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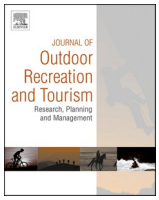

Research Article

The role of place attachment in recreation experience and outcome preferences among forest bathers

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ABSTRACT

Forest bathing or forest therapy encompasses slow mindful walking and deep immersion in nature while utilizing all sensory systems, which can occur during multiple recreation activities. This study examined differences in demographic and visit characteristics, recreation experience preferences (i.e., experiential on-site benefits sought), and improved well-being outcome preferences (i.e., long-term off-site outcomes) based on forest bathers' varying levels of place attachment. The study was framed by immersion in nature benefits-related theories and an Outcomes-Focused Management approach. Using a convenience sample and several forest bathing criteria, responses (N = 247) were voluntarily and anonymously collected with an exit survey of forest bathing participants at national, county, and metropolitan/municipal forests in South Korea from late July to mid-September in 2014. Cluster analysis segmented forest bathing participants into three place attachment groups (Low-Medium-High). Results revealed that forest bathers experiencing higher levels of place attachment were more likely to be non-local, repeat visitors who partake in water-based immersion and mindful forest walking activities. More highly attached forest bathing participants considered various on-site recreation benefits (e.g., social connection, nature enjoyment, physical and mental health) to be more important than less attached forest bathing participants. Also, more highly attached forest bathing participants rated preferences for various improved well-being outcomes, including psychophysiological, psychological, social, economic, and environmental factors significantly higher. Results suggest that forest bathing participation has a significant role in enhancing positive well-being benefits.

Management implications

1. Forest therapy known as 'forest bathing' is a globally emerging and increasingly popular recreational activity in natural areas.
2. Forest bathing participants with higher levels of attachment to a natural area report stronger preferences for achieving not only on-site personal, health and social benefits but also off-site personal, social, economic, and environmental benefits.
3. Managers can prepare maps indicating sitting places to reflect on natural features and engage with notable natural elements during their forest bathing experience.
4. Forest bathing participants often develop a high sense of attachment to and desire diverse benefit opportunities in the natural area so managers are advised to offer several forest bathing trails of varying lengths with various natural features, so that the more attached forest bathers can achieve the higher levels of experience outcomes they seek. These opportunities should be clearly communicated

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through websites and trailhead displays to ensure that first-time and long-term visitors are aware of the diverse opportunities available.
5. Since forest bathers are shown to be more highly attached to their natural area, this can benefit managers by having visitors who are more likely to be advocates and supporters of their natural areas when threats emerge or additional funding is needed.

1. Introduction

Individuals visit natural resource recreation areas for various reasons, including health and well-being. The process of deeply engaging with natural environments has been labeled as nature or forest walks or forest therapy (Li, 2018; Morita et al., 2007). Unlike basic hiking which is often associated with physical exertion, structured forest bathing allows participants to experience deep connections with their natural environments (Clifford, 2013). On a typical basic hike, participants may walk 2–5 miles in about an hour or two. A forest bathing practice will often last over 2 h, but participants typically travel only around a mile or less. Forest bathing walks begin with establishing a connection with the environment utilizing all senses to be mindful of natural surroundings. Slow mindful movement through the landscape encourages participants to "communicate" with the land through all their senses, including touch, sight, smell, sound, and body awareness (Clifford, 2018; Morita et al., 2007; Shin, 2010).

Forest bathing can serve as an enabler of various health and well-being outcomes, which can be understood within natural resource planning and management frameworks: Outcomes-Focused Management (OFM) and Visitor Experience and Resource Protection (VERP). The OFM framework conceptualizes that individuals obtain diverse tangible and intangible benefits directly and indirectly from various natural resource recreation settings (Anderson, Nickerson, Stein, & Lee, 2000; Stein & Anderson, 2002). The benefits are outcomes, which are not directly provided by managers, but managers facilitate opportunities which expedite individuals' and communities' abilities to derive beneficial outcomes from natural areas (Driver, 2008; Stein & Anderson, 2002; Stein & Lee, 1995). Individuals can achieve satisfying experiential benefits (e.g., physical fitness, nature enjoyment) by engaging in recreation activities in natural areas (Kil, Stein, & Holland, 2014). Such benefits generate emotional attachments to the place and other on-site/off-site outcomes at not only the individual level, but also with groups of individuals, communities, economies, and environments (Anderson et al., 2000; Kil, Stein, Holland, & Anderson, 2012; Kil et al., 2014; Stein & Anderson, 2002; Stein, Anderson, & Kelly, 1999).

Previous OFM studies have examined the relationships between various recreation benefits or the relationships of recreation benefits to other OFM variables. For example, certain recreation motivations are often linked to specific satisfying recreation activities (Stein & Lee, 1995) and preferred setting characteristics (Paudyal, Stein, & Swisher, 2020; Stein & Lee, 1995). Rice et al. (2020) found that well-being outcomes represent individual benefits, as perceived by park visitors. Also, research has found that trail hikers' attachment to place was often related to recreation experience preferences (Budruk & Wilhelm Stanis, 2013; Kil, Stein, et al., 2012; Kil, Holland, & Stein, 2010; Kyle, Graefe, & Manning, 2004; Warzecha & Lime, 2001), various settings from primitive to highly developed (Wynveen, Schneider, Amberger, Cottrell, & von Ruschkowski, 2020), and setting perceptions (Kyle et al., 2004) or preferences (Kil et al., 2010; Kil, Stein, et al., 2012). These previous studies were instrumental for OFM managers to provide recreation opportunities for recreationists, including park visitors and nature trail hikers. However, few previous studies have examined the relationships of place attachment to other OFM-related variables. For example, improved psychological well-being preferences as off-site outcomes among forest bathing participants should be considered as an emerging user group overlooked within the original OFM framework. Hence, to further extend OFM studies, the purpose of this study was to investigate differences in demographic and visit characteristics, recreation experience preferences, and improved well-being outcome preferences among place attachment-based segments of forest bathing participants at public forests in Korea. The results enhance our understanding of forest bathers and what types of beneficial outcomes they prefer, which potentially would assist OFM resource managers in providing appropriate recreation opportunities for forest bathers of differing place attachment levels.

