A Study on Effect of Forest Education Program for Juvenile Probationers

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Abstract

This study was performed to analyze the effect of forest education on juvenile probationers' psychological and emotional changes. Changes of resilience, mood state and attitudes toward forest of 272 juvenile probationers, who attended forest education program co-managed by Korea Forest Service and Ministry of Justice in 2016, were identified by self-report survey. Survey analysis was performed using descriptive statistics, reliability analysis, exploratory factor analysis and paired t-test with IBM SPSS 21.0 program. The forest education program consisted of physical activity, emotional activity, cognitive activity, challenging activity and problem solving activity (e.g. physical exercises in the forest, forest meditation, observing forest with mirror, talking with trees, creating with natural objects, etc.). The result was as follows: First, it showed that program using forest education activities for juvenile probationers has an effect on the development of resilience. Second, it showed that program using forest education activities for juvenile probationers had an effect on the improvement of mood state. Third, it showed that program using forest education activities for juvenile probationers had an effect on the development of attitudes toward forest. It showed that program using forest education activities for juvenile probationers had an effect on the development of enjoying the forest and importance and usefulness of forest by sub-factors of attitudes toward forest. Therefore the result came out that forest education program had influence on positive change of juvenile probationers' resilience, mood state and increase of attitude towards forest. This study had a limitation to generalize the result of the study for the limited case, but forest education was expected to help the social adaptation and development of the at-risk youth who was exposed to the current risk. The next study need for various experts' cooperation to develop customized forest education programs for juvenile probationers and continuous monitoring of the effect.

Key words : *adolescent probationers, attitude towards forest, forest experience, mood state, resilience*

I. Introduction

These days, due to rapidly changing social environment, when the youth fail to understand their role and adapt themselves to the surroundings, they may develop lower self-esteem, emotional confusion and suspend their education or run away from home or fail to fit to school, which is a very serious situation. From this realistic perspective, the Ministry of Justice has implemented a 'probation system' since 1989 to prevent juvenile offenders and recidivism. 'Probation' is an advanced criminal policy that a criminal is not detained in a prison or youth detention center, but has a normal life in home, school,

or work at the same time he or she must observe the regulations prescribed by the law, be guided or supervised by a probation officer, or serve the community or comply with the order to attend a lecture in order to limit criminal nature (Crime Prevention Policy Bureau, 2016). According to the data from the justice ministry, the most frequent problematic behavior type of juvenile probationers in Korea in 2016 were theft (6,078, 37.3%) and violence (4,719, 27.5%). The proportion of re-offenders of juvenile delinquency is once – 975 (42.0%), twice – 5,301 (27.9%), three times – 3,021 (15.9%), four times – 1,584 (8.3%), more than five times – 1,103 (5.8%), which means juvenile crimes have high recidivism as well. Compared with 5.6% of adult recidivism, the rate for juvenile re-offenders is 12.3%, over twice more than that of adults (E-Country Index, 2017).

The youth have been mostly involved with minor delinquencies and these delinquencies have become collective behavior along with a rising delinquencies among the enrolled

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students (Kwak *et al.*, 1991). Most of all notable is the fact that it can be more serious since the rapid increase of juvenile delinquency is not temporary but repetitive, which can ultimately grow into adult crimes (Hwang, 2010). As for these youth criminals, a combination of environmental and psychological factors related to education, family background, or relationship with their peers can influence their repetitive crimes (Noh, 2009; Lee, 2007). From this perspective, if family and society fail to function properly, it becomes highly likely to create a confusion in values and bring about side effects such as delinquent behavior (Wang, 2006). Actually, in many cases juvenile probationers who became involved in youth crimes were in vulnerable family environment and deviated from schools and accordingly they showed psychological and emotional problems. Due to low self-esteem, they are vulnerable to poor mental health such as psychological anxiety, negative attitude and a sense of alienation (Kim *et al.*, 2015). Because when they fail to respond to problems such as conflicts with their family or peers, pressure from school or society, they can show various behavioral problems such as suicide, school violence, smoking, drinking or runaway from home (Pelkonen *et al.*, 2003; Michael and Ben-Zur, 2007; Woo, 2009; Jang, 2010; Kim, 2012) we need to help them to effectively solve the problems they face and adapt to the environment.

