

Research paper

Evaluation of Recreation Motivation and Activity Involvement in Affecting Place Attachment by Hikers

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[Summary]

Owing to the rich forest resources in mountain areas, there are various popular hiking activities in Taiwan. Determining how to provide suitable trails for hikers has become a noteworthy issue. The effects of recreation motivation and of activity involvement on place attachment were verified in several previous empirical studies. However, relationships among them have not yet been simultaneously examined. Therefore, the purpose of this study was to investigate relationships among hikers' recreation motivation, activity involvement, and place attachment (comprised of place dependence and place identity). We conducted a questionnaire survey and selected hikers on the trail of Guanzihling Dadong Mt. in Tainan City as sampling subjects. In total, 364 valid questionnaires were obtained. Statistical software of structural equation modeling Amos 18 was used to perform a confirmatory factor analysis to estimate parameters of the model, identify the relationship of the overall model, and test the fitness. Results showed that activity involvement was a stronger predictor of the 2 dimensions (place dependence and place identity) of place attachment compared to that of recreation motivation. In terms of the overall model, recreation motivation, activity involvement, and place dependence were all antecedents that had an effect on place identity. Additionally, activity involvement played a mediating role between recreation motivation and place attachment (both dimensions of place dependence and place identity).

Key words: hiking, recreation motivation, activity involvement, place attachment.

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研究報告

登山健行者遊憩動機與活動涉入對地方依附影響之研究

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摘 要

登山健行者的遊憩動機與活動涉入個別對地方依附之影響，已有一些前人研究證實其重要性與實務應用性，但三者同時就其間關係進行驗證與探討與釐清地方依附之地方依賴和地方認同構面兩者關係，則尚屬少見。本研究選定台南市關仔嶺大棟山為研究地點，旨在瞭解登山健行者遊憩動機、活動涉入、地方依附(含地方依賴與地方認同)之因果關係。本研究採問卷調查法，有效問卷為364份。利用線性結構方程模式統計軟體Amos 18，進行驗證性因素分析、模式之參數校估及整體模式之因果模式與配適程度驗證。研究結果發現，相對於遊憩動機，活動涉入對地方依附之地方依賴與地方認同更具預測影響力；遊憩動機、活動涉入及地方依賴三者皆為地方認同之前行變數。就整體模式而言，活動涉入為影響遊憩動機與地方依附(地方依賴與地方認同構面)間關係的重要因子。

關鍵詞：登山健行、遊憩動機、遊憩涉入、地方依附。

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INTRODUCTION

Taiwan is a mountainous island with various terrains and abundant ecological resources, which provide diverse hiking sites. According to data from the Tourism Bureau's 2013 Survey of Travel by R.O.C Citizens, among recreational activities preferred by tourists, "hiking on forest trails, mountain climbing, and camping" accounted for 11.8% and ranked second highest following the activity of scenic sightseeing (Taiwan Tourism Bureau 2014). To respond to public preferences for hiking activities, in 2001, the Taiwan Forestry Bureau began to establish a national hiking trail system and designed for over 60 trails around Taiwan (Lin and Ong 2007). It is clear that hiking activities are quite popular in Taiwan. With the popularity of hiking activities, understanding relationships between hikers' experiences and nature settings is worthy of attention in trail management.

Conceptualized as place bonding, place attachment has received increasing attention in research and practical management over the past 4 decades (Lewicka 2011). In a natural setting context, place attachment can be interpreted as nature bonding, and it refers to emotional and functional connections developed between individuals and the natural environment. Recently, a lot of studies have investigated understanding of the relationship of place attachment with its antecedents (Bricker and Kerstetter 2000, Vaske and Kobrin 2001, Kyle et al. 2004c, Hou et al. 2005), and the influential role of place attachment in outcome variables (Stedman 2002, Lin 2008, Tsaur and Sun 2009). However, even though studies of place attachment have turned toward understanding the formative process of place attachment and the relationship with other variables (López-Mosquera and Sán-

chez 2013), the formative process through which place attachment develops is still being debated in existing studies (Lewicka 2011).

In this study, we tried to understand questions regarding why people are driven to a specific natural setting, and how psychological bonds subsequently developed with place. Two antecedents, recreation motivation and activity involvement, were applied to investigate their influence on place attachment in this study.

Weiner (2000) suggested that the formation of attachments involves motivational processes. Kyle et al. (2004c) and Luo and Deng (2008) showed similar results of motivation having a partial effect on place attachment. Therefore, we argued that place attachment might not be directly influenced by motivation, but rather by other experience factors after visiting a specific place. From the viewpoint of an enduring association with an activity, we suggested that activity involvement should be studied as having a congruent role between motivation and place attachment.

Kyle et al. (2003) showed that both attraction and self-expression of the activity involvement construct are related to place identity, whereas self-expression was the only construct related to place dependence in an investigation of hikers on the Appalachian Trail in the USA. Moreover, Gross and Brown (2008) also showed that involvement had a positive and significant effect on place attachment in a tourism context. These findings indicated that there is a relationship between activity involvement and place attachment. In addition, Kyle et al. (2006) showed that motivation had a significant effect on place attachment with activity involvement. Other work also showed that motivation can be recognized as an antecedents to activity involvement (Funk et al. 2004, Chen 2010). These findings also indicated that there is a

relationship between activity involvement and place attachment.

