

## Analysis of variables affecting students' happiness

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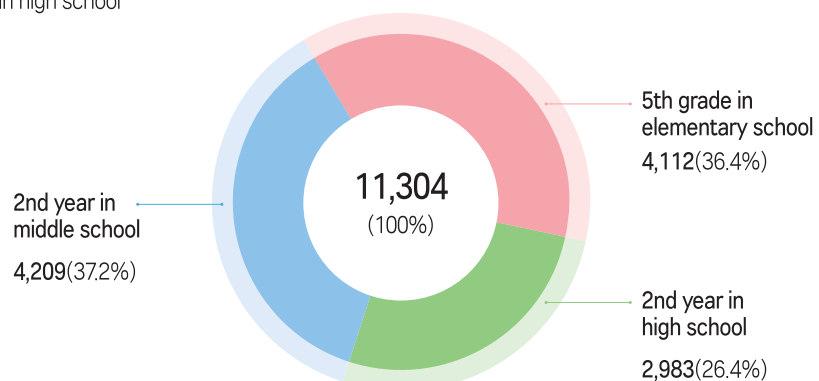
### Overview

- The Daejeon Education Longitudinal Study (DELS) examines the current state of school educational activities and systematically and continuously investigates and analyzes the factors affecting student growth and development to establish data-driven educational policies in Daejeon.
- This issue focuses on students' "happiness" to explore its relationship with various student-related variables.
- The happiness perceived by students is different from what is perceived by adults in terms of form and nature. Moreover, since happiness perceived by students as individuals is an important mechanism and driving force in establishing self-identity and achieving personal maturity, paying attention to this concept is necessary (Kwon & Yang, 2014).
- Previous studies have revealed that various factors affect happiness in adolescence, such as relationships with parents, teachers, and peers (relational aspects), self-esteem, confidence, and positive attitudes (emotional aspects), academic performance (cognitive aspects), and sleep, physical activity, alcohol or smoking habits, and breakfast consumption (health aspects) (Kim et al., 2015; Kim & Kim, 2023; Kwon & Yang, 2014; Wi & Lee, 2015).
- This study selected student happiness as well as eight variables related to home, school, and individuals that may affect happiness, analyzing a total of nine using descriptive statistics, correlation analysis, and regression analysis.
- The data used were derived from the 1st Daejeon Education Longitudinal Study collected in July 2024.

### Data and methods of analysis

#### 1) Subjects of analysis

- A total of 11,304 students from Daejeon who were in fifth grade in elementary school, second year in middle school, and second year in high school



<Table> Subjects of analysis

- Survey period: July 1-19, 2024
- Survey method: Daejeon Education Longitudinal Study online system

## 2) Variables used in analysis

<Table > Student variables

| No. | Variable                        | Description                                                                                                            | Response category                                                                           | No. of items |
|-----|---------------------------------|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--------------|
| 1   | Sufficient sleep                | Number of days in a week with sufficient sleep                                                                         | ① None ② 1 day<br>③ 2 days ④ 3 days<br>⑤ 4 days ⑥ 5 days<br>⑦ 6 days ⑧ 7 days(every day)    | 1 item       |
| 2   | At least 30 minutes of exercise | Number of days in a week with at least 30 minutes of exercise                                                          |                                                                                             | 1 item       |
| 3   | Leisure time                    | Average leisure time on weekdays and weekends                                                                          | ① 1 hour or less<br>② About 2 hours<br>③ About 3 hours<br>④ About 4 hours<br>⑤ About 5 hour | 2 item       |
| 4   | School satisfaction             | Level of satisfaction with school life                                                                                 | ① Strongly disagree<br>② Disagree<br>③ Neutral<br>④ Agree<br>⑤ Strongly agree               | 1 item       |
| 5   | Relationships with friends      | Level of communication, understanding, and trust with friends                                                          |                                                                                             | 4 item       |
| 6   | Parent/guardian relationships   | Level of interest, understanding, respect, and encouragement from parents/guardians                                    |                                                                                             | 4 item       |
| 7   | Academic achievement            | (Primary) Overall perception of academic achievement<br>(Secondary) Academic achievement in all subjects last semester |                                                                                             | 1 item       |
| 8   | Career maturity                 | Awareness of personal interests and attitudes toward career                                                            |                                                                                             | 5 item       |
| 9   | Happiness                       | Joy and satisfaction in life                                                                                           |                                                                                             | 4 item       |