According to the previous researches in Korea concerning juvenile probationers, there has been continuous studies to analyze and understand the problem factors as a part of characteristics of these youth. Hong (2000) verified that the counseling juvenile probationers dependant on personal, family and delinquency related factors is effective and Joo and Lee (2008) analyzed the statements on daily lives of delinquent youth after their second crime and categorized the developments and types of daily lives according to the repeated crimes. The study by Son and Yang (2009) suggested the tools used for correction of delinquent youth by understanding their re-socialization process and developing a substance theory on the process. Koh *et al.* (2010) decided the characteristics of criminal's personality by measuring through PAI (Personality Assessment Inventory) on the crime types based on delinquency triggering points of the juvenile delinquents. In addition, recently there has been a study on the supports such as developing educational program for delinquency prevention. An and Park (2016b)

tried to come up with measures to support juvenile delinquents after analyzing adaptation process as an influencing factor for juvenile delinquents at the facility to have willingness to return to the society after re-offence during adolescence according to personal, social and environmental factors (Song and Choi, 2016). Likewise, Studies on juvenile probationers have focused on causes of delinquency, re-offence, forecast and tried to identify root causes of crimes and make improvements. Meanwhile, programs to treat juvenile probationers differentiated from that for adults are insufficient due to difficulties in selecting external consigned institutions and shortcomings in specialized lecture programs (Cho, 2012), and the relevant studies are also insufficient.

Recently, forest education program, one of the educational programs for adolescent probations has been extensively implemented. Various studies confirmed that forest education has positive effects on depression alleviation, self-esteem improvement, emotional development, confidence boost, natural sociability, alleviation of internet addiction, etc. (Kim and Lee, 2006; Shin *et al.*, 2007; Kim, 2009; Kim, 2011; Lee, 2013). In particular, activities of experiencing forest have positive impacts on solving problems such as failure to fit to school, broken family, drug addiction and juvenile delinquency (Oh *et al.*, 2012). Against this backdrop, the Korea Forest Service and the ministry of justice made an agreement to develop and run forest education program designed for juvenile probationers in connection of relevant professionals including forest education experts, youth specialist and probation experts and have continued to make monitoring the effects. As a part of this, Eom *et al.* (2016) verified positive effects of forest education program for juvenile probationers such as self-esteem and self-control improvement. In other words, they observed that participants of the forest education program were able to delay their desires, comply with regulations and enhance their life satisfaction in the long term. However, though there have been many studies to verify the effects of forest education targeting general youth, it is still insufficient to study the effects of forest education program that prevents juvenile probationers from committing crimes again and helps them to come back to society.

Therefore, this study was performed to analyze resilience, mood state and changes in their attitude towards forest as an

emotional response of juvenile probationers before and after the forest education program and verify whether it has positive effects.

II. Research Method

1. Research Subject

The study worked on 272 juvenile probationers selected from 20 probation offices as a part of the project “2016 Korea Forest Service and Ministry of Justice’s Forest Education Program for Juvenile Probationers”, co-managed by Korea Forest Service and Ministry of Justice from May to November, 2016.

2. Forest Education Program

The representative best practice of overseas forest education program targeting juvenile probationers is ‘Wilderness Camps or Challenge Program; WCCP’, a model program of Office of Juvenile Justice and Delinquency Prevention; OJJDP in the US. In this program, the participants challenge their physical activities such as outdoor walking with backpack or rock-climbing. This is an opportunity for these young people to make physical, emotional and social changes through the process of ‘learning through practice’ (Lee, 2008).

In case of Canada, there is Coastline Challenges Program, a judiciary service education program, organized by British Columbia. In this program, juvenile probationers from age 13-18, recommended by probation officer participate in forest

education program made up of outdoor activities including camping, canoe, hiking, solo experiences and running in forest for 26 days, being disconnected from outside (National Institute of Forest Science, 2015).

In Korea, since 2014 ‘forest education for juvenile probationers’ co-managed by Korea Forest Service and Ministry of Justice has been operated. There are various forest experience programs for these young people to foster emotion, form sound values, and have positive attitude towards forest and life through forest education such as healing forest, recreational forest and urban forest.

In this way, forest education programs at home and abroad are made up of forest activities based on nature that these youth can adapt and challenge themselves to forest environment so as to foster positive emotion and improve abilities to solve problematic situations they face. Ultimately it can correct their delinquent nature and prevent them from recommitting crimes, so that they can return to the society in a sound way.

