
Articles

An Examination of the Relationship between Leisure Activity Involvement and Place Attachment among Hikers Along the Appalachian Trail

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The place attachment construct has been used by leisure researchers and practitioners to refine our understanding of certain leisure behaviors for over two decades. Despite the construct's importance to natural resource-based leisure, little empirical work has appeared in the leisure literature examining the construct's antecedent processes; that is, the processes that lead to recreationists' attachment to settings. This study examined one antecedent, activity involvement, using covariance structure analysis. The authors examined a model suggesting that place attachment (i.e., *place identity* and *place dependence*) would be predicted by activity involvement (i.e., *attraction*, *centrality*, and *self expression*) among four groups of hikers along the Appalachian Trail (i.e., *day hikers*, *overnight hikers*, *section hikers* and *through hikers*). Using LISREL's multigroup procedure, results indicated that the *place identity* dimension of place attachment was best predicted by the *self expression* and *attraction* dimensions of activity involvement, whereas the only predictor of *place dependence* was *self expression*. These relations were consistent for all hikers. Type of use (i.e., *day hiker*, *overnight hiker*, *section hiker* and *through hiker*), however, was shown only to moderate the correlation between activity involvement dimensions, *attraction* and *self expression*, and place attachment's *place identity* and *place dependence*. As hikers' activity in-

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volvement and attachment grew, the correlations between these constructs declined. This result indicates that these scales' discriminant validity improves as respondents more readily identify with the attitude object used in the item wording.

KEYWORDS: *Place attachment, leisure activity involvement, hiking, Appalachian Trail*

Introduction

The place attachment construct has been used by leisure researchers and practitioners to refine our understanding of certain leisure behaviors for over two decades (Moore & Graefe, 1994; Schreyer, Jacob, & White, 1981; Williams, Patterson, Roggenbuck, & Watson, 1992; Williams & Roggenbuck, 1989). Conceptualized as the extent to which an individual values or identifies with a particular environmental setting (Williams & Roggenbuck, 1989), investigations of the construct have demonstrated integral relations with leisure satisfaction and demand (Driver, 1976; Williams & Huffman, 1986), substitution and displacement (Shelby & Vaske, 1991), recreation specialization (Bricker & Kerstetter, 2000; Bryan, 1977), recreation conflict (Thapa, 1996), and recreationists' management preferences and use behavior (Bricker, 1998; Wickham, 2000; Williams et al., 1992). Despite the construct's importance to resource-based leisure, little empirical work has appeared in the leisure literature explaining how recreationists develop attachments to specific recreation settings. Therefore, the purpose of this study is to further investigate the relationship between activity involvement and place attachment for hikers along the Appalachian Trail (AT). We propose and simultaneously test a model with four different types of hikers along the AT using covariance structure analysis. In so doing, we also examine the moderating effect of use behavior¹ (i.e., type of hiker) on the relationship between activity involvement and place attachment.

Review of Literature

Place Attachment

Interest in understanding the meaning that places have for people can be found in several disciplines. Vaske and Kobrin (2001), in their brief review of the place attachment literature, noted several related interpretations. For example, sociology emphasizes how the symbolic meanings of settings influence the social context of human interactions (Greider & Garkovich, 1994), often providing a context for group or shared identity (Hummon, 1992). Anthropology seeks to understand the cultural significance of symbols, such as geographic settings, on day-to-day life (Geertz, 1973). Human geography's conception of "sense of place" (Buttimer & Seamon, 1980; Relph, 1976;

¹Throughout the paper, use behavior refers to the type of hiker sampled in this study; day hiker, overnight hiker, section hiker, and through hiker.

Tuan, 1980) is consistent with environmental psychology's notion of place attachment (Altman & Low, 1992; Proshanky, Fabian, & Kaminoff, 1983). In this sense, attachment represents an emotional or affective bond between a person and a particular place (Guiliani & Feldman, 1993; Williams & Patterson, 1999). This latter perspective has received the greatest attention in the leisure literature. Building from the work of geographers and environmental psychologists, leisure researchers tend to describe the meaning places have for people in terms of two components; *place dependence* and *place identity* (Schreyer, Jacob, & White, 1981).

Williams et al. (1992) suggested that *place dependence*, a functional attachment, reflects the importance of a resource in providing amenities necessary for desired activities (Stokols & Shumaker, 1981; Williams & Roggenbuck, 1989). Building from the work of Schreyer and associates (Jacob & Schreyer, 1980; Schreyer et al., 1981; Schreyer & Roggenbuck, 1981), Williams et al. "described the functional meaning of a place as the tendency to see the environment as a collection of attributes that permit the pursuit of a focal activity" (p. 31). In this context, the value of a setting to the individual is based on specificity, functionality, and satisfaction of a place and its "goodness" for hiking, fishing, camping, scenic enjoyment and so forth.

