

## **Association between the Learning Styles with Personalities of Medical Students and Their Clinical Performance Examination Achievements**

Bae, Soo Jin, \*Hong, Sun Yeun

*Professor, Department of Nursing, Kyongbuk Science college, Korea*  
*Professor, Department of Nursing, Kyungwoon University, Korea*  
[mychur@hanmail.net](mailto:mychur@hanmail.net), [hsy1009@hanmail.net](mailto:hsy1009@hanmail.net)

### **Abstract**

*The aim of this study was to investigate the learning styles with personalities of medical students which may affect the efficiency of teaching-learning system of clinical education to determine the association with the clinical performance examination achievement of the students. The learning styles and personality traits of 147 students of medical college were investigated. The obtained data were analyzed by statistical analysis including independent t-test and correlation analysis. The results of the analyses are as follows: there was significant difference in the participation model in the different genders; of the personality traits, there was significant difference in self-transcendence in the different genders, whereas there was significant difference in the persistence for past failure experiences; and there was significant association between the 6 sub-learning models (Independent vs. Dependent, Collaborative vs. Competitive, and Participant vs. Avoidant learning styles) and the personality traits (Novelty Seeking, Harm Avoidance, Reward Dependence, Persistence, Self-directedness, Cooperativeness and Self-transcendence). In addition, the participant type of students had higher scholastic achievements in clinical performance, and the students who scored high in self-transcendence and persistence also had higher clinical performance. In conclusion, the student's learning style and personalities affected the clinical scholastic performance. We believe that considering this current study, it would be possible to improve the quality of clinical education of medical teaching as well as helping medical students to choose career paths that are suitable for their personalities.*

**Keywords:** *Learning style, Medical students, Clinical Performance Examination, Personality Traits*

### **1. Introduction**

Recently, medical schools made major changes in clinical education by introducing medical school accreditation systems and adopting Clinical Performance Examination (CPX) as part of the Korean Medical Licensing Examination to produce competent physicians and improve the quality of medical education. Until now, medical schools have used traditional teaching methods centered on professors delivering a vast amount of knowledge within a limited amount of time, so it was difficult for the students to be independent and to lead the learning process. In particular, as clinical performance issues emerge from these traditional medical curriculums, clinical practice education based on medical knowledge has become the key to solve curriculum problems.

---

Manuscript Received: January. 7, 2021 / Revised: January. 13, 2021 / Accepted: January. 15, 2021

Corresponding Author: [hsy1009@hanmail.net](mailto:hsy1009@hanmail.net)

Tel: +82-54-479-1383, Fax: +82-54-479-4013

Professor, Department of Nursing, Kyungwoon University, Korea

Eventually, the demand for changes in the curriculums became an opportunity for all medical schools to review and improve their curriculums [1], so medical schools strived to improve the quality of clinical education programs and establish a learner-centered clinical practice education foundation using various learning media. Recently, as discussions on education based on individual differences and characteristics are becoming more active in Korea, a wide variety of studies are being pursued to understand personality traits and diversity to develop the learners' potential [2]. These educational trends include studies on learning styles that explain individual differences in academic achievement and characteristics that influence the efficiency of teaching and learning in the field of psychology and pedagogy [3-5].

However, among the studies on learners, there are only a few studies in Korea on university students, especially medical students, so a consistent and clear relationship between personality traits and learning styles has not been investigated. To explore the effects of personality traits and learning styles on academic achievement, it is necessary to investigate the two variables from various perspectives and systematically analyze the relationship between them. This study conducted the Grasha-Reichmann Student Learning Style Questionnaire (GRSLSQ) [6] and Cloninger's Temperament and Character Inventory (TCI) [7] on medical students to investigate the relationship between learning styles and personality traits and how each affects clinical performance to provide basic data for improving academic achievement in clinical performance and contribute to the qualitative development of clinical education.

## **2. Materials and Methods**

### **2.1. Research Subject**

The subjects were 147 students in their 3<sup>rd</sup> and 4<sup>th</sup> year in university receiving clinical practice education at a medical school in D-city. In terms of ethical consideration, the authors obtained approval from the clinical practice professor, explained the purpose of the study, the details of the test, and the time required to complete the survey, and promised absolute anonymity and confidentiality to the subjects. The survey was conducted after explaining that the collected data would only be used for research purposes and receiving written consent from the participants. All 147 participants answered the survey, and there were no incomplete responses that could not be used as data, so the number of valid questionnaires was 147 copies.