As already noted, existing studies demonstrated the relationship between two of the recreation motivations, activity involvement and place attachment, in the recreationists' psychological context. However, the effects of motivation and activity involvement on place attachment have not yet been simultaneously examined in a "hiker-trail" context. Furthermore, while many studies used place dependence and place identity as dimensions for measuring place attachment (Williams et al. 1992, Moore and Graefe 1994, Bricker and Kerstetter 2000, Gross and Brown 2008), few empirical studies investigated the relationship between these 2 dimensions (Dai et al. 2008). Thus, we suggested that the relationship between place dependence and place identity should be included as part of the overall test model to obtain a more-complete understanding of the formative process of place attachment.

Overall, the purpose of this study was to further investigate relationships among hikers' recreation motivation, activity involvement, and place attachment (both place dependence and place identity) using a structural equation model. It was expected that the results of this study can be helpful to more completely understand the formative process of place attachment, and provide reference for trail management agencies and hiking associations to promote hiking activities, and for trail planning and management.

Theoretical background and research hypotheses

The purpose of this study was to investigate relationships among recreation motivation, activity involvement, and place attachment. This proposed conceptual model "motivation → activity involvement → place

attachment” was constructed on the concept of motivation and attitudes.

Kyle et al. (2004c) applied “the expectancy-value model of motivation theory” as a theoretical basis for understanding the relationship between motivation and place attachment. They suggested that individuals are motivated to interact with natural settings in pursuit of their specific benefits, involvement as well as attachment, which may occur through interactions between these natural settings and people. However, their study provided less insight in explaining why individuals engage in a certain activity in a specific natural setting even when many various environments or activities could also satisfy their specific needs or provide similar desired outcomes.

Kyle et al. (2006) proposed that there is a relationship between motivation and activity involvement based on the expectancy-value model and the process by which ego attitudes are activated. Their work applied the concept of attitude to strengthen the understanding of the process driven by motivation. Many previous studies also suggested that attitude is a critical construct toward an object which is determined by motivation (Gnoth 1997, Hsu et al. 2010), and relationships between their motivations and specific behaviors are mediated by attitudes within specific contexts (Baloglu 2000).

Kyle et al. (2003) demonstrated that both activity involvement and place attachment are attitudinal constructs reflecting the similarity of ego and self-identity. McIntyre and Pigram (1992) noted that leisure involvements can enhance an individual’s commitment to a specific place. Additionally, Hernandez et al. (2007) and Thomson et al. (2005) demonstrated that the concept of place attachment could be similar to psychological commitment or attitudinal loyalty. Thus, according to

the 3 studies mentioned above, we assumed that activity involvement is an essential antecedent in the formation of place attachment.

Consequently, this proposed conceptual model “motivation → activity involvement → place attachment” was constructed on the basis of motivation and attitude concepts. Additionally, this study presents the following research hypotheses.

Recreation motivation and activity involvement

Funk et al. (2004) pointed out that consumers’ consumption motivations for professional baseball teams should be the antecedent of activity involvement. Kyle et al. (2006) found a positive correlation between hiking motivation and activity involvement. As a result, this study proposed a hypothesis 1(H1): hikers’ recreation motivation has a significant effect on activity involvement.

Recreation motivation and place attachment

Kyle et al. (2004c) found that recreation motivation of park users was correlated with place dependence and place identity of place attachment. In an investigation of the relationship between recreationists’ motivation and place attachment at the Nanjenshan Ecological Protection Area, Kenting National Park, Chiang et al. (2008) reported that recreationists’ motivation was significantly correlated with place dependence and place identity. Based on those studies, this study proposed 2 hypotheses, H2: hikers’ recreation motivation has a significant effect on place dependence; and H3: hikers’ recreation motivation has a significant effect on place identity.

Activity involvement and place attachment

Kyle et al. (2003) investigated the relationship between these 2 variables in a study

of hikers on Appalachian Mountains Trails, and showed that activity involvement is the antecedent of place attachment. Dai et al. (2008) also showed that activity involvement has a significant effect on both the place dependence and place identity of hikers. According to the above studies, this study proposed 2 hypotheses, H4: hikers' activity involvement has a significant effect on place dependence; and H5: hikers' activity involvement has a significant effect on place identity.

Place dependence and place identity

Moore and Graefe (1994) suggested that place dependence was formed in a short period of time, and place identity cannot be developed until a user continuously visits a place many times and participates in an activity for a long period of time. Moore and Graefe (1994) investigated railway users' attachment to the recreational facilities around the railway, and found that users' place dependence had an effect on place identity. Dai et al. (2012) also found that leisure divers' place dependence had an effect on place identity. Therefore, this study proposed research

hypothesis H6: hikers' place dependence has a significant effect on place identity.

According to the proposed research hypotheses based on the aforementioned literature, the conceptual model of the study to be verified is shown in Figure 1.