### 3) Methods of analysis

- Descriptive statistics for happiness and student variables by school level
- Correlation analysis between student variables by school level
- Regression analysis on the effects of student variables predicting happiness by school level
- SPSS 27.0.1

## Results of analysis

### 1) Results of descriptive statistics for happiness and student variables

<Table 2> Results of descriptive statistics for happiness and student variables by school level

N=11,304

| No. | Variable                        | 5th grade in elementary school (n=4,112) |                    | 2nd year in middle school (n=4,209) |                    | 2nd year in high school (n=2,983) |                    | Total       |                    |
|-----|---------------------------------|------------------------------------------|--------------------|-------------------------------------|--------------------|-----------------------------------|--------------------|-------------|--------------------|
|     |                                 | Mean                                     | Standard deviation | Mean                                | Standard deviation | Mean                              | Standard deviation | Mean        | Standard deviation |
| 1   | Sufficient sleep                | <b>4.10</b>                              | 2.37               | <b>3.10</b>                         | 2.18               | <b>2.41</b>                       | 1.86               | <b>3.28</b> | 2.28               |
| 2   | At least 30 minutes of exercise | <b>4.06</b>                              | 2.42               | <b>3.19</b>                         | 2.50               | <b>2.41</b>                       | 2.29               | <b>3.30</b> | 2.50               |
| 3   | Leisure time                    | <b>3.55</b>                              | 1.02               | <b>3.87</b>                         | 0.92               | <b>3.64</b>                       | 1.03               | <b>3.69</b> | 1.00               |
| 4   | School satisfaction             | <b>4.17</b>                              | 0.93               | <b>3.74</b>                         | 1.01               | <b>3.63</b>                       | 0.97               | <b>3.87</b> | 1.00               |
| 5   | Relationships with friends      | <b>3.89</b>                              | 0.87               | <b>3.81</b>                         | 0.85               | <b>3.86</b>                       | 0.78               | <b>3.85</b> | 0.84               |
| 6   | Parent/guardian relationships   | <b>4.19</b>                              | 0.82               | <b>3.85</b>                         | 0.90               | <b>3.89</b>                       | 0.83               | <b>3.98</b> | 0.87               |
| 7   | Academic achievement            | <b>3.69</b>                              | 0.86               | <b>3.04</b>                         | 1.01               | <b>2.73</b>                       | 0.88               | <b>3.19</b> | 1.00               |
| 8   | Career maturity                 | <b>4.26</b>                              | 0.71               | <b>3.81</b>                         | 0.78               | <b>3.84</b>                       | 0.72               | <b>3.98</b> | 0.77               |
| 9   | Happiness                       | <b>3.92</b>                              | 0.98               | <b>3.47</b>                         | 0.96               | <b>3.40</b>                       | 0.89               | <b>3.62</b> | 0.98               |

- “Sufficient sleep,” “at least 30 minutes of exercise,” and “leisure time” decreased as the school level increased.
- “School satisfaction,” “academic achievement,” and “happiness” were highest in fifth grade of elementary school, followed by second year of middle school and second year of high school.
- “Relationships with friends,” “parent/guardian relationships,” and “career maturity” were highest in fifth grade of elementary school, followed by second year of high school and second year of middle school.

