A Study on Users' Perception of the Healing Power of Forest Environments: Focused on the Visitors of Bunseong Mountain

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ABSTRACT

This study surveyed the general characteristics and forest use characteristics of forest visitors, the healing power of natural environments and Perceived Restorativeness Scale (PRS) to find out whether humans can feel the healing effects of natural environments. The target area of this study was the natural environments of Bunseong Mountain in Gimhae, Gyeongsangnam-do, Korea. A total of 50 questionnaires were analyzed. Female visitors and those aged between 40s to 60s accounted for 62% and over 70% respectively. All the surveyed respondents answered 'yes' to the question about the healing effects of Bunseong Mountain and natural environments, and 84% of them answered that they can get 'psychological and physical healing' in Bunseong Mountain. Many respondents chose oxygen, sunlight, and landscape as a healing factor. To the questions about the specific form or conditions of the natural environments that have the healing effects, those who answered 'forest' was the highest (72%), and they described thickness of forests, gentle slope and clean air as their conditions. The average score of the Perceived Restorativeness Scale (PRS) using a 7-point Likert scale was 5.14. The results of this study indicate that respondents perceive Bunseong Mountain as a restorative environment and think that they can enjoy the healing effects of Bunseong Mountain and natural environments.

Keywords: forest healing, natural environment, PRS (Perceived Restorativeness Scale)

Introduction

A series of crimes caused by a loss of humanity have been reported, and those who think of others as a tool and who do not sympathize with others rampantly violate others' human rights, freedom and lives for the sake of their pleasure. Jang (2018) attributed a loss of humanity in Korean society to rapid economic growth and modernization, and pointed out that sharp economic growth and efficiency-centered society can cause a wide range of psychopathological symptoms from a psychoanalytic perspective such as schizophrenic, depressive, obsessive-compulsive and narcissistic behaviors.

Lee (2010) said that Germany that went through industrialization earlier than Korea chose to "return to nature" to overcome dehumanization back then. People who escape from the busy city where people feel being used as a tool and find a haven in nature experience that their body and mind recover in nature. As people experience the healing effects of nature, various natural healing methods have been used since the early 19th century. A social atmosphere in which people count

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on the healing power of nature has lasted until now, and the government enacted a law to support natural healing methods.

Since the Forest Welfare Promotion Act was enacted in Korea in 2015, forest welfare has been provided in the form of forest education and healing. Forest healing is an activity of promoting the health of humans in nature, and it is defined, in the Forestry Culture and Recreation Act, as “immune-strengthening and health-promoting activities which utilize a variety of elements of the forest, including scents and scenic views” (Korea Forest Service, 2011). Currently, forest healing is provided in general through forest healing programs led by forest healing instructor in forest environments. Since forest healing programs play a role as a lubricant in achieving the expected effects and purpose of forest healing, the methods and content of the programs are important.

Kim and Park (2017) reviewed the forest healing programs that were operated in Korea and classified them into 71 unit programs, and concluded that they mostly focused on therapy methods, meditation, art therapy and craft activities, and that there were relatively less forest tending programs. Many people think that it is necessary to formulate and operate programs in a systematic way based on the analyzed results of the physical environments and resources of healing forests (Yeom et al., 2015).

With the goal of studying the healing power of natural environments focusing on forest environments, this study aimed to survey people's perception of the healing power of forest environments. The biophilia hypothesis suggested by Wilson (1986) made people have a good feeling toward the existence of life and feel comfortable with natural environments, but it is still uncertain about whether they believe they are healed or not. Some studies showed that patients showed improvements in their conditions or recovered in forest environments, but only few studies were conducted on people's perception of the healing power of forest environments. Against this backdrop, this study surveyed forest visitors on whether they perceived forest environments as a healing environment using direct questions and the Perceived Restorativeness Scale (PRS).