Accordingly this study was made up of detailed activities such as physical activities, meditation, ecological activities, self-exploratory activities, artistic activities where they can get to know themselves with waking up their physical senses, experience various elements of a forest to solve various problems in a forest, explore their own dreams with self-reflection and make the best use of natural objects for artistic activities. In addition, these programs were hosted by forest education professionals in a collective or individual activity. Moreover, probation officers observed on site to make sure their active participation (Table 1).

Table 1. Activity contents of forest education.

Division		Activity contents	Goals
Physical activity		<ul style="list-style-type: none"> Physical exercises in the forest Awakening up five senses 	<ul style="list-style-type: none"> Getting to know each other by dynamic group physical activity in forest
Emotional activity		<ul style="list-style-type: none"> Forest meditation Nap in the forest 	<ul style="list-style-type: none"> Relaxing psychological tension and stabilize one’s mind
Cognitive activity		<ul style="list-style-type: none"> Observing forest with mirror 	<ul style="list-style-type: none"> Knowing the value of forest by experiencing various components in the forest
Challenging and Problem solving activity	Self exploration	<ul style="list-style-type: none"> Tree ring of my life Fly hope Talking with trees Writing a letter to myself 	<ul style="list-style-type: none"> Getting an opportunity to introspect one-self Searching one’s dream, future and vision
	Artistic activity	<ul style="list-style-type: none"> Creating with natural objects 	<ul style="list-style-type: none"> Enhancing creativity and feeling a sense of achievement

3. Measurement Tools

In consideration of the previous researches on the effects of specific activities or programs targeting juvenile probationers, the studies were mostly focus on verifying positive effects on behavior correction such as individual and social problem solving, emotional area such as self-esteem, self efficacy or self-recognition, relational area such as social support, interpersonal relation change, change in attitude toward school life and educational area such as career preparation or decision, horticulture knowledge, attitude towards environment (Table 2).

This study selected resilience scale about coping with and solving various problem situations occurring in their own environments, mood state scale about measuring emotional changes in forest and scale of attitude toward forest to see changes in their recognition about importance of interest and protection toward forest through forest education on juvenile probationers.

1) Resilience

Resilience can be defined as a power of effective handling of problems or stressful situations and making adaptation even with risks (Garmezy, 1991; Ryff and Singer, 2007). Since those with lower resilience can be easily discouraged and become impulsive and fail to efficiently handle stressful situation (An and Park, 2016a), it is all the more important for juvenile probationers to grow the ability of handling personal or external emergency situations. Therefore this study figured out the changes in their resilience after conducting forest education program on these juvenile probationers and as for resilience scale we adopted resilience scale of Grothberg (1997) in his 'the International Resilience project' and Joo and Lee (2011) adopted the resilience scale of Oshio et al. (2003), which were recomposed to 'resilience scale for youth' in order to apply to young people. A total of 23 questions were used with a scale of five points.

Table 2. Preferences of program for juvenile probationers.

Research contents and method	Used scale	Author
The relation between social problem solving ability and social supports Experiment (N)=221	Social problem solving inventory (SPSI) Social support scale	Kim (1998)
The effectiveness of the mentoring program Experiment (N)=15, Control (N)=10	Juvenile delinquency scales Inventory of social supportive behaviors (ISSB) Personal factors (Self-control, Self-efficacy)	Ha (2001)
The effects of social competence promotion program Experiment (N)=18, Control (N)=18	Self-efficacy scale Social problem solving inventory Relationship Change Scale	Cheong (2005)
The comparison of the career self-efficacy, career decision level and career preparation behavior Experiment (N)=114, Control (N)=147	Career decision-making self-efficacy short form (CDMSE-SF) Career decision scale Career exploration survey Vocational questionnaire Career planning questionnaire	Moon (2010)
Tea culture therapy program development for social adaptability improvement Experiment (N)=20	Self-efficacy scale Self-control scale relationship change scale	Kim (2014)
Group art therapy case study Experiment (N)=4	Self-efficacy scale Problem behavior (Korea-Youth Self Report; K-YSR)	Lee (2017)
Identification of depression Experiment (N)=32	Children's Depression Inventory (Control Scale, Self-Concept Scale)	Cole et al. (1981)
The effects of community based horticultural program Experiment (N)=50	Horticultural knowledge Environmental attitudes	Cammack et al. (2002)
The effects of horticultural program Experiment (N)=50	Self-esteem Interpersonal relationships Locus of control Attitude toward school	Cammack et al. (2002)

