study Time** among adolescents, according to income level

	Dependent Variable: Weekday Study Time					
	t = 1 (2020, 2021)		t2 = 1 (2020)		t3 = 1 (2021)	
	Coef.	Std.	Coef.	Std.	Coef.	Std.
Reference (Income: Upper[1])						
Lower[5] × t	-7.54	10.79	1.30	13.91	-15.13	14.95
Lower-Middle[4] × t	-36.17***	5.34	-37.69***	6.98	-26.38***	7.14
Middle[3] × t	-32.25***	3.92	-40.01***	5.17	-18.82***	5.10
Upper-Middle[2] × t	-24.37***	4.09	-32.88***	5.42	-12.35***	5.32
Obs	215,842		186,449		215,842	
R ²	0.1416		0.1500		0.1415	

Control Variables: Region size (county, small/medium city, metropolitan city), School level (middle school, general high school, vocational high school), Gender, Academic performance, Parental education level, Subjective health status, Stress level.

$p < 0.1^{\dagger}$, $p < 0.05^*$, $p < 0.01^{**}$, $p < 0.001^{***}$

Table 3. Impact of COVID-19 on **Weekend Study Time** Among adolescents, according to income level

	Dependent Variable: Weekend Study Time					
	t = 1 (2020, 2021)		t2 = 1 (2020)		t3 = 1 (2021)	
	Coef.	Std.	Coef.	Std.	Coef.	Std.
Reference (Income: Upper[1])						
Lower[5] × t	10.56	8.64	13.70	11.09	5.63	11.97
Lower-Middle[4] × t	-1.56	4.26	1.77	5.53	-5.00	5.71
Middle[3] × t	-7.72*	3.12	-14.47***	4.10	1.01	4.08
Upper-Middle[2] × t	-8.40*	3.26	-15.94***	4.29	0.74	4.25
Obs	218,048		188,664		218,048	
R ²	0.2044		0.2040		0.2036	

Control Variables: Region size (county, small/medium city, metropolitan city), School level (middle school, general high school, vocational high school), Gender, Academic performance, Parental education level, Subjective health status, Stress level.

$p < 0.1^{\dagger}$, $p < 0.05^*$, $p < 0.01^{**}$, $p < 0.001^{***}$

Table 4. Impact of COVID-19 on **Weekday Non-Study Time** among adolescents, according to income level

	Dependent Variable: Weekday Non-Study Time					
	t = 1 (2020, 2021)		t2 = 1 (2020)		t3 = 1 (2021)	
	Coef.	Std.	Coef.	Std.	Coef.	Std.
Reference (Income: Upper[1])						
Lower[5] × t	11.07[†]	6.04	10.79	7.57	9.97	8.47
Lower-Middle[4] × t	10.92***	2.99	9.73*	3.79	10.96**	4.05
Middle[3] × t	7.14**	2.20	10.81***	2.81	2.59	2.89
Upper-Middle[2] × t	1.94	2.29	5.19[†]	2.94	-0.57	3.01
Obs	215,842		186,449		215,842	
R ²	0.058		0.0571		0.0344	

Control Variables: Region size (county, small/medium city, metropolitan city), School level (middle school, general high school, vocational high school), Gender, Academic performance, Parental education level, Subjective health status, Stress level.

p < 0.1[†], p < 0.05*, p < 0.01**, p < 0.001***

Table 5. Impact of COVID-19 on **Weekend Non-Study Time** among adolescents, according to income level

	Dependent Variable: Weekend Non-Study Time					
	t = 1 (2020, 2021)		t2 = 1 (2020)		t3 = 1 (2021)	
	Coef.	Std.	Coef.	Std.	Coef.	Std.
Reference (Income: Upper[1])						
Lower[5] × t	-1.45	8.68	-6.16	10.98	6.32	12.06
Lower-Middle[4] × t	-0.75	4.28	-1.82	5.48	1.22	5.75
Middle[3] × t	2.97	3.14	5.84	4.06	-0.28	4.11
Upper-Middle[2] × t	0.18	3.28	3.22	4.25	-2.35	4.28
Obs	218,048		188,664		218,048	
R ²	0.042		0.0397		0.0352	