2. Literature review

2.1. Forest bathing

Recent research has emerged about the health and well-being benefits of reconnecting with nature in a mindful way. Research in Japan has helped illuminate the benefits of nature connection activities. In Japan, this activity is known commonly as "shinrin-yoku" (i.e., "forest bathing" or "taking in the forest atmosphere," Clifford, 2018; Li, 2018; Park, Tsunetsugu, Kasetani, Kagawa, & Miyazaki, 2010). Shinrin-yoku is considered more than just walking through the forest or going for a hike. This practice involves breathing deeply, opening up all the senses to the natural surroundings, being mindful, walking slowly, and being aware of the various natural environments (Clifford, 2018; Li, 2018). In Korea, these processes are also known as "sanrim-yok." The primary goal of forest bathing walks is not physical exercise. The term, "hiking" is avoided because it implies a focus primarily on physical exertion. Instead, forest bathers have a specific intention of (re)connecting with nature and themselves in a therapeutic manner. They seek to move through a forested area mindfully, cultivate sensory connections with the landscape, build active communication with the land, and allow the land to infiltrate its messages deeply into their hearts and minds. Their deepening relationship(s) with the forest can be formed not only through taking walks in the forest but also sitting or lying down in a quiet and comfortable spot or immersing in water-based elements (e.g., getting feet wet while focusing on one's senses) in forested areas (Clifford, 2013, 2018; Hackenmiller, 2019; Morita et al., 2007; Shin, 2010). These nature immersion experiences can be incorporated into other traditional land-based and water-based outdoor activities, such as biking and paddling (Hackenmiller, 2019). Forest bathing activities are typically a mile or less in length and about two to 4 h in duration (Clifford, 2013, 2018; Hackenmiller, 2019).

The benefits of forest bathing activities and similar nature activities are supported by several immersion in nature benefit-related theories. For example, biophilia hypothesis explains that humans have an inherent propensity for natural environments (Kellert & Wilson, 1993). Stress Reduction Theory states that exposure to nature (e.g., visiting natural areas or observing scenery with a natural element(s), such as water or green leaves) can create positive emotional, physiological and psychological aspects of health and well-being by reducing stress (Ulrich, 1983). Attention Restoration Theory explains that feeling inherently (re)connected with natural environments, feeling a sense of escape from habitual activities, naturally capturing attention to natural settings effortlessly, and feeling that the environments are suitable for one's chosen activities, elicit not only a sense of pleasure but can help restore mindful focus lost during busy lifestyles and from mental fatigue (Kaplan & Kaplan, 1989).

In addition, the concept of 'mode of experience' is relevant (Jacob & Schreyer, 1980). Participants in outdoor settings can be conceptualized as being in a 'focused' or 'unfocused' frame of mind. A focused participant is acting more like a structured forest bather who is more slowly exploring their natural setting and perceiving its assets in greater detail compared to those who are somewhat haphazardly wandering without thinking too much about their surroundings or are focused on other things.

A study completed in Japan showed that mindful walking in a forest environment can promote cardiovascular health and reduce negative psychological symptoms (Lee et al., 2014). A summary of nature-based

interventions for mental health found various psychological benefits, such as decreased anxiety and depression and increased mental health well-being, improved self-esteem and confidence, increased sense of belonging, personal achievement, peace, and relaxation (Bragg & Atkins, 2016, p. 204). Children with attention disorders had better concentration after a short period of mindful nature walks than walks through urban areas (Taylor & Kuo, 2009). Place Attachment Theory describes how humans create a bond with certain places (Low & Altman, 1992; Moore & Graefe, 1994). Slow mindful connection turns it into a restorative approach that can have various well-being benefits, including greater place attachment for participants.

2.2. Outcomes-focused management

This research follows the OFM approach, which is based on identifying the perceived benefits people associate with a recreation engagement and then understanding how they choose recreation activities in different types of natural settings to achieve those benefits. Some scholars have stressed the importance of the psychological rewards or outcomes of recreation and contended that these should be the focus of recreation resource management (Driver, 2008; Moore & Driver, 2005).

The provision and realization of recreation benefits can be viewed as a *recreation opportunity production process* (Brown, 1984; Driver, 2008). In this process, the manager *indirectly* assists in the production of outcomes while the recreationist is in *direct* control of recreation outcomes (Driver, 2008). Therefore, management's role is to create recreation opportunities where recreationists can engage in certain activities in specific recreation opportunity spectrum (ROS) classification (e.g., primitive to developed natural) settings made up of biophysical, social, and managerial attributes, and where they can have the expectation that certain experiences will be realized (Brown, 1984; Driver, 2008). The process shows that there are three levels of demand, which outline the focus of recreation planning: 1) activity, 2) experience, and 3) outcomes (e.g., benefits) (Driver, 2008). Although these levels increase in complexity, they depend upon one another; therefore, researchers and managers must consider all three to fully understand a recreation system.

Activity-focused management (AFM) comprises the inputs to the system, the activities and settings, and only managers manipulate the setting, which directly influences recreation behavior (i.e., recreation activity) (Anderson et al., 2000; Driver, 2008). However, research has shown that taking part in activities in specific settings is only a means to an end, and it is the experience and related benefits that people most desire (Stein & Lee, 1995). Visitors look for *recreation opportunities* to attain those experiences and benefits, which leads to the second level of opportunities, experience-focused management (EFM). EFM relies on understanding people's motivations for visiting a recreation destination, and researchers have relied on recreation experience preference (REP) scales to identify and measure the intensity of those motivations (i.e., individual on-site recreational experiences) (Anderson et al., 2000; Manfredo, Driver, & Tarrant, 1996). Recognizing that EFM only focuses on experiences generated while on-site, researchers developed OFM to explain that recreation can result in not only individual on-site beneficial experiences, but also a multitude of immediate and long-term off--site outcomes for visitors, local communities, economies, and the environment, which should be considered in future studies (Anderson et al., 2000; Brown, 1984; Driver, 2008).

2.3. Place attachment

Place attachment refers to the functional, emotional, affective and other relationships between an individual and a place (Low & Altman, 1992; Moore & Graefe, 1994). Two place attachment dimensions common across most studies include place dependence and identity (Moore & Graefe, 1994; Warzecha & Lime, 2001; Williams, Patterson, Roggenbuck, & Watson, 1992; Williams & Vaske, 2003). Place dependence represents the functional meaning of a recreational place, which reflects the importance of a certain place or setting with particular features and conditions that support individuals' desired activities (Moore and Graefe, 1994; Williams et al., 1992). Place identity occurs when recreationists ascribe emotional and symbolic meanings to the particular place (Moore & Graefe, 1994).