## 2) Analysis results for 5th grade in elementary school

&lt;Table 3&gt; Results of correlation analysis by variable for 5th grade in elementary school

n=4,112

| No. | Variable                        | Sufficient sleep | At least 30 minutes of exercise | Leisure time | School satisfaction | Relationships with friends | Parent/guardian relationships | Academic achievement | Career maturity | Happiness     |
|-----|---------------------------------|------------------|---------------------------------|--------------|---------------------|----------------------------|-------------------------------|----------------------|-----------------|---------------|
| 1   | Sufficient sleep                | 1                | 0.18**                          | 0.08**       | 0.23**              | 0.16**                     | 0.22**                        | 0.12**               | 0.19**          | 0.33**        |
| 2   | At least 30 minutes of exercise |                  | 1                               | -0.03        | 0.07**              | 0.12**                     | 0.11**                        | 0.11**               | 0.20**          | 0.13**        |
| 3   | Leisure time                    |                  |                                 | 1            | 0.02                | -0.01                      | 0.03                          | -0.15**              | -0.04**         | 0.07**        |
| 4   | School satisfaction             |                  |                                 |              | 1                   | 0.40**                     | 0.33**                        | 0.18**               | 0.33**          | <b>0.51**</b> |
| 5   | Relationships with friends      |                  |                                 |              |                     | 1                          | <b>0.48**</b>                 | 0.23**               | 0.42**          | <b>0.46**</b> |
| 6   | Parent/guardian relationships   |                  |                                 |              |                     |                            | 1                             | 0.26**               | <b>0.46**</b>   | <b>0.51**</b> |
| 7   | Academic achievement            |                  |                                 |              |                     |                            |                               | 1                    | 0.36**          | 0.24**        |
| 8   | Career maturity                 |                  |                                 |              |                     |                            |                               |                      | 1               | <b>0.47**</b> |
| 9   | Happiness                       |                  |                                 |              |                     |                            |                               |                      |                 | 1             |

\*\* $p < .01$ 

- The results of correlation analysis by variable for fifth grade of elementary school showed that “school satisfaction and happiness” and “parent/guardian relationships and happiness” each had the highest correlation coefficient of 0.51, indicating a significant positive correlation.
- “Relationships with friends and parent/guardian relationships” (0.48) showed the most significant positive correlation, followed by “career maturity and happiness” (0.47), “parent/guardian relationships and career maturity” (0.46), and “relationships with friends and happiness” (0.46).

&lt;Table 4&gt; Results of regression analysis on happiness for 5th grade in elementary school

n=4,112

| No. | Variable                        | Unstandardized coefficient |                | Standardized coefficient (β) | t         |
|-----|---------------------------------|----------------------------|----------------|------------------------------|-----------|
|     |                                 | B                          | Standard error |                              |           |
| 1   | Sufficient sleep                | <b>0.062</b>               | 0.005          | 0.150                        | 12.405*** |
| 2   | At least 30 minutes of exercise | 0.000                      | 0.005          | 0.001                        | 0.069     |
| 3   | Leisure time                    | 0.057                      | 0.011          | 0.059                        | 5.073***  |
| 4   | School satisfaction             | <b>0.302</b>               | 0.014          | 0.287                        | 22.129*** |
| 5   | Relationships with friends      | <b>0.147</b>               | 0.016          | 0.131                        | 9.348***  |
| 6   | Parent/guardian relationships   | <b>0.261</b>               | 0.017          | 0.217                        | 15.481*** |
| 7   | Academic achievement            | 0.038                      | 0.014          | 0.033                        | 2.659**   |
| 8   | Career maturity                 | <b>0.256</b>               | 0.019          | 0.185                        | 13.137*** |

F=447.30, *adj. R*<sup>2</sup>=0.465\*\*\* $p < .001$ , \*\* $p < .01$ 

- The VIF values revealed no concern of multicollinearity. The adjusted R-squared of the regression model for fifth grade of elementary school was 0.465, explaining approximately 47% of variance in “happiness”, and the model was statistically significant ( $F = 447.30, p < 0.001$ ).
- Seven variables, excluding “at least 30 minutes of exercise” showed statistically significant positive relationships with “happiness”.
- Among variables related to “happiness” for fifth grade in elementary school, the variable with the largest effect size was “school satisfaction” ( $B = 0.302, p < 0.001$ ), followed by “parent/guardian relationships” ( $B = 0.261, p < 0.001$ ), “career maturity” ( $B = 0.256, p < 0.001$ ), “sufficient sleep” ( $B = 0.062, p < 0.001$ ), and “relationships with friends” ( $B = 0.147, p < 0.001$ ).