MATERIALS AND METHODS

Site description

The trail of Guanzihling Dadong Mt. (1 trail of the national trail system), located in Paiho District, Tainan City, Taiwan, belongs to Taiwan Forestry Bureau, and is near the Guanzihling Hot Spring Area. The elevation of Dadong Mt. is 1241 m, and it is the highest mountain in Tainan as well as being known as one of the "little hundred mountains" in Taiwan (Taiwan Forestry Bureau 2013). The mountain trail runs for about 6 km along the slope. It is a popular mountain site for hikers in southern Taiwan, as well as a hiking trail suitable for the public (Taiwan Forestry Bureau 2013). Because of the high accessibility of Dadong Mt. (a suburban mountain), it is very frequently visited by hikers, and there

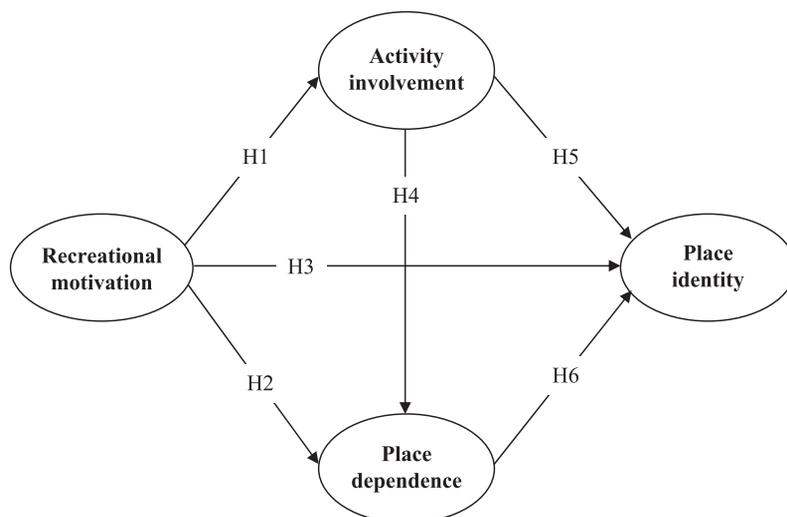


Fig. 1. Conceptual model of the study.

are more interactions between hikers and the trail environment. Therefore, we selected Guanzihling Dadong Mt. trails as the study area.

Questionnaire design

In this study, a recreation motivation questionnaire containing 5 dimensions (comprised of health promotion, natural experience, self-learning and growth, escape, relaxation, and interpersonal relationships) with 20 items was developed by referring to the scales of Kyle et al. (2004c, 2006).

To measure activity involvement, McIntyre and Pigram (1992) developed a 3-dimensional measurement of activity involvement comprised of attraction, self-expression, and centrality to lifestyle. This study developed 15 items based on 3 dimensions including attraction, centrality, and self-expression by referring to the scale of Kyle et al. (2004a).

We applied place dependence and place identity as dimensions for measuring place attachment. These 2 dimensions were verified in previous studies (Williams et al. 1992, Moore and Graefe 1994, Bricker and Kerstetter 2000, Gross and Brown 2008). This study referred to research items (8 items totally) developed by Kyle et al. (2004b). The items mentioned above were all amended according to the characteristics of hiking activities.

A Likert 5-point scale was used for scoring. Additionally, the questionnaire was amended according to the suggestions of 3 relevant experts and scholars.

Sample selection and data collection

We selected hikers on Guanzihling Dadong Mt. trails as the sample. A convenience sampling approach was adopted to distribute the questionnaires to subjects at the pavilion square near the triangulation point of Dadong Mt. trails. In total, 380 questionnaires were

distributed. After invalid questionnaires were removed, there were 364 valid questionnaires.

Data processing

We used the statistical software SPSS 17.0 (SPSS, Chicago, IL, USA) to perform the descriptive analysis, reliability analysis, and explorative factor analysis (EFA) of samples. In addition, we also used Structural Equation Modeling (SEM) statistical software Amos 18 to carry on the confirmatory factor analysis (CFA), estimate the parameters of the model, test the research hypotheses, verify the relationship of the overall model, and fit it finally.

RESULTS AND DISCUSSION

Respondents' profile

Results of the descriptive analysis of the demographic statistics and recreational characteristics of respondents were shown in Table 1. The majority of respondents were male, married, aged 51~60 yr (with 74% over the age of 41), were engaged in commerce/service, earned New Taiwan (NT\$) 20,001~40,000 (followed by NT\$ 40,000~60,000 per month), lived in Tainan City, visited the study site 1 or 2 times per month with nearly 40% visiting the study site more than 3 times per month, hiked with their friends, families, or relatives, and spent more than 4 h to complete the roundtrip hike, followed by 3~4 h (64% totally). The longest experience with hiking was > 10 yr. The main source of information obtained by respondents came from friends and family.