Williams et al. (1992) have noted that the second view of place attachment has developed around Proshansky's (1978) concept of *place identity*. *Place identity* refers to "those dimensions of the self that define the individual's personal identity in relation to the physical environment by means of a complex pattern of conscious and unconscious ideas, beliefs, preferences, feelings, values, goals and behavioral tendencies and skills relevant to this environment" (Proshanky, 1978, p. 155). Jorgensen and Stedman (2001) have referred to this as a cognitive structure that refers to global self-identification similar to conceptualizations of gender identity and role identity.

Thus, in addition to being a resource for satisfying explicitly felt behavioral or experiential goals, a place may be viewed as an essential part of one's self, resulting in strong emotional attachment to places. In an attempt to empirically define the place attachment construct, Williams and Roggenbuck (1989) developed a series of Likert-scaled statements designed to measure these two theoretical dimensions of place attachment and pilot tested them on 129 students from four universities. While their analysis produced three distinct components, subsequent testing later confirmed the existence of the *place dependence/place identity* structure.

Kyle, Absher, and Graefe (2003) have also suggested that these two components of place attachment (i.e., *place dependence* and *place identity*) are conceptually similar to two components of Katz's (1960) functional theory of attitudes and Johnson and Eagly's (1989) categorization of ego-attitudes. The functional approach suggests that attitudes can have both instrumental functions by which they directly express benefits and costs, and expressive or symbolic functions by which they express personal values and core aspects of self-identity (Herek, 1986; Katz, 1960; Prentice, 1987). Similarly, Johnson

and Eagly noted two different treatments of ego-attitudes by psychologists that focus on activating attitudes closely tied to individual values (e.g., using treatments where the attitude object includes topics such as abortion, prohibition, etc.) and attitudes that are more instrumental in nature and are tied to specific outcomes (e.g., using treatments where the attitude object may be closely tied to subjects' immediate goals—obtaining a college degree, exam format, etc.). Thus, *place dependence* (i.e., the importance attributed to natural settings for their instrumental value related to specific recreation experiences) is conceptually akin to the instrumental functions of attitudes proposed by Katz and Johnson and Eagly's conceptualization of outcome-related attitudes. On the other hand, *place identity* (i.e., the importance attributed to natural settings because of its emotional and symbolic meaning) is similar to the value expressive functions of attitudes.

Leisure Activity Involvement

Activity involvement, a widely studied construct in the leisure literature to address personal relevance, has been defined as "an unobservable state of motivation, arousal or interest toward a recreational activity or associated product. It is evoked by particular stimulus or situation and has drive properties" (Havitz & Dimanche, 1997, p. 246; adapted from Rothschild, 1984). It has been recognized that involvement with leisure activities leads to greater sensitivity toward the subtleties of activity attributes (e.g., knowledge of equipment, site selection), greater perceptions of activity importance (e.g., perceived to be an important component of a recreationists' life), and a greater commitment to specific service providers or geographic locales (Gahwiler & Havitz, 1998; Havitz & Dimanche, 1990, 1999; McIntyre & Pigram, 1992). Although there is general consensus that the construct is multidimensional, there remains disagreement over which dimensions are salient (Havitz & Dimanche, 1990, 1997, 1999; Kyle, Kerstetter, & Guadagnolo, 2002).

Early work by Laurent and Kapferer (1985) in the context of consumer products and services suggested that interest, pleasure, perceived probability and consequence of risk, and self expression are the most critical dimensions of activity involvement. Since then, Laurent and Kapferer's scale has been adapted to measure leisure activity involvement in a variety of contexts (see Havitz & Dimanche, 1997). Of the dimensions proposed by Laurent and Kapferer, items measuring risk (i.e., risk probability and risk consequence) have performed least consistently.