### 3) Analysis results for second year of middle school

<Table 5> Results of correlation analysis by variable for second year in middle school

n=4,209

| No. | Variable                        | Sufficient sleep | At least 30 minutes of exercise | Leisure time | School satisfaction | Relationships with friends | Parent/guardian relationships | Academic achievement | Career maturity | Happiness     |
|-----|---------------------------------|------------------|---------------------------------|--------------|---------------------|----------------------------|-------------------------------|----------------------|-----------------|---------------|
| 1   | Sufficient sleep                | 1                | 0.17**                          | 0.02         | 0.20**              | 0.11**                     | 0.17**                        | 0.11**               | 0.16**          | 0.27**        |
| 2   | At least 30 minutes of exercise |                  | 1                               | -0.02        | 0.11**              | 0.09**                     | 0.06**                        | -0.03                | 0.19**          | 0.13**        |
| 3   | Leisure time                    |                  |                                 | 1            | 0.02                | 0.02                       | 0.04*                         | -0.16**              | -0.01           | 0.06**        |
| 4   | School satisfaction             |                  |                                 |              | 1                   | 0.43**                     | 0.37**                        | 0.17**               | 0.35**          | <b>0.53**</b> |
| 5   | Relationships with friends      |                  |                                 |              |                     | 1                          | <b>0.56**</b>                 | 0.20**               | <b>0.47**</b>   | <b>0.48**</b> |
| 6   | Parent/guardian relationships   |                  |                                 |              |                     |                            | 1                             | 0.23**               | <b>0.45**</b>   | <b>0.53**</b> |
| 7   | Academic achievement            |                  |                                 |              |                     |                            |                               | 1                    | 0.26**          | 0.23**        |
| 8   | Career maturity                 |                  |                                 |              |                     |                            |                               |                      | 1               | <b>0.48**</b> |
| 9   | Happiness                       |                  |                                 |              |                     |                            |                               |                      |                 | 1             |

\*\* $p < .01$ , \* $p < .05$

- The results of correlation analysis by variable for second year of middle school showed that “relationships with friends and parent/guardian relationships” had the highest correlation coefficient of 0.56, indicating a significant positive correlation.
- “School satisfaction and happiness” (0.53) showed the most significant positive correlation, followed by “parent/guardian relationships and happiness” (0.53), “relationships with friends and happiness” (0.48), “career maturity and happiness” (0.48), “relationships with friends and career maturity” (0.47), and “parent/guardian relationships and career maturity” (0.45).

<Table 6> Results of regression analysis on happiness for second year in middle school

n=4,209

| No. | Variable                        | Unstandardized coefficient |                | Standardized coefficient (β) | t         |
|-----|---------------------------------|----------------------------|----------------|------------------------------|-----------|
|     |                                 | B                          | Standard error |                              |           |
| 1   | Sufficient sleep                | <b>0.051</b>               | 0.005          | 0.114                        | 9.797***  |
| 2   | At least 30 minutes of exercise | 0.009                      | 0.004          | 0.024                        | 2.053*    |
| 3   | Leisure time                    | 0.048                      | 0.012          | 0.046                        | 4.049***  |
| 4   | School satisfaction             | <b>0.278</b>               | 0.012          | 0.293                        | 22.748*** |
| 5   | Relationships with friends      | 0.110                      | 0.016          | 0.098                        | 6.729***  |
| 6   | Parent/guardian relationships   | <b>0.275</b>               | 0.015          | 0.258                        | 18.145*** |
| 7   | Academic achievement            | 0.049                      | 0.011          | 0.051                        | 4.283***  |
| 8   | Career maturity                 | <b>0.220</b>               | 0.017          | 0.178                        | 13.076*** |