Control Variables: Region size (county, small/medium city, metropolitan city), School level (middle school, general high school, vocational high school), Gender, Academic performance, Parental education level, Subjective health status, Stress level.

p < 0.1[†], p < 0.05*, p < 0.01**, p < 0.001***

The Impact of COVID-19 on Psychological and Emotional Well-being Among Adolescents by Income Level

Next, the impact of COVID-19 on the psychological and emotional well-being of adolescents was analyzed using the DID method. Except for stress levels, the variables for depression, suicide ideation, suicide planning, and suicide attempts were binary, and a logistic regression analysis was conducted, presenting odds ratios. A value greater than one indicates a higher likelihood of experiencing the dependent variable, whereas a value less than one indicates a lower likelihood.

First, regarding stress levels, differences in the direction of the coefficients were observed when the COVID-19 period was defined as 2020 (T2) and 2021 (T3). When both 2020 and 2021 were included in the COVID-19 period (T), the results were similar to those for 2021 (T3). Specifically, when defining 2020 as the COVID-19 period (T2), stress levels increased in the lower–middle-income (4) and upper–middle-income (2) groups, compared to the upper-income group (1). However, when defining 2021 as the COVID-19 period (T3), stress levels in the lower–middle-income (4), middle-income (3), and upper–middle-income (2) groups were lower than those in the upper-income group (1). These findings indicate that in 2020, stress levels increased more significantly in the lower-income groups, whereas in 2021, stress levels were higher in the upper-income group (1) than in the other groups.

Regarding depression experience, when 2020 alone was considered the COVID-19 period (T2) and when both 2020 and 2021 were considered (T), adolescents from the lower-income group (5) were found to have a higher probability of experiencing depression than those in the upper-income group (1).

Similarly, for suicide-related variables, all three measures—suicide ideation, suicide planning, and suicide attempts—showed a higher probability among lower-income adolescents (5) than among upper-income adolescents (1). Statistically significant results were evident in the lower-income (5) and lower–middle-income (4) groups.

As shown in Table 8, when defining 2021 as the COVID-19 period (T3), adolescents in the lower-income (5), lower–middle-income (4), and middle-income (3) groups were more likely to experience suicide ideation, with the highest probability observed in the lower-income (5) group. Tables 9 and 10 present the results for suicide planning and suicide

Table 6. Impact of COVID-19 on **Stress Level** among adolescents, by income level

	Dependent Variable: stress level					
	t = 1 (2020, 2021)		t2 = 1 (2020)		t3 = 1 (2021)	
	Coef.	Std.	Coef.	Std.	Coef.	Std.
Reference (Income: Upper[1])						
Lower[5] × t	0.009	0.038	0.059	0.049	-0.050	0.053
Lower-Middle[4] × t	-0.017	0.019	0.042†	0.024	-0.087**	0.025
Middle[3] × t	-0.025†	0.014	0.018	0.018	-0.078***	0.018
Upper-Middle[2] × t	-0.001	0.015	0.039*	0.019	-0.055**	0.019
Obs	222,509		192,691		222,509	
R ²	0.1321		0.1349		0.1312	

Control Variables: Region size (county, small/medium city, metropolitan city), School level (middle school, general high school, vocational high school), Gender, Academic performance, Parental education level, Subjective health status, Stress level.

$p < 0.1^{\dagger}$, $p < 0.05^*$, $p < 0.01^{**}$, $p < 0.001^{***}$

Table 7. Impact of COVID-19 on **Depression Experience** among adolescents, by income level

	Dependent Variable: Depression Experience					
	t = 1 (2020, 2021)		t2 = 1 (2020)		t3 = 1 (2021)	
	Odd ratio	Std.	Odd ratio	Std.	Odd ratio	Std.
Reference (Income: Upper[1])						
Lower[5] × t	1.18†	0.12	1.27†	0.16	1.04	0.14
Lower-Middle[4] × t	1.01	0.05	1.03	0.07	0.99	0.07
Middle[3] × t	1.00	0.04	1.02	0.05	0.98	0.05
Upper-Middle[2] × t	0.96	0.04	0.98	0.05	0.94	0.05
Obs	222,509		192,691		222,509	
R ²	0.1455		0.1456		0.1455	

Control Variables: Region size (county, small/medium city, metropolitan city), School level (middle school, general high school, vocational high school), Gender, Academic performance, Parental education level, Subjective health status, Stress level.