Building from Laurent and Kapferer's work (1985), McIntyre and Pigram (1992) conceptualized activity involvement as consisting of *attraction*, *self expression*, and *centrality* to lifestyle. Based on their research on camping and risk activities, McIntyre and Pigram suggested that the *attraction* dimension should be conceptualized as a combination of importance and pleasure. That is, although pleasure or enjoyment is clearly an aspect of *attraction*, it does not necessarily indicate high activity involvement unless the enjoyable

activity is also deemed to be important and meaningful to the individual. The *self expression* dimension of activity involvement is similar to the "sign" or symbolic notion proposed by Laurent and Kapferer. *Self expression* refers to self-representation, or the impression of oneself that individuals wish to convey to others through their leisure participation. Finally, the third dimension of activity involvement proposed by McIntyre and Pigram refers to the *centrality* of a particular leisure activity in terms of an individual's overall lifestyle (Watkins, 1986). An activity may be considered central if other aspects of an individual's life are organized around that activity.

These three dimensions of activity involvement (i.e., *attraction*, *self expression*, and *centrality*) represent conceptually separate and distinct aspects of activity involvement, although empirical associations between dimensions have occurred in some contexts (i.e., dimensions are often correlated and convergence between centrality and the importance component of *attraction* has occurred; see Havitz & Dimanche, 1997). Together, empirical indicators of the three dimensions can be seen to make up an involvement profile related to an individual's participation in a particular leisure activity, or type of activity, and thus indicate the overall relevance or meaning of that activity in the context of the individual's life (Wiley, Shaw, & Havitz, 2000).

Activity Involvement and Place Attachment

The place attachment construct shares conceptual similarity with psychological commitment or attitudinal loyalty.² While conceptualizations of commitment in leisure research have drawn from two separate bodies of literature, namely psychology and sociology (Buchanan, 1985; Kim, Scott, & Crompton, 1997; Pritchard, Havitz, & Howard, 1999; Pritchard, Howard, & Havitz, 1992), the commonality of these approaches lies in their emphasis on the personal and behavioral mechanisms that bind individuals to consistent leisure behavior. Similarly, place attachment also emphasizes personal and behavioral mechanisms that bind individuals, in this instance, to geographic locales. These similarities are also evident in the sub-components that are said to underlie each of the constructs. For example, *place identity* is somewhat similar to Pritchard et al.'s notion of *position involvement* in that they both examine a cognitive connection between the self (i.e., values, attitudes, and beliefs) and an attitude object (e.g., specific brand, service provider or geographic locale). Also, *place dependence* implies knowledge of alternative leisure settings but also acknowledges an individual's decision to select a specific site from these alternatives. These two attributes can be found in Pritchard et al.'s *informational complexity* and *cognitive consistency*. These relationships have also been observed in the context of specialization research. More experienced users are thought to have accumulated more

²These two constructs have been used interchangeably in the leisure literature. It has been suggested that psychological commitment is the attitudinal component of loyalty (Backman & Crompton, 1991; Iwasaki & Havitz, 1998; Park, 1996).

information about recreation resources (Hammitt, Knauf, & Noe, 1989; Schreyer, Lime & Williams, 1984) and have developed more elaborate mental schema to organize the details of the experience and the setting (Markus, 1977).

A number of scholars (e.g., Beatty, Kahle, & Homer, 1988; Bloch, Black, & Lichtenstein, 1989; Buchanan, 1985; Crosby & Taylor, 1983; Lastovicka & Gardner, 1979) have found that activity involvement plays a formative role in developing psychological commitment to brand. While these studies have contributed to our understanding of recreationists' commitment to recreational brands and service providers, little is understood about the development of place attachment.

Previous investigations of the relationship between activity involvement and place attachment have been limited in several ways. First, several studies have indirectly touched upon the involvement construct in their investigations of specialization (Bricker & Kerstetter, 2000; McIntyre & Pigram, 1992; Mowen, Graefe & Virden, 1997; Virden & Schreyer, 1988). In these investigations, specialization has been conceptualized as a multi-dimensional construct. Common throughout these studies has been the inclusion of items measuring *centrality* to lifestyle—a dimension that is also inherent in activity involvement (Gahwiler & Havitz, 1998; Havitz & Dimanche, 1997; McIntyre, 1989; Schreyer & Beaulieu, 1986; Wellman, Roggenbuck & Smith, 1982; Wiley et al., 2000). Bricker and Kerstetter also included McIntyre and Pigram's scale as a dimension of specialization. In their analysis, however, they treated the multi-dimensional measure of activity involvement as a unidimensional scale that produced a single involvement score for each respondent. Cumulative evidence suggests that unidimensional measures of activity involvement are limited with respect to the information they provide (Havitz & Dimanche, 1997, 1999; Kuentzal & McDonald, 1992).