Research Methods

Tools

This study used a self-reporting questionnaire formed with 10 questions about the general characteristics of respondents and six questions about the healing power of environments, and the Perceived Restorativeness Scale (PRS). The general characteristics of respondents including gender, age, disease, stress and usage frequency and time were surveyed using multiple choice and short answer questions that were designed based on earlier studies including Yoo (2013) and Shim (2013). Questions about the healing power of environments were multiple choice, short answer and open ended questions about the healing power of the target area of this study and natural environments, factors, requirements and experiences. The PRS used in this study was the one developed by Hartig, Kaiser, and Bowler (1997) and Hartig, Korpela et al. (1997) based on the Attention Restoration Theory (ART) of Kaplan, and respondents were instructed to subjectively score the restorativeness of environments. This study used a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree) composed of a total of 26 questions that were translated into Korean by Lee and Hyun (2003).

Target area

In this study, Bunseong Mountain located in Gimhae-si, Gyeongnam Province was selected as a target area in order to exclude variables such as facilities and to survey whether subjects can feel the healing effects of an ordinary mountain that can be commonly found in surrounding environments. The height of Bunseong Mountain is 382m, and has mixed forests and gentle hiking trails. A town is stretched from the southern foot of the mountain. It is easily accessible

and has several hiking trails with different slopes, which is good for both walking and hiking. As the degree of closure in mountain paths was adequate to let the sunlight and wind pass through and to keep the paths not too blinding or humid. *Chamaecyparis obtusa* trees that have been planted around the mountain from 20 years ago formed colonies, and give people places to relax. Since the colonies of *Chamaecyparis obtusa* trees are not too dark or noisy, and not too far from villages, they are safe. Figure 1 shows some photos of natural environments in Bunseong Mountain from eco forest to the colony of *Chamaecyparis obtusa* trees to hiking trails in the order of closeness to the entrance of the mountain.

Subjects

This study was conducted near the entrance of Bunseong Mountain, the eco experience center and the entrance of hiking trails located in Samgye-dong, Gimhae-si, Gyeongnam Province from January 3 to 6, 2019. Visitors of Bunseong Mountain were informed of the purpose of this study, and questionnaires were distributed to those who signed the consent form. Researchers performed an one-on-one interview with respondents, and asked them specifically about any answer that was vague or not sufficient during the interview in order to increase the accuracy of their responses.

Data analysis

The data collected in this study were analyzed using IBM's SPSS Statistics 22 program. Questions about the general characteristics of respondents and multiple choice questions were analyzed using frequency analysis. Answers to open ended questions were divided into several groups based on their similarity. The mean values and standard deviation of the Perceived Restorativeness Scale (PRS) were calculated to compare them with earlier studies. A t-test and one-way ANOVA were used to identify whether there is any difference in the PRS values between subjects who were grouped based on their general characteristics.

Results and Discussion

General characteristics of respondents

Out of a total of 53 answer sheets collected in this study, three insufficient answer sheets were excluded, and the rest 50 answer sheets were analyzed. Table 1 shows answers to four questions about the general characteristics of respondents, and six questions about their usage characteristics. The share of female visitors was 62%, higher than that of

Figure 1. Images of eco forest (A), *Chamaecyparis obtusa* forest (B), and mountain trails (C) in Bunseong Mountain.

Table 1. The Bunseong Mountain visitors' characteristics

Variable		Frequency	Percent (%)
Gender	Male	19	38
	Female	31	62
Age	10-19	2	4
	20-29	6	12
	30-39	2	4
	40-49	13	26
	50-59	12	24
	60-69	11	22
	70 or more	4	8
Stress ^z	1	3	6
	2	11	22
	3	28	56
	4	6	12
	5	2	4
Medical problem	No	43	86
	Yes	7	14
Frequency of visits	Four times a week	10	20
	Two or three times a week	12	24
	Once a week	9	18
	Once or twice a month	6	12
	Less than six times a year	13	26
Duration per visit	Less than 1 hr	8	16
	1-2 hrs	25	50
	2-3 hrs	13	26
	3-4 hrs	1	2
	More than 4 hrs	3	6
Visiting history	Less than 6 months	11	22
	Less than 1 yr	10	20
	Less than 5 yrs	10	20
	Less than 10 yrs	8	16
	More than 10 yrs	11	22
Main site	Eco forest	18	36
	<i>Chamaecyparis obtusa</i> forest	2	4
	Mountain trail	30	60
	Others	0	0