F=471.91, adj.  $R^2$ =0.472

\*\*\* $p < .001$ , \* $p < .05$

- The VIF values revealed no concern of multicollinearity. The adjusted R-squared of the regression model for second year in middle school was 0.472, explaining approximately 47% of the variance in “happiness”, and the model was statistically significant ( $F = 471.91$ ,  $p < 0.001$ ).
- All eight variables showed statistically significant positive relationships with “happiness”.
- Among variables related to “happiness” for second year in middle school, the variable with the largest effect size was “school satisfaction” ( $B = 0.278$ ,  $p < 0.001$ ), followed by “parent/guardian relationships” ( $B = 0.275$ ,  $p < 0.001$ ), “career maturity” ( $B = 0.220$ ,  $p < 0.001$ ), and “sufficient sleep” ( $B = 0.051$ ,  $p < 0.001$ ).

#### 4) Analysis results for second year in high school

<Table 7> Results of correlation analysis by variable for second year in high school

n=2,983

| No. | Variable                        | Sufficient sleep | At least 30 minutes of exercise | Leisure time | School satisfaction | Relationships with friends | Parent/guardian relationships | Academic achievement | Career maturity | Happiness     |
|-----|---------------------------------|------------------|---------------------------------|--------------|---------------------|----------------------------|-------------------------------|----------------------|-----------------|---------------|
| 1   | Sufficient sleep                | 1                | 0.19**                          | 0.15**       | 0.21**              | 0.13**                     | 0.13**                        | 0.05**               | 0.12**          | 0.26**        |
| 2   | At least 30 minutes of exercise |                  | 1                               | 0.06**       | 0.07**              | 0.02                       | 0.02                          | -0.06**              | 0.07**          | 0.11**        |
| 3   | Leisure time                    |                  |                                 | 1            | 0.02                | -0.06**                    | -0.05**                       | -0.20**              | -0.06**         | 0.04*         |
| 4   | School satisfaction             |                  |                                 |              | 1                   | 0.44**                     | 0.37**                        | 0.17**               | 0.34**          | <b>0.55**</b> |
| 5   | Relationships with friends      |                  |                                 |              |                     | 1                          | <b>0.65**</b>                 | 0.20**               | <b>0.53**</b>   | <b>0.52**</b> |
| 6   | Parent/guardian relationships   |                  |                                 |              |                     |                            | 1                             | 0.21**               | <b>0.49**</b>   | <b>0.52**</b> |
| 7   | Academic achievement            |                  |                                 |              |                     |                            |                               | 1                    | 0.22**          | 0.23**        |
| 8   | Career maturity                 |                  |                                 |              |                     |                            |                               |                      | 1               | <b>0.46**</b> |
| 9   | Happiness                       |                  |                                 |              |                     |                            |                               |                      |                 | 1             |

\*\* $p < .01$ , \* $p < .05$

- The results of correlation analysis by variable for second year in high school showed that “relationships with friends and parent/guardian relationships” had the highest correlation coefficient of 0.65, indicating a significant positive correlation.
- “School satisfaction and happiness” (0.55) showed the most significant positive correlation, followed by “relationships with friends and career maturity” (0.53), “relationships with friends and happiness” (0.52), “parent/guardian relationships and happiness” (0.52), “parent/guardian relationships and career maturity” (0.49), and “career maturity and happiness” (0.46).

<Table 8> Results of regression analysis on happiness for second year in high school

n=2,983

| No. | Variable                        | Unstandardized coefficient |                | Standardized coefficient (β) | t         |
|-----|---------------------------------|----------------------------|----------------|------------------------------|-----------|
|     |                                 | B                          | Standard error |                              |           |
| 1   | Sufficient sleep                | <b>0.050</b>               | 0.007          | 0.105                        | 7.495***  |
| 2   | At least 30 minutes of exercise | 0.020                      | 0.005          | 0.051                        | 3.718***  |
| 3   | Leisure time                    | 0.050                      | 0.012          | 0.058                        | 4.243***  |
| 4   | School satisfaction             | <b>0.299</b>               | 0.014          | 0.328                        | 21.411*** |
| 5   | Relationships with friends      | <b>0.156</b>               | 0.022          | 0.137                        | 7.228***  |
| 6   | Parent/guardian relationships   | <b>0.220</b>               | 0.019          | 0.207                        | 11.410*** |
| 7   | Academic achievement            | 0.080                      | 0.014          | 0.080                        | 5.660***  |
| 8   | Career maturity                 | <b>0.173</b>               | 0.020          | 0.140                        | 8.578***  |