Moore and Graefe (1994) examined several variables leading to recreationists' attachments to place. While their study represents the only investigation reported in the leisure literature specifically examining the development of place attachment, it too is limited by the manner in which activity involvement was operationalized; namely, a single-item measure of activity importance. Finally, common throughout most studies of specialization are measures of self-reported experience, skill level, and financial investment in the activity and related equipment, all of which have been demonstrated to be closely related to level of activity involvement (see Havitz & Dimanche, 1999). While studies have shown that the specialization construct is useful for examining recreationists' relationships with various leisure settings, they have been limited in their ability to provide insight into the developmental processes that lead to relationships with the setting. This study attempts to fill this void by demonstrating that individuals' involvement with their leisure experience is often a precursor to their involvement with the leisure setting.

It is acknowledged that activity involvement is only one of several antecedents leading to recreationists' attachment to place. We contend, however, that further investigation of the relationship between activity involvement

and place attachment is warranted given the limitations of previous studies. Past examinations have employed measures that provide only a superficial understanding of activity involvement arising from their use of global measures and unidimensional scales. An understanding of activity involvement provides insight into the underlying motivations for recreationists' association with specific leisure activities (Havitz & Dimanche, 1990). Given that motivations are said to vary between individuals and activities, multidimensional scales are better suited because of their ability to capture this variation. While previous investigations have indicated that activity involvement is an antecedent of place attachment, we know very little about how an individual's association with an activity translates into an association with specific recreation settings. We contend that by employing measures sensitive to individual variation (e.g., multi-dimensional scales), a more complete understanding of the relationship between these two constructs will follow.

The Importance of Understanding Place Attachment's Antecedent Processes

Recreationists that express a strong attachment to specific recreation settings can be considered both an asset and a thorn in an agency's side. For example, research has shown that recreationists expressing strong attachments to recreation settings are often inclined to act as resource stewards and engage in less depreciative behavior (Wellman et al., 1982). They are also more likely to possess in-depth knowledge about the resource and adopt proactive roles with respect to the setting's management (Williams & Huffman, 1986; Schreyer et al., 1984). Alternately, in the context of recreation fees, research has shown that visitors' level and type of attachment can also impact their support for the fee program. For example, Kyle et al. (2003) found that visitors scoring high on the *place identity* dimension were more supportive of spending fee revenue in the areas of resource protection and environmental education, whereas visitors scoring high on the *place dependence* dimension were more supportive of spending fee revenue in the area of facility development. Similarly, Williams, Vogt, and Vittersø (1999) also found that "experienced" wilderness users were less supportive of use fees.

Therefore, with an understanding of the constructs' antecedent processes, and activity involvement in particular, managers of natural resource recreation settings stand to benefit for two reasons. First, an understanding of the activity involvement—place attachment relation provides information concerning how the motives underlying recreationists' leisure experiences connect with their attachment to recreation settings. For some recreationists, their visit along the AT may be instrumental; an opportunity to enjoy an important leisure experience. For others, their visit may be more value-expressive, an illustration of their inner self or identity. Second, an understanding of how and why recreationists develop attachments to recreation settings may enable the agency to better design programs and maintain settings that are consistent with their constituents' level and type of attachment.

Conceptual Framework

Previous investigations have shown that recreationists vary in their level and type of association with activities and places, and that these variations are also associated with different user characteristics (Bricker & Kerstetter, 2000; Confer, Graefe, Absher & Thapa, 1999; Havitz & Dimanche, 1997; McIntyre & Pigram, 1992). In particular, past investigations have shown that use frequency and intensity is positively related to both activity involvement and place attachment (Keuntzal & McDonald, 1992; McFarlane, Boxall & Watson, 1998; Schreyer, Lime & Williams, 1984). With this in mind, we chose to conduct our analysis using four types of hikers along the AT; (a) *day hikers*, (b) *overnight hikers*, (c) *section hikers*, and (d) *through hikers*. We hypothesized that hikers' type of use (i.e., day use, overnight use, sectional use, and hiking entire length of the trail) will impact the relationship between activity involvement and place attachment such that, as the length of hikers' visit along the AT increases, so too will the strength of the effect of activity involvement on place attachment. The baseline model examined in this investigation is depicted in Figure 1 and indicates that *place identity* and *place dependence* are predicted by three dimensions of activity involvement; *attraction*, *centrality*, and *self expression*. It is important to note that this investigation is primarily concerned with first order relations among these constructs only. That is, how do the dimensions of activity involvement influence the dimensions of place attachment?