Instrument validation

To test whether internal consistencies in the scales used in this study existed, a reliability analysis and an EFA were performed prior to the CFA. Items with poor reliability

Table 1. Demographic and characteristic profile of respondents

Variable	Group	<i>N</i>	%
Gender	Male	214	58.8
	Female	150	41.2
Marital status	Married	285	78.3
	Unmarried	79	21.7
Age (yr)	≤ 20	7	1.9
	21~30	26	7.1
	31~40	61	16.8
	41~50	98	26.9
	51~60	136	37.4
	≥ 61	36	9.9
Education level	Junior high school or below	41	11.3
	high school	102	28.0
	University or college	195	53.6
	Graduate school	26	7.1
Occupation	Student	12	3.3
	Office worker or teacher	69	19.0
	Service industry	100	27.5
	Laborer	93	25.5
	Housekeeper	38	10.4
	Retiree	30	8.2
	Others	22	6.0
	Monthly income (NT\$)	≥ 20,000	68
	20,001~40,000	128	35.2
	40,001~60,000	84	23.1
	60,001~80,000	57	15.7
	80,001~100,000	15	4.1
	≥ 100,001	12	3.3
Residence	Chiayi	15	4.1
	Tainan	312	85.7
	Kaohsiung/Pingtung	31	8.5
	Other areas	6	1.6
Visitations per month (times) ≤	< 1	109	29.9
	1 or 2	110	30.2
	3 or 4	90	24.7
	5 or 6	23	6.3
	7 or 8	12	3.3
	≥ 9	20	5.5
Companion	By oneself	27	7.4
	Family	121	33.2
	Friends	184	50.5
	Association	32	8.8
Traffic vehicle	Car	342	94.0

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Traffic vehicle	Motorcycle	17	4.7
	Bus	5	1.4
Time spent hiking (h)	< 2	67	18.4
	2~3	68	18.7
	3~4	117	32.1
	> 4	112	30.8
Hiking experience (yr)	< 1	66	18.1
	1~3	81	22.3
	4~6	80	22.0
	7~9	42	11.5
	≥ 10	95	26.1
Information source	Informed by friends/relatives	269	73.9
	Internet	15	4.1
	Notice of hiking association	30	8.2
	Hiking supply store	13	3.6
	Mass media	24	6.6
	Other sources	13	3.6

and low factor loading were removed. In the recreation motivation scale, after 3 items (“To learn more about nature”, “To reduce built-up tension”, and “To be with people who have the same interests”) were removed, Cronbach’s α values of the dimensions of motivation in “learning and exploration”, “pursuit of nature”, “escape and relaxation”, “social bonding”, and “promotion of health” were 0.89, 0.86, 0.76, 0.79, and 0.8, respectively. Cronbach’s α values of the dimensions of activity involvement of “attraction”, “centrality”, and “self-expression” were 0.94, 0.90, and 0.94, respectively. Cronbach’s α value of the place dependence scale was 0.91, and that of the place identity scale was 0.93. Hair et al. (1998) indicated that when a reliability analysis is used to inspect consistency, the generally agreed lower limit for Cronbach’s α value is 0.70. The reliability of various dimensions in this study were between 0.76 and 0.94, which were all acceptable.

This study used a CFA to test factor structure, convergent validity, and discrimi-

nant validity of various dimensions. With respect to recommended values used in the CFA model, Jöreskog and Sörbom (1989) suggested deleting items with excessively high residuals or an excessively low factor loading, and only those with a standardized factor loading of > 0.45 were retained. In addition, the squared multiple correlations (SMCs) of items were at least 0.20. Based on the standards mentioned above, we removed 3 items of activity involvement: “I really enjoy hiking”, “hiking is one of the most enjoyable things to me”, and “Hiking says a lot about who I am”. Factor loadings of the remaining items ranged 0.57~0.95, their SMC values ranged 0.32~0.90, and t -values of the estimated parameters were all > 1.96 ($p < 0.05$). Those values all met the determination criteria suggested by Jöreskog and Sörbom (1989), and are shown in Table 2.

Regarding the composite reliability (CR) and average variance extracted (AVE) in the CFA, the recommended values of Bagozzi and Yi (1988) were > 0.60 and > 0.50 , respectively.