$p < 0.1^{\dagger}$, $p < 0.05^*$, $p < 0.01^{**}$, $p < 0.001^{***}$

Table 8. Impact of COVID-19 on **Suicide ideation** among adolescents, by income level.

	Dependent Variable: Suicide ideation Experience					
	t = 1 (2020, 2021)		t2 = 1 (2020)		t3 = 1 (2021)	
	Odd ratio	Std.	Odd ratio	Std.	Odd ratio	Std.
Reference (Income: Upper[1])						
Lower[5] × t	1.22†	0.14	1.13	0.17	1.31†	0.20
Lower-Middle[4] × t	1.18*	0.08	1.11	0.10	1.24*	0.11
Middle[3] × t	1.16**	0.06	1.11	0.08	1.18*	0.08
Upper-Middle[2] × t	1.15*	0.07	1.17*	0.09	1.12	0.08
Obs	222,509		192,691		222,509	
R ²	0.1715		0.1703		0.1714	

Control Variables: Region size (county, small/medium city, metropolitan city), School level (middle school, general high school, vocational high school), Gender, Academic performance, Parental education level, Subjective health status, Stress level.

p < 0.1[†], p < 0.05*, p < 0.01**, p < 0.001***

Table 9. Impact of COVID-19 on **Suicide Planning** experiences among adolescents, by income level

	Dependent Variable: Suicide Planning Experiences					
	t = 1 (2020, 2021)		t2 = 1 (2020)		t3 = 1 (2021)	
	Odd ratio	Std.	Odd ratio	Std.	Odd ratio	Std.
Reference (Income: Upper[1])						
Lower[5] × t	1.42*	0.21	1.16	0.24	1.70**	0.32
Lower-Middle[4] × t	1.28*	0.13	1.29†	0.18	1.24	0.16
Middle[3] × t	1.25**	0.11	1.34*	0.16	1.14	0.12
Upper-Middle[2] × t	1.19*	0.11	1.31*	0.16	1.05	0.12
Obs	222,509		192,691		222,509	
R ²	0.1215		0.1198		0.1214	

Control Variables: Region size (county, small/medium city, metropolitan city), School level (middle school, general high school, vocational high school), Gender, Academic performance, Parental education level, Subjective health status, Stress level.

p < 0.1[†], p < 0.05*, p < 0.01**, p < 0.001***

Table 10. Impact of COVID-19 on **Suicide Attempt** Experience among adolescents, by income level

	Dependent Variable: Suicide Attempt Experience					
	t = 1 (2020, 2021)		t2 = 1 (2020)		t3 = 1 (2021)	
	Odd ratio	Std.	Odd ratio	Std.	Odd ratio	Std.
Reference (Income: Upper[1])						
Lower[5] × t	1.41[†]	0.26	1.04	0.27	1.84**	0.43
Lower-Middle[4] × t	1.52**	0.20	1.59*	0.29	1.38[†]	0.24
Middle[3] × t	1.31*	0.15	1.40*	0.22	1.19	0.17
Upper-Middle[2] × t	1.42**	0.17	1.61**	0.26	1.19	0.18
Obs	222,509		192,691		222,509	
R ²	0.1268		0.1255		0.1263	

Control Variables: Region size (county, small/medium city, metropolitan city), School level (middle school, general high school, vocational high school), Gender, Academic performance, Parental education level, Subjective health status, Stress level.

p < 0.1[†], p < 0.05*, p < 0.01**, p < 0.001***

attempts, respectively. The results indicate that fewer adolescents reported experiencing suicide attempts than suicide planning, and fewer reported suicide planning than suicide ideation. This suggests that suicide ideation is more common, whereas suicide attempts are a more severe behavioral manifestation. Notably, the lower-income group (5) showed a stronger likelihood of experiencing suicide ideation, progressing to suicide planning, and ultimately attempting suicide than the upper-income group (1).

