

중국 대학생의 그릿이 학습만족에 미치는 영향에서 학습몰입과 주관적 안녕감의 이중 매개효과

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The double mediating effects of learning engagement and subjective well-being in the impact of Chinese college students' grit on learning satisfaction

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요약 본 연구는 중국 대학생의 그릿이 학습 만족에 미치는 영향에서 학습몰입과 주관적 안녕감의 이중 매개효과를 확인하여, 학습만족 증진을 위한 기초자료를 제공하는데 있다. 조사대상은 중국의 한 대학교의 대학생들을 편의표집하였으며, 자료는 온라인 설문조사를 통하여 수집하였다. 불성실한 응답을 제외하고, 350명을 최종 분석에 활용하였다. 통계기법은 빈도분석, 신뢰도 분석, 상관분석을 활용하였고, 학습몰입과 주관적 안녕감의 이중 매개효과 분석을 위해 PROCESS macro의 모델 6번을 적용하였다. 연구의 결과는 첫째, 그릿, 학습몰입, 주관적 안녕감, 학습만족은 서로 유의미한 정적인 상관관계가 있었다. 둘째, 학습몰입과 주관적 안녕감이 그릿과 학습만족의 관계에서 이중 매개역할을 하였다. 이러한 결과를 토대로 그릿, 학습몰입 및 주관적 안녕감을 활용하여 학습만족을 증진시킬 수 있는 방안을 제안하였다.

주제어 : 그릿, 학습몰입, 주관적 안녕감, 학습만족, 이중 매개효과

Abstract This study aims to confirm the double mediation effect of learning engagement and subjective well-being in the effect of grit on Chinese college students' learning satisfaction and provide basic data for enhancing learning satisfaction. The study subjects were college students from a Chinese university, and the data were collected through an online survey. After excluding insincere responses, 350 people were used in the final analysis. Statistical techniques used were frequency analysis, reliability analysis, and correlation analysis, and model 6 of PROCESS macro was applied to analyze the double mediation effect of learning engagement and subjective well-being. The findings of the study were as follows: First, grit, learning engagement, subjective well-being, and learning satisfaction had a significant positive correlation. Second, learning engagement and subjective well-being played a double mediating role in the link between grit and learning satisfaction. Based on these results, we suggested ways to enhance learning satisfaction by utilizing grit, learning engagement, and subjective well-being.

Key Words : grit, learning engagement, subjective well-being, learning satisfaction, double mediation effect

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1. Introduction

In modern society, college students face a lot of stress and challenges while simultaneously pursuing their studies and preparing for their careers. In this situation, grit is gaining attention as a concept that explains the consistency of interest and the continuity of effort. Grit refers to the tendency of an individual to continuously strive with passion and perseverance to achieve a long-term goal, and it acts as an important factor related to academic achievement and life success [1]. There are research results that students with higher grit have higher learning engagement, subjective happiness, and learning satisfaction [2, 3].

In particular, learning engagement is an important factor that helps students become engaged in learning activities, thereby achieving better learning satisfaction and performance [4]. The higher the engagement, the more satisfied students feel during the learning process [5], which is supported by studies that show that this ultimately contributes to improving their learning satisfaction[6]. In addition to learning engagement, subjective well-being has a significant impact on students' academic achievement and satisfaction. Students with higher subjective well-being maintain a positive attitude during the learning process, which is closely related to learning satisfaction [7, 8].

The results of the analysis of previous studies showed that grit, learning engagement, and subjective well-being affect learning satisfaction. However, previous studies have studied the effects on learning satisfaction individually, and no studies have been conducted on the integrated effects of grit, learning engagement, and subjective well-being variables on learning satisfaction. There has been no integrated research on the effects of grit on learning satisfaction through learning engagement and subjective well-being as mediating variables, and

this study aimed to confirm this with Chinese college students.

Therefore, this study aims to verify the double mediating effects of learning engagement and subjective well-being in the effect of college students' grit on learning satisfaction. This can provide important implications for seeking ways to improve learning satisfaction by making college students more engaged in their studies and increasing their subjective well-being. To achieve this research purpose, the following research questions were set. First, what is the correlation between grit, academic engagement, subjective well-being, and learning satisfaction? Second, do learning engagement and subjective well-being double mediate the relationship between grit and learning satisfaction?