Table 2. Confirmatory factor analysis of measurement model

Variables	Measured items	SFL	t-value	SMC	CR	AVE
Recreation motivation	Learning/exploration					
	To expand/explore knowledge	0.75	—	0.56		
	To experience new and different things	0.85	16.52*	0.72	0.89	0.67
	To satisfy my curiosity	0.83	15.22*	0.69		
	To experience the unknown	0.84	15.42*	0.71		
	Nature seeking					
	To be close to nature	0.74	—	0.55		
	To enjoy the tranquility	0.80	14.49*	0.64	0.86	0.61
	To enjoy the natural scenery	0.84	14.55*	0.70		
	To enjoy the natural atmosphere	0.73	13.07*	0.53		
	Escape/relaxation					
	To get away from routine affairs	0.57	—	0.32		
	To get away from crowded areas	0.91	8.79*	0.83	0.78	0.54
	To experience privacy	0.69	9.81*	0.48		
	Social bonding					
	To bring family/friends closer relationships	0.74	—	0.55		
	To be with my family/friends	0.83	11.13*	0.69	0.79	0.56
	To share my skill and knowledge with others	0.66	10.83*	0.43		
Health						
To be physically active	0.87	—	0.76			
To obtain health	0.91	20.59*	0.84	0.89	0.73	
To get exercise	0.77	17.44*	0.59			
Recreation involvement	Attraction					
	Hiking is pleasurable	0.70	—	0.48		
	Hiking interests me	0.89	16.97*	0.79	0.91	0.71
	Hiking is one of the most satisfying things that I do	0.95	16.34*	0.90		
	Hiking is important to me	0.81	14.54*	0.65		
	Self expression					
	Others can see in a way that I want them to see me when I go hiking	0.71	—	0.51		
	When I participate in hiking I can really be myself	0.95	15.54*	0.90	0.88	0.71
	You can learn a lot about a person by watching them hiking	0.85	15.51*	0.72		
	Centrality					
	I have many friends who are in some way connected with hiking	0.84	—	0.70		
	I enjoy discussing hiking with my friends	0.81	18.82*	0.65	0.94	0.77
A lot of my life is organized around hiking activities	0.91	22.81*	0.83			
Hiking plays a central role in my life	0.93	23.50*	0.86			
A lot of my life is organized around hiking	0.88	21.50*	0.77			
Place dependence	Place dependence					
	I enjoy hiking on this trail more than any other trail	0.91	—	0.84		
	I get more satisfaction from this trail than any other trail	0.94	31.82*	0.89	0.92	0.75
	Hiking here is more important than hiking any other place	0.93	29.75*	0.86		
I would not substitute any other trail for the activities I participate in here	0.65	14.82*	0.42			
Place identity	Place identity					
	Hiking on this trail means a lot to me	0.87	—	0.76		
	I am very attached to this trail	0.84	21.07*	0.71	0.92	0.75
	I identify strongly with this trail	0.92	23.82*	0.84		
I have a special connection to this trail and the people who hike here	0.84	20.57*	0.70			

SD, standard deviation; SFL, standardized factor loading; SE, standard error; SMC, square multiple correlations; AVE, average variance extracted; CR, composite reliability.

* $p < 0.05$.

The CR values of various dimensions in this study ranged 0.78~0.94, and AVE values ranged 0.54~0.77, which both met the recommended values of Bagozzi and Yi (1988). Therefore, the convergent validity of the measurement model in this study should be acceptable.

In testing the discriminant validity, Hair et al. (2006) and Fornell and Larcker (1981) indicated that the AVE for each pair of constructs should be greater than the square of the correlation between each of those 2 constructs. As shown in Table 3, the square root of each dimension was greater than the correlation coefficient of each dimension. The results showed that the judgment criteria were met, thus verifying that the discriminant validity of the measurement model in this study was acceptable.

Evaluation of the overall model

In an analysis of overall structure model, in order to simplify the items, means of the 5 dimensions of recreation motivation and 3 dimensions of recreation involvement were calculated and used as input data of observed

variables. Regarding the dimensions of place dependence and place identity, the input data of the original 4 observed variables were continuously used for analysis.

On the test of offending estimates, Hair et al. (1998) suggested that the determination of non-offending estimates should meet the criteria that there be no negative error variance (EV), or oversized standard error (SE), and the standardized factor loading (SFC) should not be greater than or close to 1. As shown in Table 4, the SFC in this study ranged 0.58~0.95, and the EV was not negative and reached statistical significance, suggesting that there was no offending estimate in the estimation of the model in this study. A test of the fit of the overall model could be performed.

After confirmation that there was no offending estimate, we then tested the fitness of the overall model. Measurement indices for the test of fitness on the hypothesis in this study included the Chi-square value, Chi-square degree of freedom ratio (normed Chi-square), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), root mean

Table 3. Examination of the discriminant validity (implied correlation of dimensions)

Dimension	n	Correlation value										
		A	B	C	D	E	F	G	H	I	J	
A. Learning/exploration	4	0.82										
B. Nature seeking	4	0.30	0.78									
C. Escape/relaxation	3	0.25	0.24	0.74								
D. Social bonding	3	0.44	0.34	0.21	0.75							
E. Health	3	0.12	0.28	0.10	0.25	0.85						
F. Attraction	4	0.22	0.25	0.19	0.35	0.27	0.84					
G. Self expression	3	0.37	0.25	0.20	0.36	0.12	0.40	0.84				
H. Centrality	5	0.29	0.19	0.20	0.37	0.16	0.64	0.52	0.88			
I. Place dependence	4	0.22	0.10	0.10	0.19	.006	0.25	0.29	0.38	0.87		
J. Place identity	4	0.31*	0.26	0.23	0.37	0.20	0.52	0.44	0.52	0.53	0.87	

Note 1: Values on the diagonal (boldface) denote the square root of the average value extracted of dimensions. Values under the diagonal are standardized correlation coefficients.

* denotes $p < 0.05$.