Place attachment has been studied in depth with various types of recreationists, such as park (Kaltenborn & Williams, 2002) and forest visitors (Budruk & Wilhelm Stanis, 2013; Kil et al., 2010), river recreationists (Warzecha & Lime, 2001), rail-trail users (Moore & Graefe, 1994), and typical hiking-type users (Kil, Stein, et al., 2012; Kyle et al., 2004). For example, previous studies about place attachment-based segments of traditional recreationists have identified experiential benefits, setting perceptions, and setting preferences (Kil et al., 2010; Kil, Stein, et al., 2012; Kyle et al., 2004; Warzecha & Lime, 2001). The studies reported that highly attached participants, compared to less attached groups, pursued higher levels of particular on-site benefits, including escape (from social and physical pressures), nature learning, achievement, nature enjoyment or exploration, and nostalgia. But the same studies revealed that there was no significant difference in the level of family togetherness between the groups. Kyle et al.'s (2004) study of trail users indicated they tended to identify with the trail (e.g., I am an Appalachian Trail hiker), which exemplifies the place identity sub-dimension.

These findings have not been documented for forest bathing participants within the context of the OFM framework that values diverse users' preferences to make informed decisions on natural resources planning and management. Thus, demographic and visit characteristics, recreation experience preferences, and preferences for improved health and well-being outcomes are worth further exploring with forest bathing participants within the OFM framework, especially as it relates to varying levels of place attachment.

3. Methods

3.1. Research design and sampling

Government-regulated "therapy forests" (i.e., forests promoted for human health) and facilities have been provided by the Korea Forest Service since the early 2000s to meet the growing demand for forest bathing or healing/therapies (known as '*sanrim-yok*' or '*sanrim-chiyou*' in Korean, Shin, 2010). The activities are promoted for the public, particularly for urban residents seeking to slow down their modern harried daily lifestyles, seek stress reduction, and maintain balance and harmony in their modern life (Shin, 2010; Shin, Yeoun, Yoo, & Shin, 2010).

In 2014, there were 136 established public forests in South Korea that consisted of national (n = 39, 29%), metropolitan/municipal, and county level (n = 97, 71%) sites. Three national, two metropolitan/municipal, and one county forests were selected for this study. Using a convenience sampling method, forest visitors were intercepted near forest exit areas before their departure on weekdays and weekends during late July to mid-September 2014. We utilized some basic elements of forest bathing activities to identify eligible forest bathing participants (Clifford, 2013, 2018; Hackenmiller, 2019; Morita et al., 2007; Shin, 2010). For example, forest visitors were asked whether they engaged in deep breathing exercises, slow, mindful, and sensory immersion experiences in forested areas, intimate meaningful relationships with the areas, and restorative experiences. This study included individuals who spent 2 h or more engaging in such healing experiences in the forested areas while they participated in various outdoor activities, including mindful nature walks, camping, biking, and immersion in water bodies (Hackenmiller, 2019). One individual in each forest bathing group who was over age 18 and who had a birthdate closest to a survey date completed the questionnaire voluntarily and anonymously. A total of 247 responses were collected.

3.2. Survey instrument

Place Attachment: People-place relationship dimensions that consist of place dependence and place identity were measured using three items per factor (Moore & Graefe, 1994; Williams et al., 1992). Participants were asked about the natural forest areas where they were interviewed before they left the areas. They rated individual-level place items on five-point Likert-type scales (1 = strongly disagree, 5 = strongly agree).

Recreation Experience Preferences: Seven experiential recreation benefit dimensions were measured with recreation experience preference scale items (Manfredo et al., 1996). The dimensions with three to four items for each factor included nature enjoyment, mental and physical health, group togetherness, solitude, achievement, nature learning, and teaching. Participants were asked to rate the importance of reasons for visiting the natural forest areas on five-point Likert-type scales (1 = not at all important, 5 = extremely important). Understanding the *importance* visitors place on motivations provides information on forest bathers' needs and desires when visiting a natural area and would assist OFM managers to know how to provide settings suitable for particiants' preferred experience (Anderson et al., 2000; Driver, 2008).

Improved Well-Being Outcome Preferences: Six dimensions to assess more encompassing long-term outcomes after on-site experiences were derived from higher-order outcomes (Driver & Bruns, 2008). The multiple dimensions with three to four items per factor included improved psychophysiological health maintenance, better mental health maintenance, personal development and growth, improved family connections, local economic support, and increased awareness of nature resources. Respondents were asked to rate the importance of the long-term outcomes they desire to achieve and pursue after their on-site experiences on five-point Likert-type scales (1 = not at all important, 5 = extremely important).

Visitor Characteristics: Socio-demographic and visit/recreation-related variables, such as gender, income, types of users (first-time users vs. repeat users), and type of respondents by travel time were also included in the questionnaire. This study chose a 'within an hour's drive' (~50 mile radius) from home to the forests to divide respondents into local and non-local (i.e., proximate and distant) resident groups as stratified in previous research on place attachment (Davenport, Baker, Leahy, & Anderson, 2010; Kil, Holland, & Stein, 2015) and nature-based tourism market segmentation (Nyaupane & Graefe, 2008).

3.3. Data analysis

Data were analyzed using SPSS and AMOS (version 25). We explored acceptable normality by examining kurtosis and skewness values for the individual observed items and its latent subdimensions of place attachment, recreation experience preferences, and improved well-being outcome preferences. In this study, all individual indicators and subdimensions revealed acceptable threshold values. A CFA approach was implemented for each construct measure (i.e., place attachment, recreation experience preferences, improved well-being outcome preferences) with its respective dimension items. Criteria for goodness-of-fit indices (e.g., $\chi^2/df \leq 3.0$, Kline, 2005; RMSEA ≤ 0.08, Hu & Bentler, 1999; CFI ≥ 0.90, Hair, Black, Babin, Anderson, & Tatham, 2006; Hu & Bentler, 1999), factor loading values (≥ 0.50, equal to *t*-values of ≥ 1.96, $p < .05$, Hair et al., 2006) for each observed item, and Cronbach's alpha coefficient values (≥ 0.60, Cortina, 1993) for each latent dimension were checked. Cluster analysis was used to classify similar respondents into groups based on dimensional place attachment scores. When the homogeneity of variance assumption for one-way ANOVA was checked, some latent subdimensions met the assumptions and other subdimensions did not meet the assumption. Thus, we utilized Welch's ANOVA with Games-Howell's post hoc method to determine the difference in place attachment levels using cluster analysis results and also the association between place attachment levels and two beneficial outcomes (i.e., recreation experience preferences, improved well-being outcome preferences). Chi-square analyses were run to examine the association between place attachment and demographic/visit characteristics of respondents.