2) Mood state

We used ‘mood state’ scale to measure immediate emotional response from forest activities of these juvenile probationers. We adopted mood state scale, developed by Campbell et al. (1976), ‘Index of Well-being’ which was translated by Lee (1998) to recompose into eight questions that question ‘feeling for life’, sub-factor from ‘criteria of subjective quality of life’. ‘Feeling for life’ is to ask participants their emotional state concerning recent experience, which was named ‘mood state’ in this study. This is semantic differential scale that each question suggests a pair of adjectives related to opposite moods located in both ends and the scale of points ranges from one to seven so that the respondents can check the appropriate mood. When the lower the point is, the more positive you feel, the higher the point is the more negative mood you have.

3) Attitude towards Forest

We used the scale of the ‘attitude toward forest’ in order to measure changes of juvenile probationers in their awareness, perspective and expectations toward forest before and after forest education programs. This was based on the scale developed by Wendling and Wuensch (1985; Joo, 2001 re-cited) but modified and complemented by Joo (2001). In detail items, there are 13 questions that ask ‘interest in forest’, ‘forest protection and importance’. Each question has a scale of five points and when average value from the questions in pre-post questionnaires are analyzed and the differences are checked statistically, the changes in the attitude towards forest are objectively recognized.

4. Method of data collection and analysis

This study performed a self-filling questionnaire before and after program participation in order to assess the effects of forest education program targeting juvenile probationers. We collected 430 copies of pre-questionnaires and 391 copies for post-questionnaires. However, we excluded cases that are mismatched with pre- and post- questionnaires and unfaithful responses so that a total of 272 copies of pre- and post-questionnaires were used ultimately. For analysis of this collected data, we used SPSS 21.0 program and conduct technical statistics analysis, reliability analysis, and corresponding sample t-verification.

We performed exploratory factor analysis for verifying validity of measuring tools and used the same pre-questionnaire data with the same scale that is used repeatedly before and after the program. Principle component analysis was also performed to extract factors for scales of mood state, attitude toward forest and resilience and Varimax method was selected. Through Bartlett’s sphericity test, we checked whether Chi-Square (χ^2) is lower than 0.05 of significance level and whether KMO value is higher than 0.5 through KMO (Kaiser-Meyer-Olkin) test and then conduct reliability analysis to check internal consistency of questions (Hair et al., 1998).

III. Results and Discussions

1. General Characteristics of Participants

General characteristics of participants are as follows (Table 3). The gender of 272 juvenile probationers participating in

Table 3. Demographics of participants.

Variables		Frequency (N)	Percentage (%)
Gender	Male	253	93.0
	Female	19	7.0
Age	15	7	2.6
	16	31	11.4
	17	58	21.3
	18	73	26.8
	19	71	26.1
	20	29	10.7
	21	3	1.1
Concern	Academic	53	19.5
	Career	126	46.3
	Interpersonal relationship	7	2.6
	Family situation	3	1.1
	Economic condition	26	9.6
	Others	57	21.0
Academic background	In middle school	39	14.3
	Dropout of middle school	17	6.3
	Graduated middle school	10	3.7
	In high school	104	38.2
	Dropout of high school	76	27.9
	Graduated high school	26	9.6
Total		272	100.0

forest education program is mostly male (93.0%). The age is from 15 to 21 with 18 (26.8%)', '19 (26.1%)' and '17 (21.3%)' as majority age groups. As a result of the research on their current concerns, "career" comes first with 46.3%, 'others (21.0%)' and 'education (19.5%)' in order. Others include a combination of concerns on career, education, etc. As for educational background, enrolled students in high school (38.2%), dropout from high school (27.9%) and enrolled in middle school (14.3%) are in order. The number of juvenile probationers that are enrolled in middle or high school is 143

(52.5%) and those who are not enrolled in schools are 129 (47.5%) due to dropout or failure to promote to the higher education, etc.

2. Verification of Effects of Forest Education Program

1) Resilience

As for resilience questions, a total of 22 questions were used for final analysis after removing questions with .40 of commonality. As a result of major component analysis, we confirmed

Table 4. Exploratory factor analysis: Resilience.