Table 4. Offending estimates of latent variables

Latent variable	Observed variable	SFL	EV	SE	SMC	CR	AVE
Recreation motivation	RM1. Learning/exploration	0.76*	0.22*	0.02	0.58		
	RM2. Nature seeking	0.75*	0.13*	0.01	0.56		
	RM3. Escape/relaxation	0.61*	0.33*	0.03	0.37	0.83	0.51
	RM4. Social bonding	0.82*	0.14*	0.02	0.67		
	RM5. Health	0.58*	0.19*	0.02	0.34		
Recreation involvement	A11. Attraction	0.83*	0.13*	0.01	0.70		
	A12. Self expression	0.75*	0.26*	0.02	0.56	0.88	0.72
	A13. Centrality	0.95*	0.06*	0.02	0.91		
Place dependence	PD1. I enjoy hiking here more than any other trail	0.91*	0.11*	0.01	0.84		
	PD2. I get more satisfaction out of visiting this trail than from visiting any other trail	0.94*	0.07*	0.01	0.89		
	PD3. Hiking here is more important than hiking any other place	0.93*	0.11*	0.01	0.86	0.92	0.75
	PD4. I would not substitute any other trail for the type of activities I do here	0.65*	0.54*	0.04	0.42		
Place identity	PI1. This trail means a lot to me	0.87*	0.15*	0.02	0.76		
	PI2. I am very attached to this trail	0.84*	0.17*	0.02	0.71		
	PI3. I identify strongly with this trail	0.92*	0.11*	0.01	0.84	0.92	0.75
	PI4. I have a special connection to this trail and people who hike here	0.84*	0.21*	0.02	0.70		

SFL, standardized factor loading; EV, error variance; SE, standard error; SMC, square multiple correlations; AVE, average variance extracted; CR, composite reliability.

* $P < 0.05$.

square error of approximation (RMSEA), normed fit index (NFI), Tucker-Lewis index (TLI), comparative fit index (CFI), parsimonious normed fit index (PNFI), parsimonious comparative fit index (PCFI), and root mean square residual (RMR). Measurement indices and standards for the test of fitness, as well as the result of the fitness on the overall model in this study were given in Table 5. Most of the results met the standards required by various indices. The AFGI value was 0.87. Although it did not meet the standard of 0.90, it was still acceptable. Overall, the fitness of the research model was acceptable.

Tests of hypotheses

In terms of the tests of the research hypotheses, as shown in Fig. 2, the findings of this study confirm that recreation motivation has a positive effect on activity involvement

($\beta = 0.81$, $t = 13.09$, $p < 0.001$). Thus, H1 was accepted. This result is consistent with those of other studies, such as those by Iwasaki Havitz (2004), Kyle et al. (2006), and Lin and Lee (2010). It was also confirmed that recreation motivation positively and significantly influenced place identity ($\beta = 0.22$, $t = 3.11$, $p < 0.01$) in this study. Thus, H3 was accepted. This research result is in line with those of Kyle et al. (2004c) and Chiang et al. (2008). The prediction of a relationship between activity involvement and place dependence ($\beta = 0.69$, $t = 6.61$, $p < 0.001$) was confirmed in this study. Thus, H4 was accepted. This finding is in line with a few previous empirical studies (Kyle et al. 2003, Dai et al. 2008). Similarly, findings of this study confirmed that activity involvement had a significant influence on place identity ($\beta = 0.38$, $t = 4.70$, $p < 0.001$). Thus, H5 was accepted. This

Table 5. Summary table of indices of the goodness of fit of the overall model

	Absolute fit measurement					Incremental fit measurement			Parsimonious fit measurement		
	X^2 (p value)	X^2/df	GFI	AGFI	RMSEA	NFI	TLI	CFI	PNFI	PCFI	RMR
Casual model	285.63 ($p = 0.00$)	2.92 ($df = 98$)	0.90	0.87	0.07	0.90	0.95	0.96	0.77	0.78	0.02
Threshold value	$p < 0.05$	< 3	> 0.9	> 0.9	< 0.08	> 0.9	> 0.9	> 0.9	> 0.5	> 0.5	< 0.1

df, degree of freedom; GFI, goodness of fit index; AGFI, adjusted goodness of fit index; RMSEA, root mean square error of approximation; NFI, normed fit index; TLI, Tucker-Lewis index; CFI, comparative fit index; PNFI, parsimonious normed fit index; PCFI, parsimonious comparative fit index; RMR, root mean square residual.

result is consistent with those of the studies by Bricker and Kerstetter (2000), Kyle et al. (2003), Kyle and Mowen (2005), and Dai et al. (2012). The effect of place dependence on place identity was confirmed by this study ($\beta = 0.39$, $t = 7.19$, $p < 0.001$). Thus, H6 was accepted. This result is consistent with those of studies by Vaske and Kobrin (2001) and Dai et al. (2012).