The findings also suggest that suicide-related experiences were statistically more significant in 2021 than in 2020, indicating that the likelihood of experiencing suicide-related thoughts or behaviors varied, depending on the period of the COVID-19 pandemic.

In summary, the analysis of psychological and emotional well-being showed that 2021 will have a more significant negative impact than 2020. Among the income groups, the lower-income group (5) was particularly affected, especially in terms of suicide-related experiences, with a greater

disparity observed when compared to the upper-income group (1).

Conclusion and Implications

This study investigated the impact of COVID-19 on adolescents' school adjustment in disaster situations. In particular, this study utilized data from 2020, the year of the COVID-19 outbreak, and 2021, one year after the outbreak, to examine how changes unfolded in the aftermath of the pandemic. Our primary focus was to empirically investigate whether the effects of the disaster persisted over time, or whether a recovery trend emerged. Additionally, to assess the differential impact of disasters, adolescents were categorized into five income groups, based on their household income, and the effects of COVID-19 were estimated accordingly.

First, the trend analysis revealed that COVID-19 contributed to an increase in the gap between income groups compared with the pre-pandemic period. This was evident in weekday study time and non-study time, showing that differences in study behavior became more pronounced with income level. Additionally, psychological and emotional changes were observed after COVID-19, particularly in relation to suicidal thoughts, suicide planning, and suicide attempts, in which income-based disparities became more evident.

Next, the DID method was used to control for other influencing factors besides COVID-19 and separately analyze the effects in 2020 and 2021. The findings were as follows: COVID-19 had a negative impact on study time among the lower-middle-income (4) and middle-income (3) groups, compared with the upper-income (1) group. In contrast, the psychological and emotional impacts of COVID-19 were statistically significant for suicide-related variables, with a more pronounced negative effect on the lower-income (5) group in 2021, one year after the pandemic, compared with the upper-income (1) group.

Policy Implications

These findings offer several key implications. First, the effects of COVID-19 persisted, even one year after the pandemic, and particularly

vulnerable groups have continued to emerge. Therefore, the policy goal of educational recovery in response to COVID-19 must be sustained and support for vulnerable populations should be actively pursued.

Second, differences in the study time between income groups highlight disparities in learning experiences. The analysis showed that middle- and lower-middle-income adolescents were more negatively affected than upper-income adolescents, which aligns with previous findings. Furthermore, the fact that the gap in study time between higher- and lower-income groups widened even further after COVID-19 suggests that the pandemic exacerbated educational inequality. Although learning gaps were already a major policy issue before the pandemic, the accelerated disparities following COVID-19 indicate that more specific and effective solutions beyond the previous policy approaches must be explored.

Third, in terms of psychological and emotional well-being (suicide-related experiences), the risk among lower-income adolescents in 2021 was greater than in 2020. Previous research on national disasters has identified various tangible and intangible effects on adolescents' mental health and negative emotional behaviors. Similarly, COVID-19 has had a disproportionately greater impact on vulnerable groups, and over time, these issues may become more severe. Therefore, ongoing support for psychological and emotional well-being must be strengthened.