Items		Factors		
		1	2	3
Self-efficacy	I can do my best to accomplish the given tasks	.783	.393	.236
	I love and trust myself	.772	.314	.327
	I have enough energy to do what I have to do	.764	.414	.239
	I can lean on my family whenever I need them	.736	.215	.411
	I think I can deal with whatever comes	.703	.442	.323
	My life has meaning	.693	.333	.391
	I am active and cheerful	.642	.535	.201
	I have a person who I love much	.575	.569	.153
	When difficult problems come in my way, I get lessons coping with them	.570	.502	.337
Trust in self and others	I can easily make friends	.292	.753	.324
	I can make tough decisions that others can't	.385	.727	.323
	I'm not afraid to try new things	.387	.702	.370
	I can accept other's opinion even though it is different from mine	.429	.632	.424
	I can keep smiling when I go through a hard time	.357	.626	.407
	I am proud of my achievements	.551	.624	.275
	I can talk to others about things that bother me	.526	.568	.378
	I practice on my own to achieve something	.472	.532	.437
Tolerance of negative affect	I am not easily annoyed when things don't go my way	.210	.229	.863
	I can control my negative emotions such as anger, sadness	.311	.282	.793
	Even though something upsets my mind, I can deal with other things assigned to me	.289	.392	.762
	I can figure out when it is a good time to talk to someone or to take action	.489	.447	.610
	I know how to calm down upset mind	.509	.446	.517
Eigenvalue		6.596	5.697	4.519
Explained variance (%)		29.982	25.896	20.543
Overall accumulated variance (%)			76.421	
Extraction method : Principal component analysis, KMO=.970, $\chi^2=13080.741$ (df=231, $p=.000$)				
Extraction method: Varimax				
Cronbach's α		.956	.950	.926
			.977	

they are appropriate for factor analysis with the result of $\chi^2 = 13080.741$ ($df=231, p=.000$), $KMO=.970$ (Table 4). It turned out that the sub-factors of resilience is three in total. Factor one questions have something to do with self-efficacy such as ‘I can do my best to accomplish the given tasks’, ‘I love and trust myself’, ‘I have enough energy to do what I have to do’, etc so that it was named ‘self-efficacy’. Factor two questions are about trust in self and others such as ‘I can make friends easily’, ‘I can make tough decisions that others can’t.’ and ‘I can accept others’ opinion even though they are different from mine’, etc so that it was named ‘trust in self and others’. Also, the factor three includes questions such as ‘I am not easily annoyed when things do not go my way’, ‘I can control my negative emotions such as anger and sadness’ and ‘even though somethings upsets my mind, I can deal with other things assigned to me’ so that it was named ‘tolerance of negative emotion’. As a result of Cronbach’s α analysis, the scale of the questionnaire is ‘self-efficacy’ .956, ‘trust in self and others’ .950, ‘tolerance of negative emotion’ .926, and ‘overall resilience’ .977, which shows internal consistence.

The resilience of the juvenile probationers rose from 3.466 before program participation to 3.749 after, which is statistically significant increase ($t=-6.541, p=.000$). In case of sub-factors of resilience, the average score of ‘self-efficacy’ increased from 3.541 in pre-program to 3.823 in post-program ($t=-6.131, p=.000$), ‘trust in self and others’ went up from 3.436 to 3.735 ($t=-6.498, p=.000$), and ‘tolerance of negative emotion’ rose from 3.378 to 3.641 ($t=-5.302, p=.000$), sub-factors show they are statistically significant (Table 5).

This shows that after forest education program participation, these juvenile probationers got better in their resilience, an ability to restore their capacity and to positively adapt themselves even with exposure of problem situations than before. As in the study results of Mun and Yang (2012), when we consider problematic behaviors of the youth and their countermeasures, this study shows that forest education program can be an educational alternative that can restore self-efficacy, social adaptiveness and problem-solving ability of juvenile probationers who have social problems.

2) Mood State

As a result of analyzing major component against eight mood state questions, $\chi^2=6414.304$ ($df=28, p=.000$), $KMO=.957$ turned out to be appropriate for factor analysis. As a result of analysing factor reliability, the overall reliability (Cronbach’s α) is .976, which shows internal consistence (Table 6).