Surprisingly, hypothesis 2, the effect of recreation motivation on place dependence, was not supported in this study ($\beta = 0.00$, $t = 0.03$, $p > 0.05$). Consequently, recreation motivation had an influence on place identity but not on place dependence. Overall, recreation motivation was a stronger predictor of place identity than it was of place dependence. This result is inconsistent with those of several existing studies showing that motivation has a significant influence on the 2 dimensions (place dependence and place identity) of place attachment (Kyle et al. 2004c, Anderson and Fulton 2008, Chiang et al. 2008). Although our findings are not consistent with those of several previous studies, Kyle et al. (2004c) pointed out that compared to place identity, the effect of motivation on place dependence was less significant in their study. Low and Altman (1992) suggested that effects/emotions toward symbols of specific places could be stronger than actual places in attachment formation. Similarly, Lewicka (2011) also demonstrated that physical attributes may facilitate

social contacts and thus indirectly influence place attachment. Furthermore, our findings showed that the factor loading of social bonding was the highest among the 5 dimensions of recreation motivation in the CFA (Table 4). This result infers that interpersonal relationships may facilitate individuals attaching to a specific place, and social ties or social identification may directly drive an internal process in the formation of place identity directly.

From the above discussion, it can be inferred that respondents would extend the meaning, value, social interaction, and affection of trail hiking activities at Dadong Mt., and thus, have a strong sense of identity with it. As indicated by Dai et al. (2012), if an individual feels that he/she belongs to a space and perceives his/her own importance to it, then he/she will develop a sense of identity for the space and develop a sense of belonging to the group within it.

From aspects of the direct effect, results showed that recreation motivation had a direct effect on recreation involvement, and the path coefficient was the highest one ($\beta = 0.81$, $p < 0.001$) in the overall structural model (Fig. 2). Clearly, activity involvement can be recognized as the variable most influenced by recreation motivation compared to the others.

Additionally, our study found that the effects of recreation motivation on place dependence ($\beta = 0.00$, $p > 0.05$) and place identity ($\beta = 0.22$, $p < 0.01$) were weaker than the effect

of activity involvement on place dependence ($\beta = 0.69, p < 0.001$) and place identity ($\beta = 0.38, p < 0.001$) (Fig. 2). Thus, the findings indicated that respondents' activity involvement was a stronger predictor of place attachment (both place dependence and place identity) than that of recreation motivation.

In addition to the results of direct effects, indirect effects among the studied variables were also investigated. We found that the path coefficient of "recreation motivation \rightarrow activity involvement \rightarrow place dependence" ($0.81 \times 0.69 = 0.56$) was higher than that of "recreation motivation \rightarrow place dependence" (0.00). Thus, in the absence of a significant direct influence of recreation motivation on place dependence, it can be stated that activity involvement fully mediates the influence of recreation motivation on place dependence. Additionally, since the path coefficient of "recreation motivation \rightarrow place identity" (0.22) was lower than that of "recreation motivation \rightarrow activity involvement \rightarrow place identity" ($0.81 \times 0.38 = 0.31$), and similar to the path coefficient of "recreation motivation \rightarrow activity involvement \rightarrow place dependence \rightarrow place identity" ($0.81 \times 0.69 \times 0.39 = 0.22$), activity involvement may play an intermediary role between recreation motivation and place identity. To determine the role mediation played by activity involvement in this study, a test was conducted on the structural model without the activity involvement variable. The goal was to understand changes in the value of the effect of recreation motivation on place identity. In the structural model without the activity involvement variable, the value of the effect of recreation motivation on place identity was 0.74. This value was the same as the effect of recreation motivation on place identity to the structural model with the activity involvement variable, namely 0.74. Furthermore, in the structural model without

the activity involvement variable, the path coefficient of "recreation motivation \rightarrow place dependence" was 0.56 ($p < 0.001$). This value was greater than that of "recreation motivation \rightarrow place dependence" in the structural model involving the activity involvement variable, namely 0.00 ($p > 0.05$). This means that the influence of place dependence between recreation motivation and place identity was mostly absorbed by activity involvement. Thus, it can be concluded that activity involvement played a mediating role between recreation motivation and place dependence, and also mediated the effect of recreation motivation on place identity.

Overall, since the path of "recreation motivation \rightarrow activity involvement \rightarrow place dependence \rightarrow place identity" ($0.81 \times 0.69 \times 0.39 = 0.22$) was found in this study, our findings confirmed that when individuals are driven to participate in and learn the benefits provided from various recreation activities in a specific place, over time they may become more deeply involved in activities which meet their needs, and then place dependence may form in a short period of time, and place identity develops later over a longer period of time (Moore and Graefe 1994, Dai et al. 2008).

In summary, our findings show that place attachment is not always influenced directly from the recreation motivation, but rather from activity involvement. Clearly, respondents' activity involvement is a stronger predictor of place attachment (both place dependence and place identity) than their recreation motivation.

