The influence of mindfulness and gratitude on the happiness of high school students: grit's moderated mediation model

Introduction. The happiness index of children and adolescents in Korea is very low, ranking 20th out of 22 OECD countries. Further, Korean high school students, who are at a critical juncture in their careers, have lower levels of happiness. There is a need for research to promote happiness among this cohort. Therefore, this study aimed to suggest a plan to improve happiness by investigating whether gratitude mediates the influence of mindfulness on happiness and whether grit moderates this mediating effect.

Study participants and methods. The participants of this study were high school students, who are in the most critical period in terms of their career choice. Three cities and counties in Korea, and three high schools in each city and county, were selected through a random sampling method. Next, the high school students to be surveyed were selected using a purposive sampling method in consideration of gender, grade, etc. Ultimately, 435 questionnaires were used for the final analysis. The participants were evenly distributed along gender lines with 220 males (50.6%) and 215 females (49.4%). Of the sample, 376 people (86.6%) lived in small and medium-sized cities while 59 people (13.6%) lived in rural areas. Of the survey participants, 377 (86.7%) lived with both parents and 58 (13.3%) lived with single parents or grandparents. Data were analyzed using SPSS PC+ Win. Ver. 25.0 and SPSS PROCESS macro Ver. 3.5. The statistical methods used were frequency analysis, reliability analysis, correlation analysis, and a moderated mediation effect analysis.

Results. First, according to the correlation analysis, mindfulness was positively correlated with grit (r=.368, p<.01), gratitude (r=.188, p<.01), and happiness (r=.452, p<.01). Gratitude and happiness had the highest correlation coefficient (r=.494, p<.01), followed by mindfulness and happiness (r=.452, p<.01).

Second, the moderated mediation effect of grit was analyzed. In the effect of mindfulness on happiness through gratitude, the conditional indirect effect of grit was significant, based on the fact that there was no ‘0’ in the upper and lower limits of the bootstrap when the value of grit was high (M+SD) (.6210, .0777~.2512). Therefore, the moderated mediation effect of grit was verified. Grit played a moderating role in increasing the influence of mindfulness on happiness via gratitude only when grit was high.

Practical significance. The results of this study can inform the development of programs and projects to promote happiness by applying mindfulness, gratitude, and grit to children and adolescents. It will also help contribute to the development of research methods through the integrated use of mediation and moderation variables.

Keywords: mindfulness, gratitude, grit, happiness, moderated mediation model

For Reference:
Introduction

The happiness index of children and adolescents in Korea ranks 20th out of 22 OECD countries. The standard score for this group in the ‘Subjective Happiness Index’ in 2019 was 88.51, the lowest in the OECD. Among the detailed indicators, this group ranked last in subjective health and life satisfaction out of all OECD countries, and when year-by-year subjective happiness indexes were collected by groups showing statistically significant differences, 2009-2013 was the lowest, 2015-2018 was the highest, and 2014 and 2019 constituted the middle level [1]; high school students have particularly lower levels of happiness due to the critical career decisions they are facing. Research is needed to increase the level of happiness among these youths.

Mindfulness is a variable that has been shown to affect happiness. For example, mindfulness has been reported to have a positive effect on happiness by reducing stress [2] and anxiety [3; 4]. Based on previous research, this study investigated the effect of mindfulness on the happiness of high school students.

It is not easy to promote happiness through mindfulness alone. In the relationship between mindfulness and happiness, it is necessary to determine the factors that influence happiness as well as the variables that affect those factors, and it is then necessary to prepare a plan to improve happiness. Therefore, it is predicted that gratitude will act as a mediating variable in the relationship between mindfulness and happiness. In other words, since mindfulness affects gratitude [5] and gratitude affects happiness [6], research needs to verify whether gratitude mediates the relationship between mindfulness and happiness in high school students.

Grit has been reported to be a predictor of success [7], as it has been shown to play a moderating role such that the relationship between the two variables is different depending on whether one has high or low grit [8]. Therefore, it is necessary to find a way to increase the happiness of high school students with chronically low happiness by increasing both their gratitude and grit.