^zThe level of stress was measured using a 5-point Likert scale (1 = not at all stressed; 5 = always stressed).

males. Their age ranged from the 10s to 80s, and those in their 40s accounted for 26%, followed by those in their 50s (24%) and those in their 60s (22%), and the rest accounted for 28%. Those who answered they had a disease accounted for 14%. The level of stress was measured using a 5-point Likert scale (1 = not at all stressed; 5 = always stressed), and the share of those who answered 'normal (3 points)' was highest (56%). In terms of the frequency of visiting, the share of those who visited the mountain less than six times per year was highest (26%), and the share of those who visited the mountain 2-3 times per week was 24%. Those who stayed for 1-2 hours accounted for 50%, and to the question

about the visiting duration, those who answered over 10 years and those who answered less than 6 months accounted for 22% respectively. Those who spent most of their time in hiking trails in Bunseong Mountain accounted for 60%. Questions on the purpose of use and major activities were open ended questions, and responses to the question about the purpose of use were divided into four types as follows: walking, physical activity, psychological activity and visiting. Out of them, the share of walking was highest (48%), followed by physical activity (42%), psychological activity (6%) and visiting (4%). Major activities included walking, strolling, hiking, exercising, riding a bicycle, meditation, playing in a playground, and experience. Out of them, the share of walking was highest (40%), followed by strolling (32%), hiking (8%), exercising (6%), riding a bicycle (6%), and the rest (8%).

Healing power of environments

This study used three multiple choice and open ended questions each on the healing power of Bunseong Mountain and the entire natural environments. Table 2 showed the frequency of each response to the multiple choice questions and the types of responses to the open ended questions.

To the question about whether they believed Bunseong Mountain had the healing power, all the respondents answered 'yes.' Out of the four choices for the question about the healing effects of Bunseong Mountain including 'psychological,' 'physical,' 'psychological·physical' and 'others,' 84% of the respondents answered 'psychological·physical.' To the questions about the healing factors, seven choices were suggested, and respondents were allowed to choose multiple answers. A total of 121 answers were collected, and the number of those who answered landscape was 23; phytoncide, 18; anion, 9; sound, 12; sunlight, 24; oxygen, 31; and others, 4. Those who answered 'others' picked 'tree' as a

Table 2. The Bunseong Mountain visitors' perception of healing power of natural environments

Area	Variable	Frequency	Percent (%)
Bunseong Mountain	Healing power	Yes	50
		No	0
	Type of healing	Psychological	3
		Physical	5
		Psychological & physical	42
		Others	0
	Healing factor	Landscape	23
		Phytoncide	18
		Anion	9
		Sound	12
		Sunlight	24
		Oxygen	31
		Others	4
Natural environments	Healing power	Yes	50
		No	0
	Healing experience	Yes	32
		No	18
	Condition of healing	Forest	36
		Entire nature	9
		Sea	5

healing factor.

To the question about whether they believed natural environments had the healing power, all the respondents answered 'yes.' Those who answered 'yes' to the question about their experience of healing in natural environments accounted for 64%, and those who answered 'no' accounted for 36%. Out of those who answered they had experience of healing, 50% answered 'psychological,' and 30% answered 'physical.' The rest 20% did not present any specific experience. Responses to the question about the shape or conditions of natural environments that have the healing power were divided into three types, and 'forest' was highest (72%), followed by 'entire nature,' 18%; and 'sea,' 10%. Those who answered 'forest' chose gentle slope, thick forest and clean air.