2. Theoretical Background

2.1 Relationship between Grit and Learning Satisfaction

Learning satisfaction is the satisfaction felt from one's learning itself, regardless of grades or rewards, and is the variable that most frequently explains learning motivation. Learning satisfaction is a factor related to the learner's continued learning motivation and is a universal indicator for measuring learning outcomes [9, 10]. Learning satisfaction also refers to students' subjective satisfaction with their educational experiences [11], and learning satisfaction is also defined as the learner's confidence that he or she can succeed during the learning process and the self-realization of the learning outcomes achieved [12]. In addition, learning satisfaction is the state of mind that learners obtain when they have learned or their expectations are met [13], and it is an indicator that identifies areas for improvement in communication and class inconveniences in the teaching and learning process for the quality of good

classes and reflects them in the next teaching and learning [14].

On the other hand, grit is a concept that emerged while studying the psychology of success. Grit is defined as the tendency to pursue long-term goals with perseverance and passion that demonstrate continuous effort and focused interest [1]. Grit refers to maintaining effort and interest for several years even when failure, adversity, and temporary stagnation occur during the process of challenge [1]. The characteristics of people with high grit are described as follows. First, they have a clear goal orientation, so they know what their goal is and how to reach it. Second, they have a strong will to achieve their goal. Third, they have a high level of self-control, so they avoid distraction and focus on the task. Fourth, they have a positive mindset, enjoy challenges, and view failure as a learning opportunity [15].

When examining the effect of grit on learning satisfaction, in a study of 72 students at a gifted education center in Gyeonggi-do, grit and parental support predicted self-regulated learning ability and satisfaction with gifted education [16]. Long-term job-related goals based on grit allowed them to receive material rewards or form pleasure through their work, which in turn increased job satisfaction [2]. College students' grit was positively correlated with learning satisfaction, and in a study on the mediating effect of family health in the relationship between grit and learning satisfaction, grit had a significant effect on learning satisfaction [17]. In addition, since grit is a factor that promotes personal growth by maximizing productivity and creativity in a given situation, it has a close influence on positive psychological capital such as educational satisfaction and positive emotions [18, 19]. As a result of reviewing the above previous studies, it was found that grit affects learning satisfaction, so we aimed to study this in more depth.

2.2 Mediating effect of learning engagement

Learning engagement is defined as a state in which learners are deeply absorbed or focused on a specific activity [20]. In addition, learning engagement is an internal factor that induces interest and active participation in learning and experiences enjoyment, ability development, self-esteem, and the highest level of learning experience [21].

A small number of studies have been conducted on the influence of grit on learning engagement. Duckworth [22] reported through various interviews and studies that people with higher grit feel engagement more frequently. A study of 327 college students found that their grit had a positive effect on learning engagement [23], and a study of 200 nursing students reported that grit had a positive effect on learning engagement [24].

On the other hand, it was reported that learning engagement affects learning satisfaction. The results of a study on how personal variables and learning engagement affect academic achievement and learning satisfaction in online English writing learning proved that learning engagement is a variable that predicts learning satisfaction [25]. The results of a study on the effects of distance learning learners' learning engagement and learning attitude on learning satisfaction showed that when learners experience learning engagement, they naturally absorb and integrate learning content and experience satisfactory learning [5].

There is no prior research that learning engagement mediates the relationship between grit and learning satisfaction. However, the mediating effect of learning engagement has been studied. In a study targeting college students, learning engagement had a mediating effect on the relationship between perceived teacher feedback and students' academic performance [26]. In a study targeting Chinese college students, learning engagement had a partial mediation effect on learning

motivation and learning effectiveness [27]. Similarly, in a study targeting Chinese college students, learning engagement mediated the association between academic self-efficacy and achievement [28]. Since learning engagement has been shown to mediate the relationships between various variables, this study aimed to confirm whether learning engagement plays a mediating role in the relationship between grit and learning satisfaction in Chinese college students.

2.3 Mediating effect of subjective well-being

Happiness generally means subjective well-being, and subjective well-being means life satisfaction, positive emotions, and developing and fully expressing one's potential to realize one's self, and is directly related to the quality of life [7]. We examined previous studies to see whether this subjective well-being mediates the relationship between grit and learning satisfaction.

Looking at studies on whether grit affects happiness, a study on 1,434 children reported that grit affects happiness in a study on the mediating effect of self-esteem in the relationship between children's grit and happiness [29]. In addition, looking at studies on whether happiness affects learning satisfaction, a study on nursing students reported that departmental satisfaction according to happiness type was significant [8].