On the other hand, when reviewing previous studies, there have been few studies examining whether gratitude plays a mediating role in the relationship between mindfulness and happiness and whether grit moderates the mediating role of gratitude. In other words, establishing a moderated mediation model that combines a mediation model and a moderation model can help find a way to improve the happiness of high school students.

Therefore, this study aimed to verify the moderated mediation effect of grit in the effect of high school student's mindfulness on happiness through gratitude with the ultimate goal of developing a way to promote happiness.

To achieve this research purpose, the following research questions were set. First, what is the correlation between mindfulness, grit, gratitude, and happiness? Second, does grit moderate the mediating effect of gratitude in the influence of mindfulness on happiness (moderated mediation effect)?

Theoretical background

1. The relationship between mindfulness and happiness

Mindfulness is a translation of sati, which refers to a mental ability to keep awake at all times by deliberately paying attention [9]. In addition, mindfulness is about attention...
and awareness, which are universal abilities inherent in humans, and it refers to paying attention in a special way, deliberately, in the present moment, as well as paying non-judgmental attention [10]. Therefore, mindfulness makes you clearly aware of how you are moving your body at any given moment, what you are saying, what you are feeling, what you desire, and what you are thinking [11]. Mindfulness is also a holistic experience in which mind, body, and spirituality are integrated to allow the practitioner to observe the phenomena of their thoughts and desires without prejudice or judgment [11].

Mindfulness initially originated in Buddhism, but it has recently developed into a fusion with psychology and pedagogy. In particular, when American psychologist Langer established mindfulness theory [12], mindfulness was activated through concrete programs in the West rather than in the East. In other words, mindfulness-based stress reduction (MBSR) programs [2] and mindfulness-based psychotherapy like Acceptance Commitment Therapy (ACT) [13] have been developed, and these have been reported to be effective in reducing stress and relieving negative emotions. In addition, research has shown that mindfulness meditation can reduce negative emotions such as depression and anxiety while increasing pleasant emotions, thus resulting in a higher quality of life [14]. In addition, many studies have shown that mindfulness is effective in managing stress and reducing anxiety [15; 16; 3]. Bae and Jang [17] also found that negative emotions decreased among college students after they had participated in a mindfulness meditation program.

On the other hand, happiness, the dependent variable of this study, is a relatively continuous feeling of well-being, not a momentary emotion or mood; it is a cognitive and emotional evaluation of one’s life, and it represents the degree to which an individual positively judges the qualitative level of his or her life [18; 19]. Happiness is also an overall evaluation of one’s quality of life based on their own chosen criteria as an overall and integrated judgment of all aspects of their life [20].

Happy people are more optimistic, more successful, and healthier [21], and they have very high self-esteem, which leads to a productive life even in the face of negative circumstances [22]. In addition, relatively happy people think more positively about themselves [23], feel more personal control [24], and rate recent experiences in their lives as being more pleasant [25]. Therefore, happiness in humans is a very important factor, and it should continue to be researched from a variety of perspectives.

Some previous studies have shown that mindfulness affects happiness. In other words, mindfulness plays a key role in cultivating one’s ability to control one behavior, because it prevents individuals from being bound by automatic thinking, habits, and unhealthy behavior patterns [26]. It is related to the promotion of an individual's psychological well-being, so mindfulness affects happiness in this way.

In addition, studies have shown mindfulness meditation leads to reductions in negative emotions such as depression and anxiety as well as increases in pleasant emotions, thereby resulting in a higher quality of life [14]. A study on housewives also reported that mindfulness not only directly affects well-being, but also gives meaning to life, and promotes overall well-being through fostering autonomous behavioral control in various stressful situations [4]. Therefore, mindfulness is a variable that has been shown to affect happiness, and it is necessary to verify that this is also the case in high school students.
2. Mediating role of gratitude

One of the variables that affect happiness is gratitude. Gratitude is a joyful feeling that arises when you recognize that you have received a favor or help from another person, or a positive emotion that you feel after recognizing the value of a specific situation, person, action, or object [27; 28; 29; 24]. Tsang [30] defined gratitude as a generalized tendency to recognize the goodwill of others and respond with positive emotions to the positive experiences and results one has and achieves. Therefore, gratitude is not a simple emotion, but a profound and complex phenomenon that plays a key role in human happiness, and it is regarded as one of the few factors that can substantially change human life [31].