4. Results

4.1. Place attachment measurement

CFA results (Table 1) revealed an appropriate model with acceptable fit indices (e.g., $\chi^2/df = 1.863$; RMSEA = 0.059; CFI = 0.991). Factor loading values ranged from 0.70 to 0.89. Cronbach's alpha coefficient values were 0.78 for place dependence and 0.84 for place identity.

4.2. Clustered segments of attached forest bathing participants

Our cluster analysis with K-means produced three homogeneous sets of place attachment dimensions. ANOVA results (Table 2) supported the three clustered place attachment groups by demonstrating significantly different mean scores of place dependence (*Welch's* $F = 193.63$, $p < .001$, est $\omega^2 = 0.493$) and identity (*Welch's* $F = 330.15$, $p < .001$, est $\omega^2 = 0.661$) across the three segments (Low-Medium-High). High-attached respondents appeared to hold significantly higher levels of place dependence and identity, respectively than less attached respondents.

4.3. Forest bather characteristics

Differences among the three place attachment groups were not found to be significant across sociodemographic variables. Significant differences among the clustered groups were observed regrading visit characteristics (Table 3). Forest bathing participants expressing greater place attachment were more likely to be repeat users ($\chi^2 = 9.54$, $p = .008$, Cramer's $V = 0.20$), and non-local users ($\chi^2 = 6.99$, $p = .030$, Cramer's $V = 0.17$). They also reported the same or increasing number of forest visits within the previous two years ($\chi^2 = 13.10$, $p = .011$, Cramer's $V = 0.23$).

Results (see Table 3) reveal two types of recreation activities in which higher attached forest bathing participants were more likely to participate. More high and medium attached groups tended to participate in "immersing some of my body in water" ($\chi^2 = 16.72$, $p < .001$,

Table 1
Kurtoses, skewnesses, and results of confirmatory factor analysis for place attachment items.

Variables[1]	Kurtosis	Skewness	*M*	*SD*	λ	*t-value*
Place Dependence (α = .78)	*0.46*	*−0.34*	*3.18*	*0.80*		
I get more satisfaction out of visiting this place than from visiting any other place	0.86	−0.78	3.58	0.88	.70	–
I wouldn't substitute any other place for doing the types of things I do here	−0.20	−0.28	3.19	0.99	.80	11.22
No other place can compare to this place	−0.47	0.00	2.77	0.99	.70	10.00
Place Identity (α = .84)	*−0.06*	*−0.29*	*3.15*	*0.87*		
This place means a lot to me	−0.30	−0.20	3.32	0.98	.76	–
I feel this place is a part of me	−0.32	−0.10	2.87	1.00	.75	11.87
This place is very special to me	−0.08	−0.37	3.27	1.01	.89	14.14

Note. $N = 247$. [1]Item was measured on a five-point Likert scale (1 = Strongly disagree, 3 = Neutral, 5 = Strongly agree). Fit statistics: $\chi^2/df = 1.863$; RMSEA = 0.059; CFI = 0.991.

Table 2
Means and one-way analyses of variance in place attachment dimensions by clustered place attachment groups.

Dimensions	Clusters						*Welch's F*-test	*p*	est ω^2
	Low		Medium		High				
	M	*SD*	*M*	*SD*	*M*	*SD*			
Place Dependence	2.14[a]	.62	3.09[b]	.40	3.98[c]	.44	193.63	<.001	.493
Place Identity	1.90[a]	.48	3.09[b]	.39	4.06[c]	.44	330.15	<.001	.611

Note. $N = 247$ ($n = 49$ for low; $n = 121$ for medium; $n = 77$ for high). Based on Welch's ANOVA with Games-Howell's post hoc method, cluster means with different superscripts indicate significant difference.

Table 3
Frequencies and chi-square results for foerst bather characteristics by place attachment-based segments.

Characteristics	Place Attachment Groups						χ^2	*df*	*p*	Cramer's *V*
	Low		Medium		High					
	n	%	*n*	%	*n*	%				
Gender ($N = 245$)										
Male	25	53	54	45	31	40	1.98	2	.372	.09
Female	22	47	67	55	46	60				
Age ($N = 247$)										
18–39 years	24	49	48	40	25	32	4.35	4	.361	.09
40–49 years	17	35	57	47	39	51				
50 years or older	8	16	16	13	13	17				
Education ($N = 245$)										
High school diploma or below	3	6	20	17	13	17	10.11	6	.120	.20
College student	4	8	5	4	1	1				
College degree	37	76	80	66	57	76				
Graduate school degree or beyond	5	10	16	13	4	6				
Income ($N = 239$)										
Less than KRW2,000,000	2	4	10	8	6	8	5.82	8	.667	.16
KRW 2,000,000–2,999,999	10	22	18	15	15	20				
KRW 3,000,000–3,999,999	14	30	40	34	18	25				
KRW 4,000,000–4,999,999	11	24	25	21	23	31				
KRW 5,000,000 or more	9	20	26	22	12	16				
Type of user ($N = 247$)										
First-time user	30	61	59	49	26	34	9.54	2	.008	.20
Repeat user	19	39	62	51	51	66				
Type of respondent by travel time ($N = 247$)										
Local (i.e., Proximate, < 1-h driving)	26	53	50	42	23	30	6.99	2	.030	.17
Non-local (i.e., Distant, > 1-h driving)	23	47	68	58	54	70				
Forest visits for forest bathing within the previous two years[1] ($N = 128$)										
Increased	5	26	14	24	27	54	13.10	4	.011	.23
Stayed the same	10	53	38	64	18	36				
Decreased	4	21	7	12	5	10				
Recreation activities[2] ($N = 247$)										
Forest camping	44	90	110	91	74	92	2.33	2	.312	.10
Immersing some of my body in water	19	39	82	68	56	73	16.72	2	<.001	.26
Mindful forest walking	19	39	65	54	48	62	6.69	2	.035	.17
Photography	17	35	37	31	31	40	1.96	2	.376	.09
Viewing forest scenery	23	47	40	33	30	39	2.94	2	.229	.11
Nature study	7	14	25	21	24	31	5.42	2	.067	.15
Wildlife viewing	7	14	28	23	21	23	2.91	2	.233	.11
Mountain biking	0	0	1	1	1	1	.63	2	.730	.05

Note. [1]Only repeated users were asked. [2]'Check all that apply' question format was utilized and only the percentage of respondents who engaged in the activities is reported.