As shown in Table 7, before and after participating in the forest education program, the mood state average value was 4.077 and went up to 4.988 after participating, which are statistically meaningful rise ($t=-11.081, p=.000$). In other words, the mood of the juvenile probationers changed positively before and after participating in the forest education program. This suggests that positive emotions such as ‘miserable’, ‘disappointing’, and ‘pessimistic’ turned to positive emotions such as ‘enjoyable’, ‘rewarding’ and ‘hopeful’. These results are similar to those of Eom et al. (2016), which suggests that positive emotions have increased so that it improves the emotions of participants thanks to the experience of participating

Table 5. Result of paired t-test: Total and sub factors of Resilience.

Variable		M	SD	<i>t</i>	<i>p</i>
(Total) Resilience	Pre-test	3.466	.716	-6.541	.000***
	Post-test	3.749	.787		
(Factor1) Self-efficacy	Pre-test	3.541	.750	-6.131	.000***
	Post-test	3.823	.808		
(Factor2) Trust in self and others	Pre-test	3.436	.746	-6.498	.000***
	Post-test	3.735	.819		
(Factor3) Tolerance of negative affect	Pre-test	3.378	.806	-5.302	.000***
	Post-test	3.641	.863		

M=Mean; SD=Standard deviation.

*** $p<.001$ by paired t-test.

Table 6. Exploratory factor analysis: Mood state.

Items		Factor
		1
Disappointing	-	Rewarding .954
Discouraging	-	Hopeful .952
Empty	-	Full .948
Useless	-	Worthwhile .947
Lonely	-	Friendly .927
Miserable	-	Enjoyable .923
Does not give me much chance	-	Brings out the best in me .916
Boring	-	Interesting .866
Eigenvalue		6.911
Explained variance (%)		86.391
Overall accumulated variance (%)		86.391
Extraction method: Principal component analysis, KMO=.957, $\chi^2=6414.304$ (df=28, $p=.000$)		
Cronbach's α		.976

Table 7. Result of paired t-test: Mood state.

Variable	M	SD	<i>t</i>	<i>p</i>
Mood state	Pre-test	4.077	-11.081	.000***
	Post-test	4.988		

M=Mean; SD=Standard deviation.

*** $p<.001$ by paired t-test.

in forest education programs.

The results of this study were as follows: the juvenile probationers who predicted that the program would be about education for everyday school life and delinquent behavior before participating in the program had come to feel freshness and pleasure from diverse experiences in forests, which would have affected the change to positive emotion.

3) Attitude towards Forest

In final analysis, a total of 12 questions were used for attitude towards the forests after removal of items with a commonality of less than .40. The result of the principal component analysis is $\chi^2=575.606$ (df=45, $p=.000$), KMO=.834, which confirms its appropriateness for factor analysis. As for the characteristics of each factor, there are two sub-factors. Factor one is an interest in forests such as 'I am very much interested in forests', 'the forest is an interesting place to learn about

nature', 'I prefer to learn in forest than in school when I learn about nature' so that this was named 'enjoying the forest'. Factor 2 is items about their recognition of forest as a space for protection, including 'we must protect the forests', 'humans are severely destroying the forests', 'we can not live without forests' so that it was named 'importance and usefulness of forest'. This is the same as in the study by Son et al. (2013). Cronbach's α of attitude toward forests showed internal consistency with 'interest in forests' .960, 'protection and importance of forests' .908, and total .958 (Table 8).

As a result of analyzing the attitude toward the forest before and after participating in the forest education program of the probation adolescents, the average value before participating in the forest education program increased from 3.256 to 3.796 after the participation, which showed a statistically significant change ($t=-10.539$, $p=.000$). These results can be interpreted that activities such as nature observation play, forest commentary, etc., give pleasure to juvenile probationers, inducing interest in forests, and affecting them to recognize forests as an interesting space as well as a space to be protected (Table 9).

This result showed that forest commentary program can help participants to feel the wonder and curiosity of the forest and to remind participants about the importance of forests by creating new insights and interests about the forest environment, which is similar to the results of Joo (2001).

Table 8. Exploratory factor analysis: Attitude towards forest.