People with high gratitude are known to have the ability to find positive attributes and reinterpret them in a good direction, even in situations that are easy to interpret negatively because they have a flexible attribution tendency [32; 5; 33]. Emmons and McCullough [34] also reported that those who typically have high levels of appreciation have higher positive emotions, higher life satisfaction, and fewer negative emotions than those who do not. In addition, people with high gratitude appreciate external favorable interests [35] and have the ability to find positive aspects even in stressful situations, and thereby reconstruct the event [5].

For gratitude to play a mediating role in the relationship between mindfulness and happiness, mindfulness—an independent variable—must have a significant effect on gratitude, and gratitude must have a significant effect on happiness—a dependent variable [36]. Previous studies have shown that people with high gratitude seem to have developed a unique cognitive scheme that allows them to find things to be grateful for in a variety of environments and that they find and reinterpret positive characteristics even when they are faced with situations that are easy to interpret negatively [37; 5]. On the other hand, among the sub-factors of mindfulness, attention and current awareness have been shown to make it possible to accurately understand and empathize with one's own emotions as well as the emotions of others, thereby controlling one's emotions and behaviors with actions that fit the situations of others [38]. It is judged that mindfulness and gratitude have a common characteristic of considering another's orientation and objectivity, and it is therefore predicted that there is a correlation between the two variables.

In addition, previous studies have shown that gratitude, the mediator in the present study, affects happiness, the dependent variable [39; 40; 41; 42; 6; 43]. The results of these previous studies consistently indicate that those with high gratitude also have high levels of happiness. Therefore, mindfulness is predicted to have a mediating effect in the relationship between gratitude and happiness, and the present study intends to test this in high school students.

3. Moderating role of grit

There has recently been increasing interest in non-cognitive characteristics as factors that predict success. In particular, grit, one of these non-cognitive characteristics, is defined as persistence and passion toward long-term goals, and it has been reported to predict success in challenging sectors beyond intelligence [44]. For example, grit has been shown to predict academic achievement better than IQ [7], and it better predicts high school graduation and average grades [45]. In addition, when examining the difference between cadets who passed summer training at West Point and those who did not, there was no significant difference in fitness score, high school grade, SAT grade, or leadership score, but grit was only high among cadets who passed summer training [44].
People with high grit have a clear goal orientation, know what their goals are and how to reach them, and have a strong will to achieve them. Because of this high level of self-control, they also avoid distraction, focus on tasks, enjoy challenges with a positive mindset, and consider instances of failure to be learning opportunities [46]. In addition, learners with high grit receive information and feedback that aid them in the process of continuing their efforts, and they use more effective learning strategies to increase their academic skills; this ultimately has a positive effect on academic achievement [47]. On the other hand, people with low grit are more inclined to change their trajectory or give up halfway through an academic program out of disappointment with themselves or boredom [48].

Meanwhile, grit, the moderating variable of this study, has been shown to contribute significantly to successful outcomes such as academic achievement [49; 44], and a study of adolescents and adults showed a positive correlation between grit and life satisfaction [50]. In a study of foreign university students residing in Korea, grit was found to be significantly higher in the medium and high school adaptation groups than in the low school adaptation group [51]. Further, the moderation and moderated mediation effects of grit have been verified through several studies. In a longitudinal study of 209 college students, the interaction effect of gratitude and grit reduced suicidal thoughts [8]. In a study of Korean adults, grit was reported to have a moderated mediation effect on the relationship between authentic leadership, hope, and organizational effectiveness [51]. When considering the results of these previous studies, it is predicted that grit will moderate the relationship between mindfulness and gratitude, and play a moderated mediation role in the path to mindfulness→gratitude→happiness (conditional indirect effect); therefore, it is necessary to test this prediction in high school students.