Method

Design and Sample

Data were collected over the summer and fall of 1999. Sampling occurred along the entire length of the trial. Two sampling techniques were employed. First, a stratified, systematic sampling technique was employed to

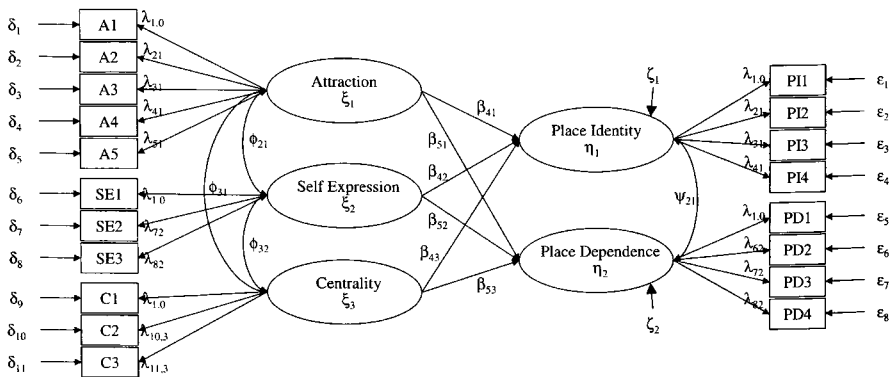


Figure 1. Hypothesized Model

obtain a representative sample of all AT hikers, with the exception of through hikers (Babbie, 1995). Sampling intensity was stratified (i.e., time and day of the week) in accordance with these use estimates³ provided by staff from the National Park Service and the Appalachian Trail Conference.⁴ Consequently, most sampling occurred on weekends. Every third trail user over the age of 18 was intercepted by volunteers and paid staff and were requested to provide their name and address to be sent a survey instrument. Because we were interested in capturing through hikers who had completed the entire length of the trail in a single season and given that many fail to hike the entire length of the trail, through hikers intercepted along the trail were initially excluded. Instead, through hikers were "purposely sampled" (Babbie, 1995, p. 225) at the northern end of the AT⁵ to ensure a sufficient number of cases for this group of hikers. From data supplied by the Appalachian Trail conference, only 2.6 percent of all hikers along the AT were *through hikers*. To capture these hikers, staff and volunteers in Baxter State Park in Maine had through hikers complete the mail-back instrument on-site before they commenced the final ascent to the trail's end on Mount Katahdin.

A total of 2,847 AT visitors agreed to participate (approximately 95% response rate) in the study and were mailed a questionnaire within two weeks after their visit. Two weeks after the initial mailing, visitors were mailed a reminder/thank you postcard. Visitors who did not return a completed questionnaire within four weeks of the initial mailing were mailed a second copy of the questionnaire. Finally, non-respondents were sent a third survey instrument in mid-November. This sampling procedure yielded 1,879 completed questionnaires (66% response rate). Of this sample, 679 were day users, 597 were overnight users/backpackers, 285 were section hikers/backpackers, and 318 through hikers.

Measurements and the Structural Model

The three dimensions of activity involvement (i.e., *self expression*, *centrality*, and *attraction*) were measured using items adapted from McIntyre and Pigram's (1992) measure of involvement with hiking (see Table 1). For place attachment, eight items measured two dimensions (i.e., *place identity* and *place dependence*). Construct reliability estimates were calculated for all scales. While Nunnally (1978) has suggested that Cronbach's alpha coefficients which are equal to or greater than .70 are acceptable, Cortina (1983) has indicated that in scales with a reduced number of items (e.g., six or less), .60 and

³Use estimates were estimates based on staff and volunteer heuristics.

⁴The Appalachian Trail Conference is a volunteer-based, not-for-profit organization dedicated to the preservation, management and promotion of the trail.

⁵The majority of through hikers hike the AT from south to north finishing in Baxter State Park, Maine. In 1999, 2625 hikers began the hike from Georgia with only 376 completing the hike (49 hikers completed the north to south route).