F=37.71, *adj. R*<sup>2</sup>=0.475

\*\*\* $p < .001$

- The VIF values revealed no concern of multicollinearity. The adjusted R-squared of the regression model for second year in high school was 0.475, explaining approximately 48% of the variance in “happiness”, and the model was statistically significant ( $F = 337.71$ ,  $p < 0.001$ ).
- All eight variables showed statistically significant positive relationships with “happiness”.
- Among variables related to “happiness” for second year in high school, the variable with the largest effect size was “school satisfaction” ( $B = 0.299$ ,  $p < 0.001$ ), followed by “parent/guardian relationships” ( $B = 0.220$ ,  $p < 0.001$ ), “career maturity” ( $B = 0.173$ ,  $p < 0.001$ ), “relationships with friends” ( $B = 0.156$ ,  $p < 0.001$ ), and “sufficient sleep” ( $B = 0.050$ ,  $p < 0.001$ ).

## Overall results

<Table 9> Overall results by method of analysis

### Descriptive statistics

- Sufficient sleep, exercise frequency, and leisure time decreased as the school level increased
- School satisfaction, academic achievement, and happiness also decreased as the school level increased
- Relationships with friends, parent/guardian relationships, and career maturity were highest, in order, for fifth grade of elementary school, second year of high school, and second year of middle school

### Correlation analysis among student variables

- **Fifth grade of elementary school:** “School satisfaction and happiness” and “parent/guardian relationships and happiness” showed high correlations
- **Second year of middle school:** “Relationships with friends and parent/guardian relationships”, “school satisfaction and happiness”, and “parent/guardian relationships and happiness” showed high correlations
- **Second year of high school:** Relationships with friends-parent/guardian relationships, school satisfaction-happiness, relationships with friends-career maturity, relationships with friends-happiness, parent/guardian relationships-happiness showed high correlations

### Regression analysis of happiness

- All variables related to happiness showed significant positive relationships with happiness except “at least 30 minutes of exercise” for fifth grade of elementary school
- **Effects of happiness for fifth grade of elementary school:** (1) School satisfaction, (2) Parent/guardian relationships, (3) Career maturity, (4) Sufficient sleep, (5) Relationships with friends, (6) Leisure time, (7) Academic achievement
- **Effects of happiness for second year in middle school:** (1) School satisfaction, (2) Parent/guardian relationships, (3) Career maturity, (4) Sufficient sleep, (5) Relationships with friends, (6) Leisure time, (7) Academic achievement, (8) At least 30 minutes of exercise
- **Effects of happiness for second year of high school:** (1) School satisfaction, (2) Parent/guardian relationships, (3) Career maturity, (4) Relationships with friends, (5) Sufficient sleep, (6) Academic achievement, (7) Leisure time, (8) At least 30 minutes of exercise

## Implications

- 1) For fifth-grade elementary-school students, seven variables, excluding “at least 30 minutes of exercise”, showed significant positive relationships with happiness. For second-year middle-school and second-year high-school students, all eight variables showed significant positive relationships. This once again highlights the importance of relevant educational policies.
- 2) The variables that had the greatest impact on the happiness of students across all school levels were “school satisfaction” and “parent/guardian relationships”, which suggests the need to prioritize these variables in educational policies.
- 3) At least 30 minutes of exercise did not have a significant effect for fifth-grade elementary-school students with much exercise, but it had a significant effect on second-year middle-school and second-year high-school students whose amount of exercise tends to continuously decrease. This suggests the need to emphasize regular exercise habits during middle and high school years.

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