Cramer's $V = 0.26$) and "mindful forest walking" ($\chi^2 = 6.69$, $p = .035$, Cramer's $V = 0.17$). All clustered groups tended to engage in other activities, such as photography and viewing forest scenery.

4.4. Recreation experience preferences

CFA results (Table 4) showed an appropriate model with acceptable fit indices (e.g., $\chi^2/df = 1.73$; RMSEA = 0.055; CFI = 0.934). Factor loading values were above the threshold value (0.5) except for the observed item of "To relax physically." Cronbach's alpha coefficient values ranged from 0.68 to 0.90.

ANOVA results for recreation experience preferences (Table 5) found that all seven domains were significant. Forest bathing participants with higher levels of place attachment reported higher mean scores of recreation experience preferences, including "nature enjoyment" (*Welch's* $F = 10.08$, $p < .001$, est $\omega^2 = 0.083$), "physical and mental health" (*Welch's* $F = 22.03$, $p < .001$, est $\omega^2 = 0.122$), "group togetherness" (*Welch's* $F = 6.30$, $p < .001$, est $\omega^2 = 0.063$), "solitude - escaping physical pressure" (*Welch's* $F = 12.76$, $p < .001$, est $\omega^2 = 0.096$), and "nature learning" (*Welch's* $F = 25.33$, $p < .001$, est $\omega^2 = 0.127$). Also, significant differences between the three groups were revealed regarding "achievement" (*Welch's* $F = 24.36$, $p < .001$, est $\omega^2 = 0.135$) and "teaching" (*Welch's* $F = 19.04$, $p < .001$, est $\omega^2 = 0.102$).

4.5. Improved well-being outcome preferences

CFA results (Table 6) supported an appropriate model with acceptable fit indices (e.g., $\chi^2/df = 2.952$; RMSEA = 0.075; CFI = 0.941).

Table 4
Kurtoses, skewnesses, and results of confirmatory factor analysis for recreation experience preference items.

Variables[1]	Kurtosis	Skewness	*M*	*SD*	λ	*t-value*
Nature Enjoyment (α = .73)	*0.20*	*−0.47*	*4.20*	*0.57*		–
1. To enjoy the scenery	2.46	−1.17	4.06	0.79	.70	8.74
2. To experience nature	1.76	−0.78	4.09	0.72	.70	8.42
3. To enjoy the smells and sounds of nature	−0.55	−0.62	4.44	0.61	.67	
Physical and Mental Health (α = .68)	*0.95*	*−0.67*	*4.15*	*0.56*		
1. To feel healthier	0.38	−0.69	3.74	0.94	.73	–
2. To relax physically	2.27	−1.05	4.19	0.77	.47	6.42
3. To give my mind a rest	−0.48	−0.83	4.60	0.53	.54	7.37
4. To stay healthy and fit	2.26	−1.19	4.07	0.85	.65	8.71
Group Togetherness (α = .68)	*2.05*	*−1.09*	*4.35*	*0.56*		
1. To do something with my family or friends	3.65	−1.48	4.36	0.73	.71	–
2. To be with members of my group	1.22	−1.02	4.45	0.64	.67	7.41
3. To enjoy the closeness of family or friends	1.61	−1.08	4.26	0.76	.57	6.81
Solitude - Escaping Physical Pressure (α = .79)	*−0.47*	*0.43*	*2.24*	*0.89*		
1. To be on my own	−0.11	0.74	2.18	1.09	.82	–
2. To be away from people	−0.85	0.25	2.55	1.14	.73	10.64
3. To experience solitude	0.27	0.87	1.97	0.93	.69	10.18
Achievement (α = .78)	*−0.51*	*−0.03*	*2.82*	*0.87*		
1. To share my skills and knowledge with others	−0.77	0.12	2.62	1.08	.80	–
2. To develop my skills and abilities	−0.46	−0.21	2.93	1.00	.71	11.35
3. To have thrills and excitement	−0.54	0.02	2.90	1.06	.70	11.29
Nature Learning (α = .70)	*0.34*	*−0.36*	*3.31*	*0.70*		
1. To learn about the natural environment of the area	−0.36	−0.05	3.04	0.95	.67	–
2. To explore the area	−0.17	−0.29	3.24	0.94	.68	8.00
3. To learn about the nature	1.13	−0.75	3.64	0.75	.66	7.86
Teaching (α = .90)	*−0.40*	*0.40*	*2.28*	*0.95*		
1. To teach my outdoor skills to others	−0.09	0.68	2.10	1.01	.86	–
2. To share what I have learned with others	−0.52	0.34	2.40	1.05	.86	16.76
3. To help others learn about things here	−0.57	0.41	2.34	1.07	.87	17.04

Note. $N = 247$. [1]Measured using a five-point Likert scale format (1 = Not at all important, 3 = Moderately important, 5 = Extremely important). Fit statistics: $\chi^2/df = 1.731$, RMSEA = 0.055, CFI = 0.934.

Factor loading values ranged from 0.62 to 0.82. Cronbach's alpha coefficient values ranged from 0.66 to 0.80.