**Research method**

1. **Participants and data collection method**

To improve the applicability of the research results, the target research area of this study was limited to Chungnam province. The participants of this study were high school students who are faced with making the most important decisions about their careers, and in order to increase the possibility of generalization, the high schools were selected through a random sampling method from three cities/counties in Chungnam province, and three high schools from each city/county. Next, the high school students to be surveyed were sampled using a purposive sampling method in consideration of both gender and grade.

A questionnaire was used for data collection. A researcher visited each selected school, explained the purpose of the questionnaire to the principal, homeroom teacher, and students, and then obtained consent and administered the questionnaire. Prior to conducting the survey, the procedure was approved by IRB (HS21-03-02). Ultimately, 435 questionnaires were used for the final analysis.

The survey participants were evenly distributed along gender lines with 220 males (50.6%) and 215 females (49.4%). There were 376 people (86.6%) in small and medium-sized cities and 59 people (13.6%) in rural areas. Of the survey participants, 377 (86.7%) lived with both parents and 58 (13.3%) lived with single parents or grandparents.

2. **Research tools**

2.1. **Mindfulness**

To measure mindfulness, we used the scale developed by Park [16]. This scale was developed to measure the degree of immediate current awareness, attention, non-
judgmental acceptance, and decentralized attention to internal and external experiences. It is composed of 20 questions such as, “It is difficult to concentrate my mind on one task or thing (inverted questionnaire)” and “If I know that I have a certain emotion, I think that other people will look at me strangely (inverted questionnaire)”. Each question is rated on a 5-point Likert scale ranging from 1 point (“not at all”) to 5 points (“very much”); the higher the score, the higher the level of mindfulness. In this study, the reliability of Cronbach’s α for mindfulness was .900.

2.2. Grit
The grit (Grit-O) scale developed by Duckworth and Quinn [7] was translated and used by the researcher in the present study. The sub-areas of this scale are passionate interest such as "I am interested in pursuing new things every 2-3 months'-inverted question" and persistence such as "I have achieved goals that take years". It consists of 12 questions in total. The responses are made on a 5-point Likert scale, where higher scores indicate higher levels of grit. In this study, the reliability of Cronbach’s α for grit was .784.

2.3. Gratitude
For gratitude, we used Kwon et al. [53]'s Korean translation and adaptation (K-CQ-6) of the gratitude questionnaire (CQ-6) developed by McCullough et al. [54]. This scale consists of six questions, such as, “I have so many things to be grateful for in my life” and “If I list all the things I have been grateful for, the length will be very long”. Each question is rated on a 5-point Likert scale ranging from 1 point (“not at all”) to 5 points (“very much”), and the higher the score, the higher the gratitude. In this study, the reliability of Cronbach's α for gratitude was .830.

2.4. Happiness
For happiness, the present study used the shortened happiness scale (COMOSWB) developed and validated by Seo and Koo [55]. This scale consists of three questions that measure the satisfaction of the individual, relational, and group; three questions that measure positive emotions; and three questions that measure negative emotions, comprising a total of 9 questions. The questionnaire measuring satisfaction is responded to on a 7-point Likert scale ranging from 1 point (“not at all”) to 7 points (“very much”), and the questionnaire measuring positive and negative emotions is rated on a 7-point Likert scale ranging from 1 point (“I never felt this way”) to 7 points (“I always felt this way”), and the higher the score, the higher the happiness. In this study, the reliability of Cronbach's α for happiness was .852.