Perceived Restorativeness Scale (PRS)

The Perceived Restorativeness Scale (PRS) was calculated as a mean value of the scores of the entire questions which individual respondents answered. Table 3 shows the overall PRS of respondents, and the mean value and standard deviation of each sub-item, and all the scores were converted into a 10-point scale. The mean value of the entire 26 questions was 5.14, and that of the 11 questions about 'repose' was 5.10. The mean value of the eight questions about 'fascination' was 4.87, and that of the four questions about 'coherence' was 5.80. The mean value of the four questions about 'legibility' was 5.13.

To examine the PRS of the target area, the score was compared with that of similar places surveyed in earlier studies. In this study, the natural environments of Bunseong Mountain were surveyed, and its PRS was compared with the results of earlier studies to understand the obtained PRS. There were several studies that used the PRS, and, out of them, eight studies that targeted a real site, not photos or videos, and presented the exact number of subjects by place were selected. The place that showed the highest score was selected, and the score was converted into a 10-point scale as follows.

The mean PRS value of 313 respondents about Sambong Recreational Forest converted into a 10-point scale was 7.89 (Song, 2013), and that of 262 respondents about Bukhansan National Park was 7.32 (Yoo et al., 2013). The mean PRS value of 283 respondents about Hangang Park was 6.62 (Kang et al., 2013), and that of 154 respondents about Chungnyungsan Natural Recreational Forest was 8.59 (Kim, 2014). The mean PRS value of 51 respondents about Near Sidewall at Cheonggyecheon Stream was 6.74 (Kim, 2015), and that of 98 respondents about *Chamaecyparis obtusa* forest trails in Geonji Mountain was 6.98 (Park and Lee, 2016). The mean PRS value of 30 respondents about Healing Forest in Jangseong was 7.72 (Jang, 2017), and that of 133 respondents about Seoulo 7017 was 6.27 (Lee, 2019).

The mean PRS value of 50 respondents about Bunseong Mountain converted into a 10-point scale in this study was

Table 3. The Bunseong Mountain visitors' Perceived Restorativeness Scale (PRS)

Item	M	SD	Conversion to 10-point scale
Overall PRS (Perceived Restorativeness Scale)	5.14	0.64	7.34
Repose	5.10	0.79	7.28
Fascination	4.87	0.75	6.95
Coherence	5.80	1.05	8.28
Legibility	5.13	1.22	7.32

Note. 7-point Likert scale questions were used (1 = Strongly disagree; 7 = Strongly agree).

7.34, showing no significant difference from those of earlier studies. In addition, the PRS about Bunseong Mountain was higher than that of natural environments in urban areas including Bukhansan National Park, Hangang Park, Cheonggyecheon and Seoulo 7017, and was higher than or similar to that of healing forest, natural recreational forests and forest trails, which indicates that the respondents in this study perceived Bunseong Mountain and its natural environments as a restorative environment.

In order to identify differences in the PRS depending on the general characteristics of respondents, the overall PRS and the PRS of sub-items of each general characteristic listed in Table 1 were calculated and were compared through t-test and one-way ANOVA tests. Most of the general characteristics of respondents did not show any statistically significant difference in their PRS. Out of the PRS factors listed above, the ‘coherence’ score of females was statistically significantly higher than that of males, and the ‘legibility’ score of those in their 60s was statistically significantly higher than that of those of which age ranged from the 10s to 30s as shown in Table 4.

Discussion

Several findings were obtained in this study, and can be summarized into four implications regarding the purpose of this study as follows. First, the perceived restorativeness score (PRS) of respondents was higher than that in earlier studies. Second, to the question about whether they experienced the healing power of natural environments, 64% answered ‘yes,’ and to the question about whether they believed the target area and natural environments had the healing power, all the respondents surveyed in this study answered ‘yes.’ Third, there was no statistically significant difference in the PRS depending on the general characteristics of respondents. Fourth, 48% of respondents answered that their purpose of using forest environments was walking, and 40% answered that their major activity was walking; 32%, strolling; and 8%, hiking.