We examined studies that showed that subjective well-being plays a mediating role. As a result of verifying the mediating effect of subjective well-being on the subfactors of personality traits, job satisfaction, and organizational citizenship behavior for organizational members, it was confirmed that subjective well-being completely mediated openness, job satisfaction, and organizational citizenship behavior, and also completely mediated extraversion, job satisfaction, and neuroticism and job satisfaction [30]. In a study targeting teachers, subjective

well-being at work partially mediates the relationship between dispositional subjective well-being and teacher health, and fully mediates the relationship between self-esteem and teacher health [31]. In a study targeting kindergarten teachers, role stress was found to have a negative effect on subjective well-being and a positive indirect effect on turnover intention completely mediated by subjective well-being [32].

As a result of reviewing previous studies, there were no direct previous research results that subjective well-being mediates the relationship between grit and learning satisfaction, but grit affected subjective well-being, and subjective well-being affected learning satisfaction. In addition, subjective well-being was found to play a mediating role in the relationship between various variables, so this study aimed to confirm whether subjective well-being played a mediating role in the relationship between grit and learning satisfaction among Chinese college students.

2.4 The effect of learning engagement on subjective well-being

In order for the double mediation effect to be established, the first parameter must have a significant effect on the second parameter. Therefore, the effect of learning engagement on subjective well-being was examined through previous studies.

It was confirmed that the higher the happiness in life, the higher the level of lifelong learning happiness of adult learners, and the more learning time and sufficient learning, the higher the level of happiness about learning [33]. When adult learners engage in a learning situation, they feel satisfaction from the engagement experience itself, which can increase intrinsic motivation and improve the quality of learning at the same time [34]. In addition, it was suggested that the perception of happiness and the level of engagement of adult learners have a positive

effect [35], and it was said that the learning engagement of adult learners has a significant effect on the learners' happiness [36]. Although there are only a few studies, it is predicted that learning engagement will have a significant effect on subjective well-being. Therefore, we aimed to confirm the double mediating effect of learning engagement and subjective well-being in Chinese college students.

3. Research Method

3.1 Research Model

The research model was established by applying model 6 of SPSS PROCESS macro proposed by Hayes [37] to confirm whether learning engagement and subjective well-being double mediate the relationship between grit and learning satisfaction based on previous studies. Gender, grade, major, only child status, and household income were used as control variables. The research model is presented in [Figure 1].

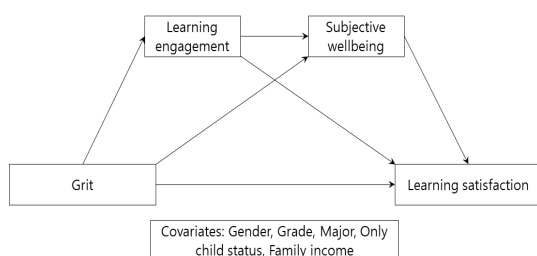


Fig. 1 Research model

3.2 Survey subjects and data collection

The Guangdong region in China was purposively selected as the study area, and the study subjects were college students. The convenient sampling method was utilized to sample the study subjects. Data was collected through an online survey from July to August, 2024. Excluding insincere responses, the total number of subjects used in the final analysis was 350.

The general characteristics of the survey subjects were 35.1% male and 64.9% female, with a slightly higher proportion of females. The grades were 70.6% in the first grade, 11.1% in the second grade, 13.7% in the third grade, and 1.4% in the fourth grade. 16.9% were only child status, and the majority of respondents said their household economy was in the middle level at 56.3%, followed by those in the lower middle level at 29.7%.

3.3 Research tools

3.3.1 Grit

This study used the grit scale developed by Duckworth [1] and translated by Lee [39], consisting of 8 items. 4 items measure the consistency of interest, and 4 items measure the persistence of effort. Each item is “Even if I have a goal, I often find another goal after a while(reversed item)” and “Even if I am already working on something, I often stop and change to a new one(reversed item).” The response category is a Likert scale from 1 to 5 points, from “Not at all” to “Very much.” A higher score indicates higher grit, and the reliability of this scale, Cronbach Alpha, was .760, which was appropriate.

3.3.2 Learning engagement

This study used the Evaluation Table of Learning Engagement of Higher Vocational College Students revised and compiled by Zhu [40]. This scale consists of 15 items such as “I think learning is a very meaningful thing.” and “I believe that in college, learning is the main task”. The measurement was done on a 5-point Likert scale, with higher scores indicating higher learning engagement. This study's Cronbach Alpha reliability of learning flow was high at .934.

3.3.3 Subjective well-being

To measure the subjective well-being scale, this study used the scale developed by Ni [41]. This scale consists of a total of 8 questions such as “Overall,

I'm happy with myself", and "I feel like a valuable person". The measurement was done on a 5-point Likert scale, with higher scores indicating higher subjective well-being. In this study, the reliability of this scale, Cronbach Alpha, was high at .859.