TABLE 1
Item Means, Construct Reliabilities, and Factor Loadings

Scale Items	λ	Day	Overnight	Section	Through
		Hikers	Hikers	Hikers	Hikers
		M	M	M	M
Involvement¹					
<i>Self Expression</i>					
δ_1 When I participate in hiking I can really by myself	.70	3.83	3.91	4.08	3.93
δ_2 You can tell a lot about a person by seeing them hiking	.39	3.26	3.34	3.43	3.31
δ_3 When I participate in hiking others see me the way I want them to see me	.68	3.31	3.41	3.56	3.41
<i>Attraction</i>					
δ_4 Hiking is important to me	.79	4.02	4.13	4.40	4.22
δ_5 Hiking interests me	.71	4.27	4.38	4.52	4.43
δ_6 Participating in hiking is one of the most enjoyable things that I do	.79	3.86	3.97	4.25	3.95
δ_7 Hiking is pleasurable	.65	4.46	4.49	4.55	4.40
δ_8 I really enjoy hiking	.76	4.39	4.46	4.60	4.42
<i>Centrality</i>					
δ_9 I find a lot of my life is organized around hiking	.94	2.69	2.83	3.18	2.95
δ_{10} Hiking has a central role in my life	.87	2.73	2.96	3.27	3.02
δ_{11} I find a lot of my life is organized around hiking activities	.88	2.66	2.83	3.13	2.84
Place Attachment¹					
<i>Place Identity</i>					
ϵ_{12} This trail means a lot to me	.69	3.92	3.91	4.43	4.44
ϵ_{13} I am very attached to the Appalachian Trail	.88	3.26	3.26	3.93	3.96
ϵ_{14} I identify strongly with this trail	.85	3.04	3.14	3.74	3.85
ϵ_{15} I have a special connection to the Appalachian Trail and the people who hike along it	.63	2.93	3.13	3.78	4.10
<i>Place Dependence</i>					
ϵ_{16} I enjoy hiking along the Appalachian Trail more than any other trail	.84	3.12	3.07	3.59	3.21
ϵ_{17} I get more satisfaction out of visiting this trail than from visiting any other trail	.91	2.86	2.87	3.40	3.05
ϵ_{18} Hiking here is more important than hiking in any other place	.82	2.59	2.59	3.08	2.66
ϵ_{19} I wouldn't substitute any other trail for the type of recreation I do here	.50	2.46	2.45	2.71	2.38

¹Measured using a Likert-type format where 1 = Strongly disagree and 5 = Strongly agree

above may also be acceptable. The alpha values for all constructs ranged between .60 through .93. On the basis of this, we concluded that all scales were reliable.

Items were worded to refer to both the "trail" and the "Appalachian Trail." It is acknowledged that, due to the length of the AT, hikers may have developed stronger attachments to specific sections of the trail. Consequently, the attitude object presented in each of the items (i.e., the "trail" and the "AT") may not have been relevant for some hikers. We contend, however, in light of the ATs "brand recognition" and unique reputation in the U.S., references to the "trail" and the "Appalachian Trail" would be most appropriate for the majority of hikers. Past research on place attachment has demonstrated that it is possible to measure the construct without referencing specific locales along trails, rivers, and within recreation areas. For example, Bricker and Kerstetter (2000) measured kayakers' and rafters' attachment to the American River; Moore and Graefe (1994) measured hikers' attachments to several trails throughout the U.S.; and Williams et al. (1992) measured recreationists' attachments to four wilderness areas throughout the U.S.

The moderating variable, use behavior, was an ordinal measure that asked respondents to indicate the type of visit they were on at the time of the on-site contact. The measurement and structural components of the model are depicted in Figure 1. The measurement model contained three exogenous constructs (ξ_1 , ξ_2 , and ξ_3) and two endogenous constructs (η_1 and η_2) measured by nineteen manifest variables (see Table 1). The structural component consisted of the variance/covariance of both the exogenous (ϕ_{11} , ϕ_{22} , ϕ_{33} , ϕ_{21} , ϕ_{31} , and ϕ_{32}) and endogenous (ψ_{11} , ψ_{22} , and ψ_{21}) variables along with their structural coefficients (β_{41} , β_{42} , β_{43} , β_{51} , β_{52} , and β_{53}).

Analysis

Covariance structure analysis, a component of LISREL (version 8.12; Jöreskog & Sörbom, 1997), was used to simultaneously test the model for four different types of hikers. The use of covariance structure analysis has certain advantages over separate analyses using factor analysis and regression. It allows the researcher to; (a) simultaneously test a system of theoretical relationships involving multiple dependent variables, (b) restrict the relationships among variables to those that have been hypothesized *a priori*, and (c) more thoroughly investigate how well the model fits the data (e.g., through the use of residuals and goodness-of-fit indices) (Lavarie & Arnett, 2000).