When each group's responses on the importance of improved well-being outcomes were compared (Table 7), ANOVA results indicated that as place attachment increased, the respondents' scores on preferences for improved well-being outcomes increased. Forest bathing participants attaining higher levels of place attachment, compared to the participants with lower levels, tended to report higher mean scores of "improved psychophysiological" (*Welch's* $F = 12.34$, $p < .001$, est $\omega^2 = 0.094$), "psychological" (better mental health maintenance, *Welch's* $F = 21.04$, $p < .001$, est $\omega^2 = 0.115$; personal development and growth, *Welch's* $F = 8.37$, $p < .001$, est $\omega^2 = 0.154$), "social" (improved family connections, *Welch's* $F = 15.12$, $p < .001$, est $\omega^2 = 0.082$), "economic" (local economic support, *Welch's* $F = 24.36$, $p < .001$, est $\omega^2 = 0.169$), and "environmental" (*Welch's* $F = 22.17$, $p < .001$, est $\omega^2 = 0.140$) indicating these outcomes to be important.

5. Discussion

To expand understanding of the role of place attachment as it relates to forest bathers in the context of the OFM approach, this study extended earlier work by linking place attachment-based segments to visitor characteristics, on-site recreation experience preferences, and off-site improved outcome preferences. Our study of forest bathing participants found some results that are similar and others in contrast to previous findings among different, traditional user groups.

As conducted by previous studies with different types of users, for example, Appalachian Trail hikers (Kyle et al., 2004), forest users (Kil et al., 2010), and Florida Trail hikers (Kil, Stein, et al., 2012), this study classified forest bathing participants into similar groups, based on their scores on two place attachment dimensions: place identity and dependence. Cluster analysis revealed that forest bathing participants were grouped into three hierarchical levels: low, medium, and high levels of attachment. Our results revealed that high-attached forest bathers reported higher place identity scores than place dependence scores and that low-attached forest bathers reported higher place dependence scores than place identity. This is contrary to previous research reporting that all clustered hiking groups reported higher place identity scores than place dependence scores (Kil, Stein, et al., 2012; Kyle et al., 2004) or vice versa (Kil et al., 2010). In addition, our findings indicate that forest bathers who use an area more frequently tend to increase their dependence on those natural resources. They are also inclined to identify more with the place (Moore & Graefe, 1994).

Regarding understanding visitor characteristics within the OFM framework, forest bathing participants with the three hierarchical levels of attachment showed different trip characteristics, recreation experience preferences, and preferences for improved well-being outcomes. These results are discussed below.

Trip Characteristics: Most forest bathing participants expressing

Table 5
Means and one-way analyses of variance in recreation experience preferences by place attachment-based segments.

Dimensions[1]	Place Attachment Groups						*Welch's F*-test	*p*	est ω^2
	Low		Medium		High				
	M	*SD*	*M*	*SD*	*M*	*SD*			
Nature Enjoyment	3.91^a	0.64	4.18^b	0.49	4.41^c	0.57	10.08	<.001	.083
Physical and Mental Health	3.78^a	0.57	4.14^b	0.55	4.40^c	0.43	22.03	<.001	.122
Group Togetherness	4.09^a	0.69	4.38^b	0.51	4.49^b	0.48	6.30	<.001	.063
Solitude - Escaping Physical Pressure	1.79^a	0.72	2.18^b	0.88	2.61^c	0.85	12.76	<.001	.096
Achievement	2.20^a	0.73	2.81^b	0.82	3.22^c	0.80	26.75	<.001	.135
Nature Learning	2.84^a	0.61	3.29^b	0.69	3.62^c	0.59	25.33	<.001	.127
Teaching	1.76^a	0.69	2.24^b	0.89	2.68^c	1.01	19.04	<.001	.102

Note. $N = 247$ ($n = 49$ for low; $n = 121$ for medium; $n = 77$ for high). Based on Welch's ANOVA with Games-Howell's post hoc method, segment means with different superscripts indicate significant difference. [1]Item was measured on a five-point Likert scale format (1 = Not at all important, 3 = Moderately important, 5 = Extremely important).

Table 6
Kurtoses, skewnesses, and results of confirmatory factor analysis for improved well-being outcome preference items.

Variables[1]	Kurtosis	Skewness	*M*	*SD*	λ	*t-value*
Psychophysiological - Improved Psychophysiological Health Maintenance[2] (α = .66)	*2.27*	*−0.69*	*3.98*	*.61*		
1. Improved physical fitness and health maintenance	1.21	−0.52	3.91	.68	.74	–
2. Restored body from fatigue	1.22	−0.72	4.05	.73	.76	12.35
Psychological - Better Mental Health Maintenance (α = .75)	2.77	−0.94	4.07	.60		
1. Restored mind from unwanted stress	2.58	−1.10	4.38	.66	.70	–
2. Diminished mental anxiety	0.39	−0.65	3.74	.80	.69	11.67
3. Improved mental well-being	2.23	−0.95	4.09	.73	.74	12.46
Psychological - Personal Development and Growth (α = .80)	*1.36*	*−0.84*	*3.72*	*.74*		
1. Improved sense of control over my life	0.97	−0.76	3.84	.82	.75	–
2. Improved skills for outdoor enjoyment	0.90	−0.80	3.72	.88	.79	14.62
3. Improved skills for enjoying the outdoors	0.47	−0.68	3.59	.91	.77	14.19
Social - Improved Family Connections (α = .78)	*1.95*	*−0.83*	*3.97*	*.63*		
1. Improved functioning of individuals in family or friends	1.04	−0.69	3.83	.80	.80	–
2. Greater family or friend bonding	1.25	−0.68	4.21	.65	.62	11.64
3. Increased compassion for others	1.73	−0.88	3.87	.80	.82	16.19
Economic - Local Economic Support (α = .80)	*0.27*	*−0.27*	*3.24*	*.68*		
1. Improved local economic stability	0.15	−0.24	3.21	.84	.79	–
2. More positive contributions to local-regional economy	0.43	−0.40	3.33	.84	.80	14.87
3. Increased local recreation and tourism revenue	0.33	−0.20	3.19	.75	.75	13.82
Environmental - Increased Awareness of Nature Resources (α = .79)	*1.84*	*−0.81*	*3.65*	*.72*		
1. Increased awareness of the particular natural sites and areas to be maintained	1.02	−0.82	3.75	.86	.70	–
2. Increased understanding of human dependency on the natural world	1.27	−0.91	3.76	.87	.72	16.04
3. Increased understanding of the way our natural resources and facilities are being managed	0.33	−0.32	3.43	.84	.71	12.19