The first finding indicates that not only the target area but also other similar forest environments can be perceived by humans as a restorative environment. The second finding indicates that those who believe that forest environments have the healing power feel confident about the healing power of nature regardless of their experience of healing. From the third finding, it can be inferred that people experience or perceive the healing power not because of partial elements

Table 4. The t-test and the one-way ANOVA results of Perceived Restorativeness Scale(PRS) scores by the Bunseong Mountain visitors’ characteristics

Variable		n	PRS		Repose		Fascination		Coherence		Legibility	
			M	SD	M	SD	M	SD	M	SD	M	SD
Gender	Male	19	5.03	0.74	4.79	0.70	4.75	0.73	5.42	1.28	5.15	1.19
	Female	31	5.34	0.57	5.28	0.80	4.93	0.77	6.03	0.83	5.11	1.25
	t(p)		−1.64(.335)		−2.16(.431)		−0.82(.597)		−2.04(.049*)		0.11(.959)	
Age	10-39 (a)	10	4.85	0.67	4.96	1.06	5.01	0.81	5.45	1.54	4.00	1.46
	40-49 (b)	13	5.35	0.67	5.19	0.73	5.08	0.80	5.92	0.79	5.20	0.98
	50-59 (c)	12	5.38	0.78	5.02	0.88	4.97	0.87	6.02	0.95	5.50	1.14
	60-69 (d)	11	5.27	0.48	5.10	0.64	4.45	0.52	5.93	0.98	5.60	0.95
	70 or more (e)	4	5.13	0.42	5.34	0.62	4.62	0.30	5.25	0.95	5.33	0.72
	F(p)		1.12(.359)		0.22(.923)		1.38(.254)		0.74(.568)		3.44(.015*) d > a	

* $p < .05$

but because of the entire environments, since there was no significant difference in the PRS of respondents about major activities and places that they used depending on their general characteristics. The fourth finding indicates that, as many earlier studies including Kim (2017) showed, walking or strolling along forest trails was the motive of visiting forest environments, and was the major activity that people do in forest environments, which indicates that walking is the most effective forest healing method.

There were still some limitations in this study. Questions about the healing effects and factors of Bunseong Mountain were multiple-choice questions. The multiple choices were suggested to promote the understanding of respondents and guarantee the content of answers, but it resulted in a failure to listen to people's various thoughts about the healing power of forest environments. Questions were not written specifically. Although questions about which natural environments specifically respondents believed had the healing power, and why they believed so presented examples, respondents felt that it was difficult to answer the questions, and wrote simple answers.

There were other limitations in terms of the design of this study. First of all, it is difficult to generalize the results of this study due to the small number of subjects (a total of 50 subjects). Second, since this study conducted a survey only one time in one place, it is difficult to know whether the target area's own characteristics acted as a variable or not. Lastly, the results of this study were compared to understand their implications with those of earlier studies that were published at least 6 months ago.

Conclusion

It is no wonder that forest healing can and needs to be done through the power of forest environments. However, many earlier studies focused only on forest healing instructor, facilities and programs, and only few studies focused on forest environments themselves and their impact on humans. This study surveyed whether people had experience of healing or believed humans can be healed by forest environments in order to make the best of the healing power of forest environments.

The results of this study showed that all the respondents surveyed in this study perceived in general forest environments as a restorative environment regardless of their differences, and that they believed in the healing power of forest environments. In addition, they preferred walking in forest environments the most, and they believed they can get the healing effects simply by walking in forest environments. These results tell the answers to the questions including what the healing effects that people get from forest environments look like, and how people need to do to enjoy the healing effects of forest environments.

Meanwhile, it will be necessary to conduct a follow-up study on 'what kind of resources in forest environments people believe give humans the healing effects.' In addition, it will be also possible to ensure more people enjoy the healing effects in restricted environments by studying the 'forms and conditions of environments that give humans the healing effects' and 'measures to maximize the healing effects of forest environments.'

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