Many investigators of leisure phenomena have tended to assume that their samples are homogenous because they were drawn from a specific geographic location or because respondents were engaging in a common activity. Literature that has segmented users across a variety of segmentation bases has repeatedly demonstrated that the assumption of homogeneity is often flawed (Andereck & Caldwell, 1994; Donnelly, Vaske, DeReuter, & King, 1996; Havitz, Dimanche, & Bogle, 1994; McIntyre & Pigram, 1992;

Peter & Olson, 1987; Shafer, 1969). Consequently, respondents in this study were asked to indicate their type of use on this specific trip; (a) *day hiker*, (b) *overnight hiker*, (c) *section hikers*, or (d) *through hiker*. Users of the trail fall into one of these categories. *Day hikers* were defined as those hikers commencing and ending their hike on the same day; *overnight hikers* were defined as those hikers out for more than one day; *section hikers* were defined as those hikers that were hiking sections of the AT with the intent of hiking the entire trail length over an extended period of time; and *through hikers* were defined as those hikers that hike the entire length of the trail in one season. Separate covariance matrices were then constructed for each type of hiker. To examine the causal relationship between activity involvement and place attachment for each type of hiker, analyses were designed to test whether or not components of both the measurement model and structural model were invariant (i.e., equivalent) across the four types of hikers. In essence, this approach tested for the moderating effect of use type on the relationship between activity involvement and place attachment.

Assessment of model fit was based on Steiger and Lind's (1980) Root Mean Square Error of Approximation (RMSEA), the Goodness-of-Fit Index (GFI) (Hu & Bentler, 1995), and Bentler's Comparative Fit Index (CFI; 1990). An RMSEA value less than .08 is said to indicate an acceptable model fit (MacCullum, Browne, & Sugawara, 1996) and GFI and CFI values over .90 also indicate acceptable model fit.⁶ While it has been demonstrated that the chi-square test of significance is overly sensitive to sample size and, thus, not a good indicator of overall model fit when using large samples, the use of the statistic to test model respecification is still considered appropriate (Byrne, 1998).

Results

Profile of Respondents

Table 2 displays the demographic profile of respondents of each of the groups examined in this investigation. The general patterns observed in this data suggest that:

1. Men were more inclined to spend a greater length of time hiking on the AT;
2. Most hikers fell between 19 and 55 years of age, with most *through hikers* being 35 years of age or younger (65.3%);
3. Most hikers were well educated with at least some post high school education;
4. The household income distribution for *day hikers*, *overnight hikers* and *section hikers* was relatively evenly distributed from "less than \$20,000"

⁶GFI and CFI values range from 0 to 1.0.

TABLE 2
Socio-Demographic Profile of the Sample

		Day Hikers %	Overnight Hikers %	Section Hikers %	Thru Hikers %
<i>Gender</i>	Male	60.8	72.6	78.2	82.4
	Female	39.2	25.8	21.2	17.6
<i>Age</i>	1 to 18	2.7	2.7	3.4	0
	19 to 25	19.5	25.5	11.8	37.5
	26 to 35	24.1	19.2	18.7	27.8
	36 to 45	23.0	24.1	19.1	13.7
	46 to 55	19.3	20.0	20.2	12.0
	56 to 65	9.9	6.7	19.1	8.6
	66 to 75	2.6	1.8	7.6	.3
<i>Education</i>	76 and above	.5	0	0	0
	8 th grade or less	.2	0	0	0
	Some high school	1.1	2.3	3.1	.7
	High school graduate or GED	5.4	10.3	7.7	9.3
	Business school, trade school some college	18.8	21.1	16.5	21.0
	College graduate	34.1	27.9	29.5	46.4
	Some graduate school	11.3	10.6	1.7	9.6
<i>Household Income</i>	Masters, doctoral, or professional degree	29.0	27.7	32.6	13.1
	Less than \$20,000	19.6	19.1	11.2	36.1
	\$20,000 to \$39,999	17.3	18.5	19.9	24.5
	\$40,000 to \$59,999	29.6	19.5	21.2	13.4
	\$60,000 to \$79,999	13.9	14.1	19.5	11.2
	\$80,000 to \$99,999	11.4	10.0	14.9	3.7
	\$100,000 and above	17.2	18.9	13.3	11.2
<i>Race/Ethnicity</i>	Hispanic or Latino	2.2	1.9	2.0	3.9
	Black or African American	1.8	.9	2.7	.7
	Asian American	1.3	1.3	.4	1.4
	White	93.5	95.3	94.9	96.8
	American Indian or Alaskan Native	1.0	.2	0	.7
	Native Hawaiian or other Pacific Islander	.2	.4	0	.4

through "\$60,000 to 79,999" For *through hikers*, however, most respondents earned less than \$40,000 (60.6%); and

5. The majority of all respondents were White.

Testing the Hypothesized Model

Because invariance testing (i.e., constraining parameters to be estimated in the analyses to be equal) across groups assumes well-fitting single-group models, a prerequisite to testing for invariance is establishing a baseline model estimated separately for each group (Byrne, 1998; Byrne, Shavelson, & Muthen, 1989). The *a priori* structure of the measurement component of the model posits that each indicator has a nonzero factor loading on only the factor it is hypothesized to measure, covariance among exogenous con-

cepts is freely estimated, and the uniqueness associated with each measured variable was uncorrelated. For the structural model, two endogenous variables were predicted by three exogenous variables. Covariance was permitted among exogenous and endogenous variables, but not between.