### **2.2. Research Tools:**

The following two self-reporting questionnaires were used as the research tools: the Grasha & Reichmann Student Learning Style Questionnaire (GRSLSQ) [6], which measures the learners' affective factors, and the Temperament and Character Inventory (TCI) by Cloninger et al. [7], which was developed based on a psychobiological model of personality.

#### **2.2.1. Learning Style Inventory:**

In terms of learning style inventory, the GRSLSQ classifies the types of learning styles into three dimensions: independent-dependent, collaborative-competitive, participant-avoidant, and six sub-learning types. The questionnaire consists of 47 questions: independent (Questions 1 to 6), dependent (Questions 7-11), collaborative (Questions 12-20), competitive (Questions 21-27), participative (Questions 28-37), and avoidant (Questions 38-47). For learning style inventory, this study used the questionnaire used in a study by B.G. Choi [8], and each question uses a 4-point Likert scale: (4) Strongly agree, (3) Agree, (2) Disagree, (1) Strongly disagree. Higher scores are interpreted as preferring the corresponding learning style. This study measured the reliability by using Cronbach's  $\alpha$  (Table 1).

### 2.2.2. Personality Inventory:

In terms of personality inventory, the TCI was jointly developed by Cloninger, Przybeck, Svrakic, and Wetzel to diagnose and predict personality disorders and temperament dimensions and describe the process of developing personality disorders [9]. This study used TCI-RS (revised short version), a shorter version of TCI-R (revised), which consists of 140 questions using a 5-point Likert scale: (4) Strongly agree, (3) Agree, (2) Neither agree nor disagree, (1) Disagree, (0) Strongly disagree. TCI-RS operates with four temperament scales (Novelty Seeking, Harm Avoidance, Reward Dependence, Persistence) and three personality scales (Self-directedness, Cooperativeness, Self-transcendence). The seven temperament and personality scales consist of 29 subscales within each scale, and the seven scales are scored with the mean and standard deviation of each subscale [10].

### 2.2.3. Clinical Performance Achievement Evaluation:

Clinical performance refers to the ability to competently perform one's role in clinical situations with knowledge, skill, attitude, and judgment [11], and the 2012 Korean Medical Licensing Examination clinical skills assessment consists of 52 clinical skills and 28 written test questions. The clinical skill test is called the clinical performance examination (CPX), and it evaluates the physician's clinical ability to care for patients for 10 minutes. The written test is called the objective structured clinical examination (OSCE) and refers to performing and evaluating a part of treatment or clinical skills for five minutes. Clinical performance evaluation refers to the assessment of the two tests above.

The clinical performance achievement of the 3<sup>rd</sup> year medical school students was evaluated by their grades in the final exam of clinical skill practice. In the case of 4<sup>th</sup> year medical school students, it was evaluated by their average grade of three clinical performance examinations during clinical practice. The 3<sup>rd</sup> year students' clinical skill practice test consists of 5 written and 14 clinical skill questions, and the 4<sup>th</sup> year students' clinical performance achievement evaluation consists of 20 written and 20 clinical skill questions.

### 2.3. Data Analysis and Statistical Processing:

Statistical Package for Social Science software (SPSS for Windows 12.0, SPSS Inc., Chicago, IL, USA) was used to analyze the collected data. To investigate the relationship between medical students' preferred learning styles, personality traits, and clinical performance academic achievement, independent t-tests were performed to verify the difference between each mean score (mean $\pm$ SD), and correlation analysis was used to examine the relationship between variables. The level of statistical significance was  $P < 0.05$ .

**Table 1. Learning style inventory: Configuration of questions and reliability**

Learning style	Questions	Reliability (Cronbach's $\alpha$ )
Independent	No. 1-6	0.573
Dependent	No. 7-11	0.441
Collaborative	No. 12-20	0.714
Competitive	No. 21-27	0.663
Participant	No. 28-37	0.815
Avoidant	No. 38-47	0.776

## 3. Grades

### 3.1. General Characteristics of The Subjects:

Among the 147 participants, 70.1% (103) were male students and 29.9% (44) were female students, and 5.4% (8) of the students experienced academic failure.

### 3.2. Differences in Learning Styles by Gender and Academic Failure Experience:

The differences in learning styles according to gender and academic failure experience were verified by an independent t-test (Table 2). According to the results by gender, independent-dependent and collaborative-competitive types did not show significant differences between genders, but there was a significant difference between genders in participant learning style ( $p < 0.05$ ). The results according to failure experience showed no significant difference according to learning styles. Table 2.