Note. [1]Measured using a five-point Likert scale format (1 = Not at all important, 3 = Moderately important, 5 = Extremely important). [2]An observed item ('Improved capacity for outdoor physical activity') was removed to improve our measurement model fit. Fit statistics: $\chi^2/df = 2.952$, RMSEA = 0.075, CFI = 0.941.

higher levels of attachment tended to be repeat visitors. They reported that their visits for forest bathing activities had increased. These findings corroborate previous results that frequent resource use or longer histories of visits influence participants' place attachment levels (Kil et al., 2010; Moore & Graefe, 1994; Williams & Vaske, 2003). Some forest bathing participants may have attained additional recreation benefits sought during the forest bathing activities, which made them more attached and, therefore, reported a higher intention to return (Kil, Holland, Stein, & Ko, 2012). Another possibility is that some forest bathing participants have repeat experiences (a longer use history) and have more fully developed perception and activity skills as they relate to that specific setting and activity. Therefore, more highly attached visitors may be more likely to attain additional benefits because they know where to look for opportunities, and they are better at the activity. This raises the question: what comes first–attachment to place or the attainment of additional benefits? Also, in our study, a small group of first-time visitors included were highly attached. Like most repeat visitors, the first-time visitors with medium- and high-attachment may have attained slow, mindful, sensory, and intimate connections with nature as well as their on-site recreation experience preferences, which may have fostered their place attachment levels.

However, unlike past findings (Kaltenborn & Williams, 2002; Moore & Graefe, 1994), our findings revealed that forest bathing participants with higher levels of attachment more often tended to be non-local users. This could be related to their more intensive involvement in certain restorative activities and experiences that fostered place attachment. Since non-local users tend to be from urban areas, they may be more likely to be looking for restorative forest-oriented experiences (Shin et al., 2010), as opposed to local users from rural areas who typically do not value those experiences as highly as urban visitors.

Our 'recreation activities' results within the OFM framework found that more highly attached forest bathers engaged in activities, such as immersing some of their body in water and mindful forest walking, while most groups with different place attachment levels engaged in forest camping, and fewer groups with different place attachment levels engaged in other activities, such as photography, viewing forest scenery, wildlife viewing, and mountain biking. Findings here signify that participation in slow, mindful, and sensory immersion activities in natural water- and land-based areas may have enhanced connection with self and nature, thereby attaining recreation benefits sought and greater attachment to the areas.

Recreation Experience Preferences: Forest bathing visitors with higher levels of attachment had stronger preferences for diverse on-site recreation experiences, such as nature enjoyment, solitude (escape - physical pressure), achievement, nature learning, and teaching, which are consistently previously reported (Kil et al., 2010; Kil, Stein, et al., 2012; Kyle et al., 2004; Warzecha & Lime, 2001). Also, increased preferences for physical/mental health and group bonding are also sought by the most highly attached forest bathers. Stronger preferences for nature enjoyment, solitude, and physical/mental health desired by the higher-attached forest bathers indicate that they appeared to have more innate relationships with nature.

Preferences for Improved Well-Being Outcomes: The highly attached forest bathers desired improved well-being outcome benefits, including long-term individual (better mental health), social (improved family connections), economic, and environmental outcomes. Findings here indicate that the more highly attached participants were more likely to attain the on-site benefits they were seeking, which likely further cemented their levels of attachment and improved well-being outcome preferences (Budruk & Wilhelm Stanis, 2013; Kil, Holland, et al., 2012). They also indicated the importance of attaining various health and well-being outcomes, which is likely further explained by the immersion in nature benefit-related theories. In sum, findings here provide a substantial linkage or contribution of desired forest bathing activities in natural areas to the inducement of various on-site and off-site outcomes, particularly the relationship of place attachment with on-site recreation

Table 7
Means and one-way analyses of variance in improved well-being outcome preferences by place attachment-based segments.

Dimensions[1]	Place Attachment Groups						*Welch's F*-test	*p*	est ω^2
	Low		Medium		High				
	M	*SD*	*M*	*SD*	*M*	*SD*			
Psychophysiological - Improved Psychophysiological Health Maintenance	3.73^a	.68	3.90^a	.59	4.26^b	.48	16.16	<.001	.094
Psychological - Better Mental Health and Health Maintenance	3.76^a	.68.	4.00^b	.56	4.37^c	.45	20.63	<.001	.115
Psychological - Personal Development and Growth	3.27^a	.87	3.61^b	.66	4.16^c	.52	31.61	<.001	.154
Social - Improved Family Connections	3.71^a	.88	3.91^a	.46	4.23^b	.58	10.69	<.001	.082
Economic - Local Economic Support	2.80^a	.67	3.15^b	.59	3.67^c	.59	32.06	<.001	.169
Environmental - Increased Awareness of Nature Resources	3.18^a	.86	3.60^b	.59	4.02^c	.61	21.37	<.001	.140

Note. $N = 247$ ($n = 49$ for low; $n = 121$ for medium; $n = 77$ for high). Based on Welch's ANOVA with Games-Howell's post hoc method, segment means with different superscripts indicate significant difference. [1]Item was measured on a five-point Likert scale format (1 = Not at all important, 3 = Moderately important, 5 = Extremely important).

experiences and off-site improved well-being outcomes, which supports the production of multiple outcomes within OFM (Anderson et al., 2000; Driver & Bruns, 2008).

5.1. Management implications

Managers should understand the on-site and off-site outcomes sought by highly-attached forest bathing participants, and then seek to provide opportunities that facilitate forest bathing that potentially results in visitors attaining immediate and long-term outcomes. Based on our findings, higher-attached forest bathing visitors were more likely to seek various on-site and off-site individual, social, economic, and environmental outcomes. As shown in the recreation opportunity production process (Brown, 1984) and the ROS classification system (Driver, 2008), quality recreation is defined as providing for diverse opportunities. Treating forest bathers as a homogenous audience who only need to immerse themselves in nature will likely not facilitate the achievement of the diverse outcomes visitors desire, especially highly attached visitors.