3. Data analysis
In this study, SPSS PC+ Win. Ver. 25.0 and SPSS PROCESS macro Ver. 3.5 were used for analysis. First, frequency analysis was conducted to determine the trends of variables, and Cronbach’s α, an internal consistency reliability coefficient, was calculated to determine the reliability. Second, Pearson’s correlation analysis was applied to understand the correlations between variables. Third, model 7 of the SPSS PROCESS macro was used to analyze the moderated mediation effects. When analyzing the effects, the confidence level was set to 95% and the number of bootstrap samples was set to 5,000. The conditions for confirming the conditional effect were set as M and M±SD, and the independent and moderating variables were analyzed after centering the mean.
Results

1. Correlation of major variables and descriptive statistics

Following the correlation analysis of the major variables, significant positive correlations were shown between all variables. Mindfulness showed a positive correlation with grit (r=.368, p<.01), gratitude (r=.188, p<.01), and happiness (r=.452, p<.01). Gratitude and happiness had the highest correlation coefficient (r=.494, p<.01), followed by mindfulness and happiness (r=.452, p<.01).

Regarding the descriptive statistics analysis, gratitude (rated on a 5-point scale) showed the highest average score, whereas happiness (rated on a 7-point scale) showed the lowest average score.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mindfulness</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Grit</td>
<td>.368**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Gratitude</td>
<td>.188**</td>
<td>.258**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4. Happiness</td>
<td>.452**</td>
<td>.299**</td>
<td>.494**</td>
<td>1</td>
</tr>
<tr>
<td>M</td>
<td>3.1387</td>
<td>3.1025</td>
<td>3.5613</td>
<td>4.3436</td>
</tr>
<tr>
<td>SD</td>
<td>0.60252</td>
<td>0.62097</td>
<td>0.73372</td>
<td>1.08364</td>
</tr>
</tbody>
</table>

**p<.01

2. Moderated mediation effect of grit

To investigate whether grit moderates the mediating effect of gratitude in the relationship between mindfulness and happiness in high school students, we analyzed the 7th model of the SPSS PROCESS macro proposed by Hayes [36], and the results are listed in Figure 1 and Table 2.

First, as a result of examining the mediating effect of gratitude, it was found that mindfulness did not have a significant effect on gratitude (.1082, p>.05). Therefore, in the relationship between mindfulness and happiness, the mediating effect of gratitude was not significant. This is the result of offsetting the influence of mindfulness on gratitude by grit, a moderating variable.

As a result of analyzing whether grit moderates the link between mindfulness and gratitude, the interaction term between mindfulness and grit (mindfulness x grit) was positively significant (.2422, p<.001), indicating that grit moderated the link between mindfulness and gratitude. Specifically, grit increased the influence of mindfulness on gratitude.

When examining the conditional effect (M±SD, M), the conditional effects of gratitude were significant among the group with high grit (i.e., when grit was M±SD). The conditional effect was specifically examined using the Johnson-Neyman method [56], which is a floodlight method. In the area where the grit value was higher than .0394, the conditional effect of mindfulness was significant; 48.5% of the total survey participants fell into this area.
However, in the region where the gratitude value was lower than .0394, the conditional effect of mindfulness was not significant; 51.5% of all survey participants fell into this area. In addition, the value of grit was significant in the region lower than -1.4353; 1.15% of the survey participants were covered in this area.

Figure 2 shows an illustration of the conditional effect of mindfulness by dividing grit, a moderating variable, into a high group (M+SD), a middle group (M), and a low group (M-SD). In the group with a high grit, when mindfulness increased, gratitude increased sharply. However, in the low grit group, when mindfulness increased, gratitude gradually decreased. Therefore, the influence of mindfulness on gratitude differed between the high and low grit groups.

Regarding the influence of mindfulness on happiness through gratitude, a conditional indirect effect of grit was identified. When the grit value was high (M+SD), there was no '0' in the upper and lower limits of the bootstrap, so the conditional indirect effect was significant (.6210, .0777~.2512). Therefore, the moderated mediation effect of grit was verified. Only when grit was high (M+SD), mindfulness had a significant effect on happiness via gratitude (mindfulness→gratitude→happiness).