**Table 2. The differences in learning styles according to gender and failure experience**

Learning style	Gender			Failure experience		
	Gender	Learning style scale (mean±SD)	P-value	Failure experience	Learning style scale (mean±SD)	P-value
Independent	M	2.36±0.35	0.36	O	2.38±0.41	0.99
	F	2.42±0.33		X	2.38±0.34	
Dependent	M	2.52±0.38	0.78	O	2.73±0.26	0.12
	F	2.54±0.36		X	2.51±0.38	
Collaborative	M	2.82±0.34	0.08	O	2.94±0.46	0.16
	F	2.71±0.30		X	2.77±0.32	
Competitive	M	2.29±0.41	0.56	O	2.25±0.25	0.69
	F	2.33±0.36		X	2.31±0.40	
Participant	M	2.58±0.39	0.02	O	2.56±0.47	0.59
	F	2.74±0.34		X	2.63±0.38	
Avoidant	M	2.28±0.40	0.42	O	2.27±0.29	0.99
	F	2.22±0.32		X	2.26±0.38	

### 3.3. Differences in Personality Traits by Gender and Failure Experience:

An independent t-test was performed to verify the differences in personality traits according to gender and failure experience (Table 3). Among the seven personality traits, there were no significant differences between men and women in novelty seeking, harm avoidance, reward dependence, persistence, self-directedness, and cooperativeness. However, female students had significantly higher scores than male students in self-transcendence ( $p < 0.01$ ). In addition, the students only showed a difference in persistence depending on their past failure experiences, and the students who experienced academic failure had significantly lower scores than those who did not experience failure ( $p < 0.05$ ). Table 3.

**Table 3. The differences in personality traits according to gender and failure experience**

Personality trait	Gender			Failure experience		
	Gender	Learning style scale (mean±SD)	P-value	Failure experience	Learning style scale (mean±SD)	P-value
Novelty seeking	M	36.73±9.00	0.42	O	35.88±7.92	0.69
	F	38.07±9.37		X	37.20±9.18	
Harm avoidance	M	38.01±12.24	0.49	O	38.38±7.13	0.98
	F	39.52±11.75		X	38.47±12.31	
Reward dependence	M	42.14±8.89	0.11	O	43.88±9.55	0.77
	F	44.82±10.00		X	42.88±9.30	
Persistence	M	44.49±10.46	0.67	O	35.63±7.87	0.01
	F	45.25±8.27		X	45.24±9.70	
Self-directedness	M	46.65±10.44	0.49	O	41.13±6.64	0.09
	F	47.91±8.84		X	47.37±10.04	
Cooperativeness	M	53.85±10.13	0.62	O	53.75±8.73	0.96
	F	52.98±8.94		X	53.58±9.85	
Self-transcendence	M	24.15±10.49	<0.01	O	21.75±9.07	0.26
	F	29.55±9.26		X	25.99±10.46	

### 3.4. Correlation between Learning Styles and Personality Traits:

Correlation analysis and independent t-test were performed to analyze the relationship between the medical students' learning styles and personality traits (Table 4). Independent learning styles showed positive correlations with persistence and self-directedness among the temperament and personality scales. Dependent learning styles showed a positive correlation with harm avoidance and a negative correlation with self-directedness. Collaborative learning styles showed positive correlations with reward dependence and cooperativeness among the temperament and personality scales. Competitive learning styles showed positive correlations with harm avoidance and persistence and a negative correlation with cooperativeness. Participant learning styles showed positive correlations with persistence and self-directedness among the temperament and personality scales. Avoidant learning styles showed a positive correlation with harm avoidance and negative correlations with reward dependence, persistence, self-directedness, and cooperativeness. Table 4.

**Table 4. The correlation between learning styles and personality traits**

Personality traits	Learning styles					
	Independent	Dependent	Collaborative	Competitive	Participant	Avoidant
Novelty seeking	-0.080	0.020	-0.052	0.004	-0.115	0.134
Harm avoidance	-0.114	0.190*	-0.138	0.212**	-0.128	0.329***
Reward dependence	0.011	0.047	0.292***	-0.078	0.138	-0.208*
Persistence	0.343***	-0.034	0.098	0.197*	0.423***	-0.234**
Self-directedness	0.236**	-0.191*	0.145	-0.078	0.309***	-0.394***
Cooperativeness	-0.023	-0.034	0.247**	-0.348***	0.169	-0.309***
Self-transcendence	0.011	0.016	0.029	0.013	0.081	0.048