Furthermore, this study suggests that activity involvement play a mediating role between recreation motivation and place attachment (both dimensions of place dependence and place identity). Hence, the relationship of "recreation motivation \rightarrow recreation involvement

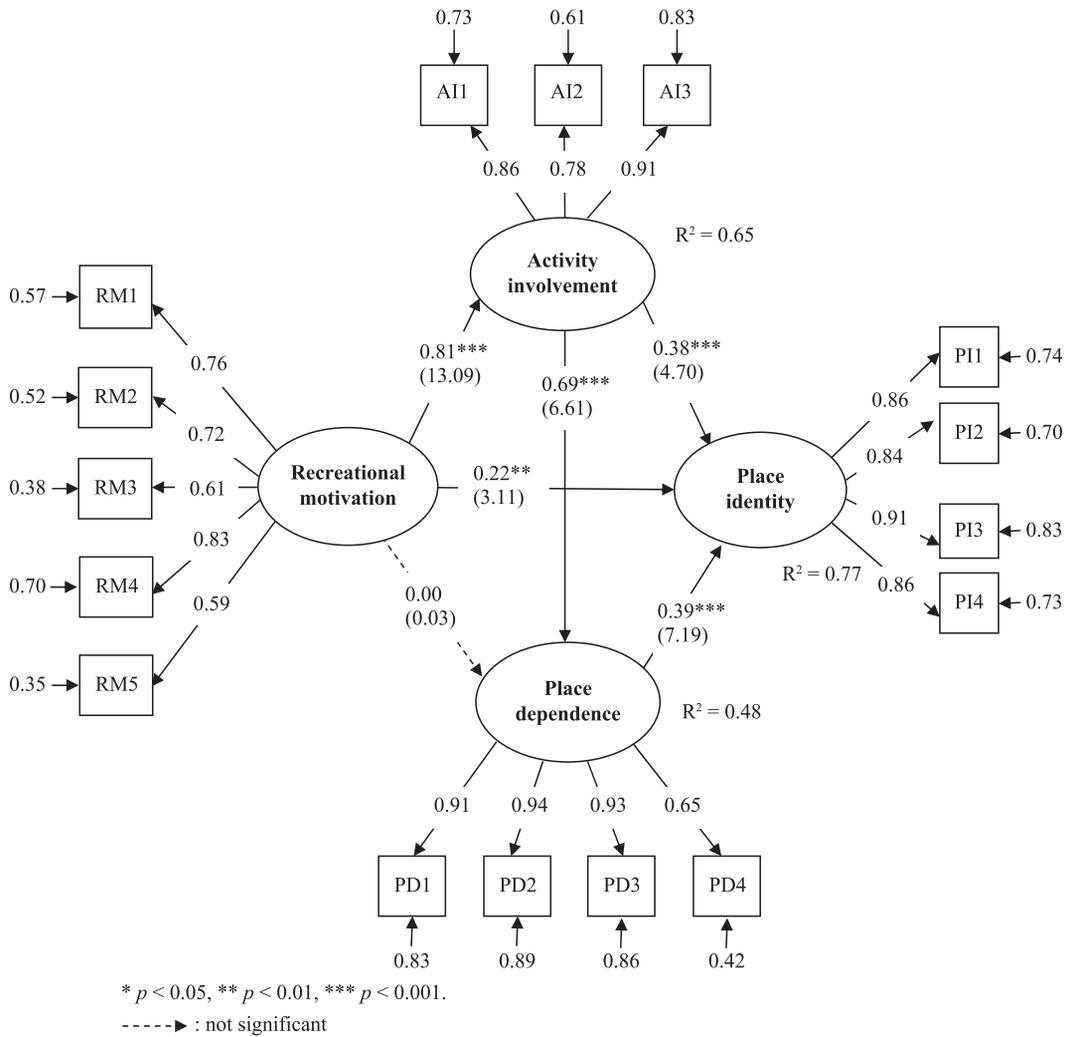


Fig. 2. Estimated structural model.

Note: RM1..RM5, AI1..AI3, PI1..PI4, and PD1..PD4 are observed variables associated with corresponding latent variables.

→ place dependence → place identity” is verified in hiking extent, thus, potentially contributed to the academic literature on place attachment and the application of the theoretical frameworks.

CONCLUSIONS

Along with an increasing awareness of the importance of place attachment, it is also

important to understand that relationships of place attachment with its antecedents. This study developed a conceptual model that incorporated recreation motivation and activity involvement as critical factors in order to strengthen place attachment among hikers on Taiwanese trails.

The findings of this study also have practical implications for managers. Owing to the relationship model “recreation motivation →

recreation involvement → place dependence → place identity” being verified in this study, this result can be provided as a reference for management agencies to develop trail and hiker management strategies. In order to increase hikers’ recreation involvement, and dependence and identity with Dadong Mt. trails, management agencies can focus on providing environmental, social, and management contextual settings to meet the motivations of hikers. When hikers spend more time and efforts in a place and engage in its relevant activities, they will develop a sense of identity with the place. In other words, the power of hikers’ place attachment can also be used to effectively manage and maintain local resources and provide them to users for continuous use.

Despite its contributions, this study has certain limitations. First, since this study focused on respondents hiking on the trail of Guanzihling Dadong Mt, our findings are limited to this setting, and might not reflect the situation on other trails around Taiwan. We suggest that follow-up studies choose different suburban mountain types as sites to investigate differences. Second, our findings present only relationships among recreation motivation, activity involvement, and place attachment. We suggest that follow-up studies expand this conceptual model presented here with other antecedents such as image and experience to enrich our understanding of the formative process of place attachment.

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