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COVID-19时代, 教育恢复还是差距扩大? 基于2016-2021年青少年网络健康行为调查的分析

摘要: 本研究旨在分析灾害对青少年的影响。具体而言, 研究了2020年, COVID-19疫情爆发一年后, 其对来自不同收入群体的青少年在学校适应方面(包括学习时间和心理情绪健康)的影响。本研究利用了韩国疾病控制与预防机构(KDCA)提供的2016-2021年青少年健康行为在线调查数据。本研究采用趋势分析和双重差分(DID)方法评估随时间的变化。结果表明, COVID-19疫情后, 与高收入群体相比, 中等收入和中低收入群体的青少年学习时间更短。此外, 自2016年以来, 高收入群体与低收入群体在学习时间上的差距在2021年达到最大。在心理和情绪变化方面, 低收入群体的青少年比高收入群体的青少年更容易出现与自杀相关的因素, 如自杀念头、自杀计划和自杀未遂。这一影响在2021年比2020年更为显著。基于这些发现, 本研究强调了需要持续监测COVID-19的后续影响, 并制定更全面的教育恢复政策, 以解决不同收入群体之间恢复率的差异。

关键词: 灾害不平等、COVID-19、学校适应、收入群体、青少年

코로나19 시대, 교육의 회복인가 격차 확대인가? 2016~2021년 청소년온라인건강행태조사 분석을 중심으로

초록: 본 연구는 코로나 19와 같은 재난이 청소년에게 미치는 영향을 분석한다. 특히 코로나 19가 2020년 발생한지 1년이 경과한 시점에서 그 영향이 소득계층별 청소년의 학교적응(학습시간, 심리·정서)에 미치는 영향을 분석했다. 분석을 위해 질병관리청에서 제공하는 청소년건강행태온라인조사 2016년~2021년 자료를 활용하였으며, 연도별 변화 추이 분석과 이중차분법을 활용하였다. 분석결과, 코로나 19 이후 소득계층별로 학습시간에 있어서 소득 상(1) 계층에 비해 소득 중(3), 중하(4) 계층이 낮게 나타나고 있으며, 소득 상(1) 계층과 소득 하(5) 계층 간의 격차는 2016년 이래로 2021년에 가장 크게 나타난 것을 확인할 수 있었다. 또한, 코로나 19 이후 소득계층별 심리·정서적 변화 측면에서 소득 상(1) 계층에 비해 소득 하(5) 집단에서 자살 관련 변인을 경험할 확률이 더 높게 나타나고 있는 것을 확인할 수 있었으며 그 효과는 2020년 시점보다 2021년 시점에 더 크게 나타나고 있는 것을 확인할 수 있었다. 이러한 분석 결과를 바탕으로, 코로나 19 이후 그 영향에 대한 지속적인 분석과 계층 간 회복속도의 차이를 고려한 교육회복 정책이 보다 촘촘하게 마련될 필요가 있다는 점을 시사점으로 제시했다.

핵심어: 재난불평등, 코로나19, 학교적응, 소득집단, 청소년

COVID-19の時代、教育回復か格差拡大か？ 2016~2021年度青年健康行動オンライン調査に基づいた分析

要旨: 本研究では、COVID-19などの災害が青年に与える影響を分析することを目的とした。具体的には、2020年のアウトブレイクから1年を経て、COVID-19が、異なる所得層の青年の間で、勉強時間や心理的・感情的ウェルビーイングを含む学校適応感に及ぼした影響を検証する。この分析では、韓国疾病管理庁（KDCA）が提供する2016~2021年度青年健康行動オンライン調査のデータを活用した。また、本研究では、傾向分析と差分の差分（DID）法を用いて経時的変化も評価した。結果からは、COVID-19発生後は、高所得層（1）の青年と比較して、中所得層（3）および低中所得層（4）の青年の勉強時間が短くなっていたことが示された。また、高所得層（1）と低所得層（5）の勉強時間の差は、2016年以降では2021年の時点で最も大きくなっていた。さらに、心理的・感情的変化の点では、高所得層（1）の青年と比較して、低所得層（5）の方が希死念慮、自殺計画、自殺未遂といった自殺関連の要因を経験する可能性が高くなっていた。このような影響は、2020年よりも2021年の時点でより顕著になっていた。これらの結果から、本研究では、所得層間での回復率の差に対処するために、COVID-19後の影響を継続的にモニタリングし、より包括的な教育回復政策を策定する必要性を強調する。

キーワード: 災害の不平等性、COVID-19、学校適応感、所得層、青年

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