\*P<0.05, \*\*P<0.01, \*\*\*P<0.001

### 3.5. The Relationship between Learning Styles and Clinical Performance Examination Achievement:

The relationship between the medical students' learning styles and clinical performance examination achievement was analyzed by an independent t-test (Table 5). The students were divided into independent-dependent, collaborative-competitive, and participant-avoidant types according to the higher score between independent and dependent scores. Then, an independent t-test was performed to analyze whether there was a difference in examination achievement according to each learning style. According to the results, the examination achievement of participant students and avoidant students were 79.54 and 77.19, respectively, showing that the participant students' grades were significantly higher ( $p < 0.01$ ). Table 5.

**Table 5. The relationship between learning styles and clinical performance examination achievement**

Learning styles (n)	Examination achievement (mean±SD)	P-value
Independent (56)	79.14±4.02	0.620
Dependent (91)	78.75±4.86	
Collaborative (120)	78.84±4.76	0.713
Competitive (27)	79.19±3.48	
Participant (107)	79.54±4.25	0.005
Avoidant (40)	77.19±4.91	

### 3.6. The Relationship between Personality Traits and Clinical Performance Examination Achievement:

As a result of analyzing the correlation between the medical students' personality traits and clinical performance examination achievement (Table 6), the students who had high scores in persistence and self-transcendence also scored high in clinical performance examination achievement ( $p < 0.01$ ). Table 6.

**Table 6. The relationship between personality traits and clinical performance examination achievement**

Personality traits	Correlation coefficient	P-value
Novelty seeking	-0.075	0.364
Harm avoidance	0.095	0.251
Reward dependence	0.134	0.105
Persistence	0.247	0.003
Self-directedness	0.062	0.458
Cooperativeness	-0.002	0.980
Self-transcendence	0.262	0.001

#### 4. Discussion

This study investigated the variables (learning styles and personality traits) that affect the teaching and learning efficiency of medical students taking clinical medicine courses to analyze the differences according to gender and academic failure experiences and to examine the correlation between the two variables and the association between each variable and clinical performance examination achievement. According to the results, there was a significant difference in participant learning styles in the different genders. In terms of personality traits, there was a significant difference in self-transcendence in the different genders, and there was a significant difference in persistence for failure experiences. Moreover, the learning styles, temperament, and personality scale tests showed that there was a correlation between the characteristics that describe each scale. The students who preferred participant learning styles showed higher achievement in clinical performance evaluation than those with avoidant learning styles, and students with more persistence and self-transcendence in the personality trait test showed higher achievement in clinical performance evaluation.

Based on the findings above, although personality traits or learning styles may directly affect clinical performance examination achievement, parameters such as personality traits and preferred learning styles also affect academic achievement by forming organic relationships with each other. Even learners who have excellent intellectual abilities and academic achievement, such as medical students, cannot produce the best results if their work or assignments do not match their personality traits or if they are taught in ways they do not prefer. Further consideration of the findings above is as follows.

First, as a result of studying the difference in learning styles according to the gender of the medical school students, many female students were found to be participant learning styles. Previous studies found that variables, such as gender, subject or major, and personality, influenced the development of learning styles. Although some studies showed that gender affects learning styles [12, 13], there was also a study showing that there was no significant difference in the learning styles of university students according to gender [14]. Overall, research on different learning styles according to gender may produce different results depending on where you place the perspective of learning styles, and definitive conclusions should not be made because the research period is relatively short and due to insufficient clues as to whether there were sufficient research samples of various classes. Therefore, more systematic studies should be performed from various perspectives.

Second, as a result of analyzing the differences in personality traits according to academic failure experiences, students with failure experiences had a correlation with persistence. Having failure experiences does not necessarily mean poor academic performance, but in many cases, the reason for failing is highly related to academic achievement, and medical students have a strict system for failure in their curriculum, unlike other

university students. Therefore, it would be meaningful to study the characteristics of the students who experienced failures, given that the failures are a great stress on them and their families. Individual differences in education were found to appear according to variables, such as learning ability, learning style, learning motivation, and learning speed [15]. Byrnes and Yamamoto reported that the most common characteristics related to academic retention were immaturity, low motivation, low self-esteem, emotional anxiety, lack of ability to solve problems independently, lack of self-concept related to the affective aspects, and psychosocial immaturity [16]. These factors independently affect retention, but they are also intertwined with each other, so medical students should also be examined and studied from a comprehensive perspective.