Understanding that forest bathers who are highly attached to the place desire diverse personal outcomes (e.g., physical and mental health) and social outcomes (greater family or friend bonding) means a diversity of opportunities (e.g., different mixes of activities and settings) should exist and be communicated to them. For example, managers could develop short, accessible trails that are more likely to provide easy walks and forest bathing experiences for all visitors. Although these settings would have minimal development, they would fall on the more developed side of the ROS framework because of their higher social contacts and easier access, and they would still provide a wealth of opportunities for forest bathers to directly connect with nature as individuals or in groups. In addition, they would be more amenable and accessible to those with limited ambulatory capabilities. Simultaneously, managers could offer longer, more challenging walks into remote areas of the forest for more attached and/or ambitious forest bathing visitors to attain superior solitude experiences often associated with less developed settings (e.g., the more primitive side of the ROS framework). These diverse opportunities should then be clearly communicated to all visitors on websites, pamphlets, and trailheads, allowing for higher attached forest bathers to choose the opportunities they most desire.

To provide biophysical ROS settings for forest bathing participants to achieve diverse benefits (esp, nature exploration, mental health), managers may need to modify existing trail areas or develop new trail areas (i.e., with little to no human-induced noise), as also indicated by earlier research (Kil, Stein, et al., 2012). Providing more natural and serene conditions, particularly in areas closer to urban areas, may be challenging to managers. Spatial zoning planning that can designate natural quiet areas or zones should be considered to facilitate visitors achieving more restorative experiences (e.g., via natural sounds) (Manning & Anderson, 2012). Similarly, when developing an area for forest bathing activities, managers should examine the distribution of diverse flora and fauna species (e.g., plants, trees, animals), natural terrain (e.g., flat and/or varied topographical areas, and/or water-based areas where visitors can maximize opportunities to utilize their senses, including seeing, smelling, hearing, touching, tasting, and proprioception (Clifford, 2018; Shin, 2010). These settings can allow individuals to (re) connect with themselves and nature or immerse themselves in nature, stay focused, diminish mental anxiety, restore their minds from unwanted stress, and increase cognitive performance.

As suggested by earlier findings about managerial and social settings of ROS (e.g., higher preferences for loop trails and moderate preferences for linear trails among scenic trail users with varying levels of attachment, Kil, Stein, et al., 2012), providing trail settings with a mixture of loop and linear/meandering trails as well as with little contact with others (e.g., preferably no more than 7–15 people) is useful for forest bathing visitors to avoid resource use conflict with the same or other traditional types of recreationists, such as hikers and mountain bikers. Such settings can better secure solitude, sense of control, attention, and/or social bonding experiences. Providing natural (wood logs) loop trail stations within quiet areas for forest bathing visitors to sit and/or lie down on for mindful meditative nature engagement is also useful for facilitating benefit opportunities (esp, mental health). Such settings can be designated within short distances; for example, less than a 2 mile radius from access points for visitors of all ages with (out) health or physical ability issues.

If managers communicate messages that focus on natural elements that help foster various well-being outcomes, including physical, emotional, and spiritual connections with the element(s), as well as personal identity, they will better communicate these unique and valuable opportunities to urban visitors who might be unfamiliar with natural environments but are in need of forest bathing benefits. The desire to seek such benefits seems to have grown during the recent pandemic to alleviate feelings of being 'shut in' and to find alternative, healthy outdoor activities. Through providing and promoting these diverse benefit opportunities managers are likely to help more people (first-time and regular visitors) develop a higher attachment to the area. Highly attached visitors will more likely be advocates and supporters of their natural areas and aid area managers when threats emerge or additional funding is needed.

5.2. Limitations and future research

Our study conducted a convenience sampling approach with exit surveys at various public forest areas in Korea in 2014 to explore the needs (i.e., recreation experience and outcome preference) of forest bathers with different levels of place attachment. Individuals' beliefs and attitudes can change over time so our findings and applications can be cautiously utilized by researchers and managers. Future studies should consider measuring recreation experience preferences before participation as well as attainment of the preferred on-site experiences

after participation. We utilized recreation experience preference dimensions and place attachment dimensions commonly employed in previous research to explore on-site benefits among forest bathers. Additional dimensions of recreation experience preferences (e.g., introspection, stewardship and hospitality, Driver & Bruns, 2008) and place meanings (e.g., ecological identity, family identity, community identity, Davenport et al., 2010; Kil et al., 2014, 2015; Kil, Stein et al., 2015) should also be explored in future forest bathing research if feasible to include the additional dimensions in a (longer) survey. Off-site outcomes (esp, mental health conditions) should be determined by a follow-up survey after the on-site exit survey. Given our findings that higher-attached forest bathing visitors tended to have more frequent resource visits for forest bathing, the outcomes associated with the number of forest bathing experiences (e.g., half-day to months) could be examined longitudinally.

Place attachment can vary across ROS-type settings desired by visitors (Kil et al., 2010; Wynveen et al., 2020). Thus, future investigation might explore differences in outcomes associated with various settings perceived by forest bathers with different levels of place attachment. This study did not examine the relationship of setting characteristics to desired benefit opportunities as they relate to forest bathers. Pierskalla, Lee, Stein, Anderson, and Nickerson (2004) found that benefits associated with forest bathing (e.g., release/reduce built up tension) was not strongly affected by setting type or activity. Again, this indicates that forest bathers value many benefit opportunities, and a diversity of settings can help them achieve those desired benefits. However, the forest setting should not be discounted. It is clearly important and its role must be better understood. Given that place attachment can be represented in small to larger scale contexts (Kyle et al., 2004; Moore & Scott, 2003), future studies targeting OFM outcomes should identify specific elements (e.g., trees, plants, animals, sounds, creeks, waterfalls, terrain) of natural places that potentially draw visitors' attention to slow down their trail walks, interact with the natural elements, and stay focused, which may induce higher levels of nature immersion, experiential benefits, and place attachment. Future research should link place attachment to the outcomes measured here and other outcome variables, including nature connection, mindfulness, mood states, group cohesion, and rumination among forest bathing participants.

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CRediT authorship contribution statement

Namyun Kil: Conceptualization, Literature review, Methodology, Formal analysis, Discussion, Writing – original draft, Writing – review and editing. **Taylor V. Stein:** Literature review, Discussion, Writing – review and editing. **Stephen M. Holland:** Discussion, Writing – review and editing. **Jae Jun Kim:** Funding acquisition, Reviewing survey instrument, Data collection and entry supervision. **Jaehyun Kim:** Literature review. **Samantha Petitte:** Literature review.

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