	Items	Factors	
		1	2
Enjoying the forest	I'm very interested in the forest	.856	.208
	The forest is an interesting place to learn about nature	.845	.354
	I prefer to learn in forest than in school when I learn about nature	.841	.317
	I like to go to the forest	.836	.307
	The forest is a fun place	.828	.320
	The forest is a good place to learn about nature	.750	.494
	I feel comfortable in the forest	.736	.492
	I feel grateful to the forest	.722	.510
Importance and usefulness of forest	We must protect forests	.347	.851
	Humans are destroying forests harshly	.307	.837
	We can't live without forests	.278	.807
	Both the creatures living in forest and men are important lives	.351	.798
Eigenvalue		5.579	3.926
Explained variance (%)		46.489	32.720
Overall accumulated variance (%)		79.209	
Extraction method: Principal component analysis, KMO=.834, $\chi^2=575.606$ (df=45, $p=.000$)			
Rotation method: Varimax			
	Cronbach's α	.960	.908
		.958	

Table 9. Result of paired t-test: Total and sub factors of Attitude towards forest.

Variable		M	SD	<i>t</i>	<i>p</i>
(Total)	Pre-test	3.256	.805	-10.539	.000***
Attitudes toward forest	Post-test	3.796	.835		
(Factor1)	Pre-test	3.070	.900	-11.417	.000***
Enjoying the forest	Post-test	3.717	.875		
(Factor2)	Pre-test	3.631	.854	-5.927	.000***
Importance and usefulness of forest	Post-test	3.955	.871		

M=Mean; SD=Standard deviation.

*** $p < .001$ by paired t-test.

In terms of the sub-factors, 'interest in forest' showed a statistically significant change ($t=-11.417$, $p=.000$) since the average score went up from 3.070 to 3.717 before and after participation in the forest education program. In 'importance and usefulness of forest' factor, there was meaningful change since average value before the participation rose from 3.631 to 3.955 after participation ($t=-5.927$, $p=.000$).

In other words, we observed that during the process of

participating forest education program (physical activities such as meditation to awaken a sense of body or relaxation, ecological experience activities in which various components of the forest are learned, and craft activities using natural things) juvenile probationers have been positively affected in the positive attitude change in that they recognize forest positively and understand importance of forest.

IV. Conclusion

This study examined the effect of the forest education program on the resilience, mood state, and attitude of the forests of the probation adolescents, which has been conducted jointly by Korea Forest Service and the Ministry of Justice, and the results are as follows .

First, forest education programs have positive effect on changes in resilience of juvenile probationers, which is statistically meaningful. In terms of sub-factors, forest education activities have a positive effect on the improvement of self-efficacy, social adaptability and problem solving ability of juvenile probationers. This is because the relationship between the forest commentator, juvenile probationers, and the participants of each group is formed as a result of various activities in the forest and it also affects the attitude of juvenile probationers during resolving the mission such as forest exploration or craft-making. In addition during the process of solving difficult problems or achievement, they can develop the ability to endure negative emotions. All of these can be interpreted to be effective in restoring their resilience. This result is consistent with the study by Kim (2014) that forest activities can reduce the negative emotions of participants.

Second, as a result of comparing the mood state before and after participating in the forest education program, the forest education significantly affects the change of the mood state of the participants positively and meaningfully. This result confirms that forest education can be a positive experience to strengthen the protective factors of juvenile probationers. In other words, participation in forest education allows positive emotional factors from forest experience to become buffer for risk factors that juvenile probationers have and help strengthen the protection factor by removing negative emotions (Kim, 2014).

Third, as a result of examining attitude towards forest before and after participating in the forest education program, it was found that forest education has a significant effect on positive attitude change towards forest. In other words, the participation of juvenile probationers promoted the interest and curiosity towards forests and enhance their recognition of the importance of forests, which supports the study of Eom et al. (2015) that the experience in forests has a positive effect on the participants' attitude towards forest.

This study has identified that as they participate in forest activities, juvenile probationers improve resilience in a meaningful way since their self-efficacy which enables them to establish confidence on their own increases and they can form trust to others and increase problem-solving ability. In addition, the forest education program proved that it can induce the interest of probation juvenile probationers and achieve emotional stability and changes in positive attitude towards forest through mood improvement.

Through this study results, we expect that the forest education will be gradually expanded and applied to help correct juvenile probationers who are exposed to diverse risk factors. To this end, it is necessary to conduct continuous monitoring of the effectiveness of forest education programs for these young people, as well as a study to improve the quality of programs in consideration of the characteristics and types of juvenile probationers.

V. References

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