Third, as a result of analyzing the relationship between the medical students' learning styles and personality traits by correlation analysis and independent t-test, independent-type students scored high in persistence and self-directedness, collaborative-type students scored high in reward dependence and cooperativeness, and participant-type students scored high in persistence and self-directedness. According to a study on the correlation between personality traits and learning styles of university students majoring in dance, personality traits excluding neurosis or neuroticism showed a correlation with learning styles [17]. The research results above show that there is a correlation between learning styles and personality traits. Therefore, developing more integrated personality and learning style test tools and studying the associations between each test will be of great help in researching variables that influence learning.

Fourth, as a result of analyzing the difference in clinical performance academic achievement according to the medical students' learning styles with independent t-test, participant-type students had the best grades. The participant-type group showed opposite learning characteristics to the avoidant-type group and showed a high degree of participation in teaching and learning, which was consistent with the results of the previous studies. In terms of comparing learning styles according to academic achievement, the higher the academic achievement, the more independent, participant, and less avoidant [8]. According to a study conducted on university students in Korea, participant and collaborative-type students showed more positive satisfaction and effectiveness in problem-based learning classes of four engineering courses [18]. In addition, as a result of examining the relationship between learning styles and teaching and learning, experimental (or trial) style, a participant learning method, was more appropriate in medical studies [19]. In trial teaching methods, the learner leads the class by taking the initiative based on the given teaching materials [20]. The findings above show that participant learning styles are suitable for clinical education and that they are correlated with clinical performance examination achievement. Therefore, supplementary measures should be developed to create learning environments to demonstrate participatory learning.

Fifth, as a result of analyzing the correlation between the medical students' personality traits and clinical performance examination achievement, the students who scored high in self-transcendence and persistence also showed higher academic achievement. Those who scored high in self-transcendence were reported to be patient, creative, spiritual, and tolerate ambiguity and uncertainty [10]. Considering these characteristics, self-transcendence does not seem to be irrelevant to persistence.

According to a study by H.S. Lee on the correlation between the personality traits of medical students and academic achievement, 'novelty seeking' had a positive correlation with practical skill tests, and 'persistence' showed a positive correlation with written tests [21]. Recently, our society is experiencing a high level of uncertainty and ambiguity, so the inner strength to endure uncertainty is significant in career development, in addition to outstanding personal competence and constant effort [22]. Research has shown that the lack of tolerance for uncertainty has a high negative correlation with problem-solving skills [23]. Studies have shown that the lack of tolerance for uncertainty increases the level of worries [23-25] and that those with high levels of worries showed a significant disruption in processing when the stimulus and answer were ambiguous [26].



Considering the above, it is necessary to study the correlation between tolerance, study, and career, and develop and apply programs related to strengthening tolerance.

## 5. Conclusion

The aim of this study was to investigate the learning styles with personalities of medical students which may affect the efficiency of teaching-learning system of clinical education to determine the association with the clinical performance examination achievement of the students. In conclusion, the student's learning style and personalities affected the clinical scholastic performance. We believe that considering this current study, it would be possible to improve the quality of clinical education of medical teaching as well as helping medical students to choose career paths that are suitable for their personalities.

The limitations of this study are as follows. There is a limit in generalizing the results because the participants were sampled from one medical school and do not include all of the medical students in Korea. The clinical performance examination achievement of 3<sup>rd</sup> year medical students was also measured by only their final exam scores in clinical skill practice. The learning style test and temperament personality scale test used in this study were both self-reporting questionnaires, so the students' memories may be inaccurate, and they may have underestimated or overestimated the learning styles or personality traits. Therefore, it is necessary to increase the number of samples to obtain more reliable research results and examine the research design in a concrete and systematic manner to conduct a valid and reliable investigation and study of medical students. In addition, the learning styles used in this study were based on the results of a self-reporting test, so experimental studies should also be performed with self-reporting questionnaires to conduct more accurate research.