3.3.4 Learning satisfaction

To measure the learning satisfaction scale, this study used the scale developed by Qian [42]. This scale consists of 25 items in total, including 5 items measuring teacher teaching in school, 5 items measuring the school's curriculum and learning resources, 5 items measuring extracurricular life at school, 5 items measuring the school you attended, and 5 items measuring what you have gained after enrollment. Each item includes such as "The moral character and mental demeanor of the teacher", "The knowledge of the teacher," etc. The measurement was done on a 5-point Likert scale, with higher scores indicating higher learning satisfaction. In this study, the reliability of this scale, Cronbach Alpha, was high at .967.

3.3.4 Control variables

Gender, grade, major, only child status, and family income, which were shown to affect the mediating and dependent variables in this study, were used as control variables.

3.4 Data Analysis

The data was analyzed using SPSS PC+ Win. Ver. 25.0 and SPSS PROCESS macro Ver. 4.2. Frequency analysis was performed to identify the general characteristics of the main variables, and Pearson's bivariate correlation analysis was applied to identify the bivariate correlation between grit, learning engagement, subjective well-being, and learning satisfaction. In addition, model 6 proposed by Hayes [37] was applied to identify the double mediation effect of learning engagement and subjective

well-being in the relationship between grit and learning satisfaction. The bootstrap method was used to verify the double mediation effect of learning engagement and subjective well-being, and the confidence level was 95%, and the number of samples was set to 5,000.

4. Research Results

4.1. Correlation between Major Variables

The correlation between main variables was analyzed. Grit showed a significant positive correlation with other variables, and learning engagement was the highest among them ($r=.493, p<.01$). Learning engagement also showed a positive correlation with subjective well-being and learning satisfaction, and showed the highest correlation with learning satisfaction ($r=.581, p<.01$). Learning satisfaction showed a positive correlation with all other variables, and among them, it showed the highest correlation with subjective well-being ($r=.706, p<.01$). Overall, the independent variables of this study showed a correlation lower than .7, indicating no problem of multicollinearity.

The results of the descriptive statistics analysis showed that the means of all four variables exceeded the midpoint of 3, and subjective well-being was the highest among them ($M=3.6471$).

Table 1. Correlation and descriptive statistics analysis

	1	2	3	4
1. Grit	1			
2. Learning Engagement	.493**	1		
3. Subjective well-being	.433**	.548**	1	
4. Learning Satisfaction	.319**	.581**	.706**	1
M	3.2357	3.5531	3.6471	3.6078
SD	.59341	.70356	.63769	.64486

** $p<.01$

4.2 Double mediation effect of learning engagement and subjective well-being

We investigated whether learning engagement and subjective well-being serially double mediate the relationship between grit and learning satisfaction. The analysis applied model 6 of SPSS PROCESS macro, the bootstrap confidence interval was set to 95%, the sample size was set to 5,000, and gender, grade, major, only child status, and household income were controlled during the analysis. The results of the analysis are presented in [Figure 2] and <Table 2>.

In order to confirm the mediating effect, we examined the significance of the total effect, the effect of grit on learning engagement (M1), the effect of learning engagement (M1) on subjective well-being (M2), and the effect of subjective well-being (M2) on learning satisfaction. First, looking at the significance of the total effect, the effect of the independent variable on the dependent variable was significant at $B=.3464$ ($p<.001$). Next, the effect of grit on learning engagement (M1) was significant at $B=.5830$ ($p<.001$). The effect of learning engagement (M1) on subjective well-being (M2) was significant at $B=.4027$ ($p<.001$). And the effect of subjective well-being (M2) on learning satisfaction was significant at $B=.5658$ ($p<.001$). That is, the total effect, the effect of grit on learning engagement (M1), the effect of learning engagement (M1) on subjective well-being (M2), and the effect of subjective well-being (M2) on learning satisfaction were all significant, indicating that learning engagement and subjective well-being serially double-mediated the relationship between grit and learning satisfaction.

As a result of verifying the serial double mediation effect of learning engagement and subjective well-being using bootstrap, the double mediation effect was .1328, which was significant because there was no 0 between the lower and upper limits of the bootstrap (.0807 ~ .1963). In other words, learning

engagement and subjective well-being serially double-mediated the relationship between grit and learning satisfaction.