**Figure 1** Statistical diagram of moderated mediation of grit

**Table 2**

Results of analysis of moderated mediation effect of grit

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>SE</th>
<th>t-value</th>
<th>p</th>
<th>LLCI*</th>
<th>ULCI**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mediating variable model (DV: Gratitude)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>3.5280</td>
<td>.0348</td>
<td>101.4129</td>
<td>.0000</td>
<td>3.4596</td>
<td>3.5964</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>.1082</td>
<td>.0602</td>
<td>1.7992</td>
<td>.0727</td>
<td>-.0100</td>
<td>.2264</td>
</tr>
<tr>
<td>Grit</td>
<td>.2629</td>
<td>.0580</td>
<td>4.5302</td>
<td>.0000</td>
<td>.1488</td>
<td>.3770</td>
</tr>
<tr>
<td>Mindfulness x Grit</td>
<td>.2422</td>
<td>.0694</td>
<td>3.4912</td>
<td>.0005</td>
<td>.1059</td>
<td>.3786</td>
</tr>
</tbody>
</table>

Conditional effects of the mindfulness at values of the grit:

<table>
<thead>
<tr>
<th>Grit</th>
<th>Effect</th>
<th>se</th>
<th>t-value</th>
<th>p</th>
<th>LLCI*</th>
<th>ULCI**</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.6210</td>
<td>-.0422</td>
<td>.0777</td>
<td>-.5431</td>
<td>.5874</td>
<td>-.1950</td>
<td>.1106</td>
</tr>
<tr>
<td>.0000</td>
<td>.1082</td>
<td>.0602</td>
<td>1.7992</td>
<td>.0727</td>
<td>-.0100</td>
<td>.2264</td>
</tr>
<tr>
<td>.6210</td>
<td>.2586</td>
<td>.0701</td>
<td>3.6917</td>
<td>.0003</td>
<td>.1209</td>
<td>.3964</td>
</tr>
</tbody>
</table>
### Conditional effects of the mindfulness at values of the grit:

<table>
<thead>
<tr>
<th>Grit</th>
<th>Effect</th>
<th>se</th>
<th>t-value</th>
<th>p</th>
<th>LLCI*</th>
<th>ULCI**</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1.6739</td>
<td>-.2973</td>
<td>.1365</td>
<td>-2.1777</td>
<td>.0300</td>
<td>-.5656</td>
<td>-.0290</td>
</tr>
<tr>
<td>-1.4953</td>
<td>-.2540</td>
<td>.1255</td>
<td>-2.0243</td>
<td>.0436</td>
<td>-.5007</td>
<td>-.0074</td>
</tr>
<tr>
<td>-1.4353</td>
<td>-.2395</td>
<td>.1218</td>
<td>-1.9655</td>
<td>.0500</td>
<td>-.4789</td>
<td>.0000</td>
</tr>
<tr>
<td>-1.3167</td>
<td>-.2108</td>
<td>.1147</td>
<td>-1.8368</td>
<td>.0669</td>
<td>-.4363</td>
<td>.0148</td>
</tr>
<tr>
<td>-.0667</td>
<td>.0921</td>
<td>.0608</td>
<td>1.5132</td>
<td>.1310</td>
<td>-.0275</td>
<td>.2116</td>
</tr>
<tr>
<td>.0394</td>
<td>.1178</td>
<td>.0599</td>
<td>1.9655</td>
<td>.0500</td>
<td>.0000</td>
<td>.2355</td>
</tr>
<tr>
<td>.1118</td>
<td>.1353</td>
<td>.0598</td>
<td>2.2626</td>
<td>.0242</td>
<td>.0178</td>
<td>.2529</td>
</tr>
<tr>
<td>1.8975</td>
<td>.5679</td>
<td>.1387</td>
<td>4.0958</td>
<td>.0001</td>
<td>.2954</td>
<td>.8404</td>
</tr>
</tbody>
</table>