## References

- [1] H. C. Oh and S. Kim, "Seeking directions to reorganize Yonsei University's medical education curriculum," *Yonsei Journal of Medical Education*, vol. 1, No.1, pp. 75-93, 1999
- [2] E. J. Kim, "Establishing a conceptual model through a systematic classification of learning styles and learning types," *Korean Journal of Educational Research*, vol. 40, No.4, pp.13-33, 2002.
- [3] M. S. Song and E. L. Chi, "University students' personality, major, and academic achievement," *Korean Journal of Educational Research*, vol. 34, No.1, pp.13-29, 1996.
- [4] K. A. Lee, N. H. Yoo, E. K. Lee, J. Y. Chon, and K. H. Lee, "The relationship of academic personality types and major satisfaction on academic achievement related variables," *Korean Journal of Psychology*; vol.16, No.1, pp. 107-121, 2004.
- [5] S. Kim, J. H. Kim, and Y. R. Hur, "A proposal on educational method of studying by comparing medical students' personality types and class achievement," *Korean Journal of Medical Education*, vol.17, No.2, pp. 107-119, 2005.
- [6] Riechmann SW and Grasha AF, "A rational approach to developing and assessing the construct validity of a student learning style scales instrument," *J Psychol*, vol.87, pp.213-223, 1974.
- [7] Cloninger CR, "A systematic method for clinical description and classification of personality variants," *Arch Gen Psychiat*, vol.44, pp.573-588, 1987.
- [8] B. G. Choi, "(The) relationship between learning style and class satisfaction of college student according to the difference of basic elements in cooperative learning," Master's thesis, Yonsei University, Seoul, 2006.
- [9] Cloninger CR, Svrakic DM, and Przybeck TR, "A psychobiological model of temperament and character," *Arch Gen Psychiat*, vol.50, pp. 975-990, 1993.
- [10] B. B. Min, H. S. Oh, and J. Y. Lee, "Temperament and character inventory family manual. First edition," Seoul, Maumsarang Co., Ltd., pp.6-33, 2007.
- [11] Barrett C and Myrick F, "Job satisfaction in preceptorship and its effect on the clinical performance of the preceptee," *J Adv Nurs*, vol. 27, No. 2, pp. 364-371, 1998.

- [12] Kats N: Individual learning style, "israeli norms and cross-cultural equivalence of Kolb's learning style inventory," *J Cross-Cult Psychol*, vol.19, pp. 361-379, 1988.
- [13] Mohamed O, "Gender socialization and learning style patterns of secondary school students," *Pertanika J Soc Sci & Hum*, vol. 5, No.1, pp. 15-20, 1997.
- [14] H. K. Jeon, "(The) relationship between learning styles and majors of college students," Master's thesis, Yonsei University, Seoul, 2002.
- [15] H. J. Yoon. "Reinterpretation of differentiated curriculums: Focusing on the concept of individual differences," Master's thesis, University of Education, Seoul, 2003.
- [16] Bynes D and Yamamoto K, "Views on grade repetition," *J Res & Dev Educ*, vol. 20, No.1, pp. 14-20,1985.
- [17] S. H. Lee, "Relations between personality and learning styles of dance majored university students," Master's thesis, Kookmin University, Seoul, 2008.
- [18] S. Y. Kang, H. H. Cho, J. I. Hong, E. J. Kim, and S. E. Park, "The effect of problem based learning in engineering education," *Journal of Engineering Education Research*, vol.8, No.2, pp. 24-34, 2005.
- [19] E. J. Kim, "A study on the relationship between affective learning styles and academic studies," *The Journal on Curriculum Studies*, vol.20, No.2, pp. 329-348, 2002.
- [20] S. Kim, "Types of teaching and learning methods and their application to medical education," *Yonsei Journal of Medical Education*, vol. 3, No.2, pp.45-53, 2001.
- [21] H. S. Lee, "A study on the relation of self-efficacy with environmental factors, personality, and academic achievement in medical students," Master's thesis, Wonkwang University, Jeollabuk-do, 2010.
- [22] K. S. Kim, "A study on the effects of locus of control and tolerance for uncertainty on school adaptation," Master's thesis, Korea University, Seoul, 2010.
- [23] S. W. Seol, "The mechanism of the influence of intolerance of uncertainty and perceived emotion controllability on worry," Master's thesis, Yonsei University, Seoul, 2006.
- [24] K. R. Shin, "A study on the relationship tolerance for worry and uncertainty according to parents' perfectionism," Master's thesis, Sogang University, Seoul, 2005.
- [25] Y. A. Oh, "The relationship between intolerance of uncertainty and worry, The mediational effect of experiential avoidance," Master's thesis, the Catholic University of Korea, Seoul, 2009.
- [26] Metzger RL, Miller ML, Cohen M, Sofka M, and Borkovec TD, "Worry changes decision making: the effect of negative thoughts on cognitive processing," *J Clin Psychol*, vol.46, pp.78-88, 1990.