Additionally, as a result of analyzing the simple mediation effect of learning engagement and subjective well-being, the indirect effect of learning engagement was .1666 (.1037 ~ .2294), and the indirect effect of subjective well-being was .1257 (.0635 ~ .1880), which was significant because there was no 0 between the lower and upper bootstrap limits.

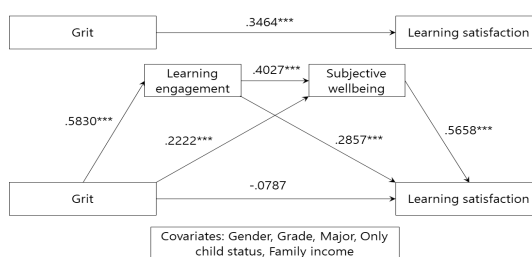


Fig. 2. Statistical model of the double mediation effect of learning engagement and subjective well-being

Table 2. Dual mediating effect analysis

Classification		Mediating variable model (DV: learning engagement)			Mediating variable model (DV: subjective well-being)			Dependent variable model (DV: learning satisfaction)		
		Coefficient	SE	t value	Coefficient	SE	t value	Coefficient	SE	t value
Constant		1.4502	.3919	3.702**	2.3901	.3352	7.124**	.9714	.2988	3.2513**
IV	grit	.5830	.0562	10.330**	.2222	.0541	4.102**	-.0787	.0416	-1.705
M1	learning engagement				.4027	.0453	8.898**	.2857	.0418	6.837**
M2	subjective well-being							.5658	.0450	12.584**
Covariates	Gender	.0457	.0713	.6416	-.0992	.0598	-1.658	-.0999	.0499	-2.012
	grade	-.0019	.0322	-.0398	-.0374	.0270	-1.384	-.0466	.0225	-2.012
	major	-.0037	.0158	-.2330	-.0201	.0133	-1.512	-.0001	.0111	-.0051
	only child	.1258	.0911	1.3807	-.0309	.0766	-.4036	.0379	.0637	.5945
	family income	-.0097	.0469	-.2062	-.0958	.0393	-2.434**	-.0055	.0330	-1.674
Model Summary	R ²	.2497			.3593			.5681		
	F	19.0290**			27.3979**			56.0574**		

Classification		Effect	SE	Confidence interval	
				LLCI*	ULCI**
Total effect		.3464	.0555	-.1693	.4555
Direct effect		-.0787	.0461	-.1693	.0119
Total indirect effect		.4251	.0492	.3288	.5225
Indirect effect	grit→learning engagement→learning satisfaction	.1666	.0321	.1037	.2294
	grit→subjective well-being→learning satisfaction	.1257	.0318	.0635	.1880
	grit→learning engagement→subjective well-being→learning satisfaction	.1328	.0291	.0807	.1963

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

*LLCI=Lower bound within 95% Confidence interval of boot Indirect effect

**ULCI=Upper bound within 95% Confidence interval of boot Indirect effect

5. Discussion and Conclusion

The discussion and conclusion based on the results of the study are as follows.

First, the correlation analysis results showed that there was a positive correlation between grit, learning engagement, subjective well-being, and learning satisfaction. These research results are consistent with the research results that grit affects learning engagement [2], grit affects learning satisfaction [3], learning engagement affects learning satisfaction [5], and subjective well-being affects learning satisfaction [7]. Therefore, it suggests that learning satisfaction is related to grit, learning engagement, and subjective well-being, and it is meaningful to utilize these variables to improve learning satisfaction.

Second, learning engagement and subjective well-being double-mediated the relationship between grit and learning satisfaction. In other words, grit directly affected learning satisfaction, but it also affected learning satisfaction through learning engagement and subjective well-being. These results are consistent with the results showing that learning engagement mediates the relationship between

perceived teacher feedback and students' academic performance [26] and subjective well-being mediates the relationship between self-esteem and teacher health [31]. In other words, this suggests that improving learning satisfaction is not only about grit, but also about improving learning engagement and subjective well-being.

The limitations of the study and suggestions for follow-up research are as follows. First, the research subject of this study was limited to one university. This may cause bias from the population, so in follow-up research, it is necessary to sample 3-4 universities evenly to reduce such sampling errors and prevent bias. Second, this study analyzed by applying double-effect statistical analysis. Since this has limitations in identifying various roles of variables, it is necessary to apply learning engagement and subjective well-being as moderator variables to confirm whether they play a moderating role.

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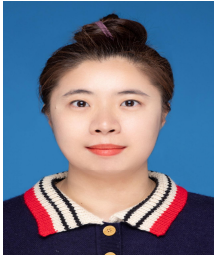
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