### Dependent variable model (DV: Happiness)

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>se</th>
<th>t-value</th>
<th>p</th>
<th>LLCI*</th>
<th>ULCI**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>2.1124</td>
<td>.2073</td>
<td>10.1890</td>
<td>.0000</td>
<td>1.7049</td>
<td>2.5199</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>.6696</td>
<td>.0695</td>
<td>9.6357</td>
<td>.0000</td>
<td>.5330</td>
<td>.8061</td>
</tr>
<tr>
<td>Gratitude</td>
<td>.6265</td>
<td>.0571</td>
<td>10.9790</td>
<td>.0000</td>
<td>.5143</td>
<td>.7386</td>
</tr>
</tbody>
</table>

### Direct effect of gratitude on happiness:

<table>
<thead>
<tr>
<th>Effect</th>
<th>se</th>
<th>t-value</th>
<th>p</th>
<th>LLCI*</th>
<th>ULCI**</th>
</tr>
</thead>
<tbody>
<tr>
<td>.6696</td>
<td>.0695</td>
<td>9.6357</td>
<td>.0000</td>
<td>.5330</td>
<td>.8061</td>
</tr>
</tbody>
</table>

### Index of moderated mediation:

<table>
<thead>
<tr>
<th>Grit</th>
<th>Index</th>
<th>Bootse</th>
<th>BootLLCI*</th>
<th>BootULCI**</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.6210</td>
<td>.1518</td>
<td>.0484</td>
<td>.0563</td>
<td>.2479</td>
</tr>
</tbody>
</table>

**Figure 2** Moderating effect of grit on the relationship between mindfulness and gratitude.
Discussion and conclusion

The discussion and conclusion of the study are as follows. First, mindfulness, grit, gratitude, and happiness showed significant positive correlations. These findings were consistent with prior studies [4; 5; 14; 26; 28; 37]. However, only a few studies have attempted to determine the relationship between grit and the other main variables of this study. Grit is defined as passion and perseverance for long-term goals [7]. The variables of mindfulness, gratitude and happiness refer to stable and lasting traits [19; 30]. Based on these relationships, the results of this study’s correlation analysis are judged to be acceptable.

Second, grit moderated the link between mindfulness and gratitude, as well as the path by which mindfulness influences happiness through gratitude. Students with high grit showed a sharp increase in gratitude when mindfulness increased, whereas students with low grit showed a gradual decrease in the same situation. Further, grit moderated the link between mindfulness→gratitude→happiness. In other words, when gratitude played a mediating role in the link between mindfulness and happiness, grit moderated the mediating role of gratitude. These results are consistent with the results of prior studies [46; 47; 48] showing that the relationship between the two variables is affected by the level of grit. In addition, the effects of grit shown in this study were consistent with the results showing that it moderated the mediating effect of hope in the effect of authentic leadership on organizational effectiveness [52]. Therefore, grit moderated the path of mindfulness→gratitude→happiness.

Since grit has a moderating effect that increases the path of mindfulness→gratitude→happiness, it is possible to improve the happiness of high school students by using mindfulness, gratitude, and grit. High school students are under a lot of academic stress and have substantial concerns about their career paths. This time leads to a decrease in happiness, and there is no alternative to avoiding this time in one’s life. Therefore, schools must improve mindfulness, gratitude, and grit to help students overcome this period.

Meanwhile, mindfulness has been reported to be effective in relieving stress [2]. Therefore, future research should replace the mediator considered in this study with a stress-related variable to analyze the effect on happiness and compare it with the present results. Second, there is a limitation in this study, as the purpose of general research is limited to providing data. This study also provided the results of the research in a basic way, but practical studies in this area are still lacking. Therefore, further research is needed to develop a program that specifically promotes mindfulness, gratitude, and grit, as well as a program that promotes happiness by applying this integrated relationship.

Acknowledgement

This work was supported by the Ministry of Education of the Republic of Korea and the National Research Foundation of Korea (NRF-2020S1A5A2A01041330)
REFERENCES


Information about the author
Chang Seek Lee
(Seosan city, South Korea)
Professor, Doctor of Philosophy, Chairman
Department of Health, Counseling and Welfare
E-mail: lee1246@hanmailnet
ORCID ID: 0000-0002-9222-1953