The matrices were analyzed separately for each group because this stage of the analysis did not impose any between-group constraints on parameters. A specification search of the resulting modification indices suggested that by allowing two of the theta epsilons for measures of *attraction* to correlate (i.e., δ_4 and δ_5), model fit could be significantly improved ($\Delta\chi^2 = 75.31$ —*day hikers*, 19.8—*overnight hikers*, 43.57—*section hikers*, and 36.67—*through hikers*). This decision (i.e., common source of error) was based on the similarity in item wording, questionnaire format, and level of measurement. All four solutions provided good support for the *a priori* model. The goodness of fit indices were good in relation to baselines of acceptable fit (see Table 3).

Invariance Constraints Across Groups

Bollen (1998) noted that testing for comparability across groups is a matter of degree in that the researcher decides which parameters should be tested for equality across groups and in what order these tests should be made. The hierarchy of invariance⁷ that was tested in this study included:⁸

- H₁: Equality of structure (examines the suitability of a three-factor solution for activity involvement and a two-factor solution for place attachment across the four groups);

TABLE 3
Summary of Tests for Invariance of Involvement—Place Attachment Measurements and Structure

Model	χ^2	df	$\Delta\chi^2$	Δ df	RMSEA	GFI	CFI	NFI
<i>No invariance constraints</i>								
Day Hikers ($n = 640$)	489.96	141			.064	.90	.95	.93
Overnight Hikers ($n = 597$)	469.83	141			.067	.91	.95	.93
Section Hikers ($n = 285$)	284.68	141			.061	.90	.95	.91
Thru Hikers ($n = 318$)	348.66	141			.066	.90	.93	.89
<i>Tests of Invariance Across Groups</i>								
H ₁ : Invariance of form	1593.13	564			.065	.90	.95	.92
H ₂ : Invariance of lambdas	1636.69	606	43.56	42	.063	.89	.95	.92
H ₃ : Invariance of lambdas, phis, phos ¹	1692.93	630	65.86***	24	.062	.89	.95	.92
H ₄ : Invariance of lambdas, phis, phos, betas	1704.43	645	11.50	15	.061	.89	.95	.92

¹All factor variances and covariances were held to be equal across groups except for covariance between *self expression* and *attraction* ($\phi_{2\ 1}$) and the variance *place identity* and *place dependence* ($\psi_{2\ 1}$)

⁷For a more detailed discussion of invariance testing, see Byrne, 1998.

⁸The invariance of relations among second-order constructs was less substantively relevant to this study's purpose and therefore was not included in the invariance testing procedures.

- H₂: Equality of scaling (examines the similarity in the pattern of factor loadings across the four groups);
- H₃: Equality of factor variance/covariances (examines the similarity in the variances and covariances among the four groups); and
- H₄: Equality of structural coefficient estimates (examines the similarity of the regression paths for the four groups).

The focus of the tests of invariance discussed above explicitly examine the similarity of each groups' covariance structure. If we fail to reject these hypotheses, then we can conclude that the relationship (assuming there is a relationship) between activity involvement and place attachment is identical for all four groups of hikers. Rejection of these hypotheses, however, would imply that the covariance structure for each group differs, and thus, our hypothesized model will not fit each group in the same manner. Therefore, these hypotheses focus on the similarity/differences in the measurement and structural components of our hypothesized model, but do not specifically test our hypothesized model. For example, we hypothesized that each dimension of activity involvement would positively and significantly affect each dimension of place attachment for all four groups. It is possible that we could reject each of the above hypotheses (i.e., tests of invariance), which would suggest that the nature of the relationship between activity involvement and place attachment differed among the four groups, but still find support for our hypothesized model if the effect of activity involvement on place attachment were statistically significant. This would occur if these effects differed in magnitude among each of activity involvement and place attachment's dimensions.

Place Attachment and Activity Involvement

The models for the four groups were run simultaneously so that specific parameters of interest could be tested for significance. In testing for equality of structure (H₁), the pattern of fixed and free parameters was consistent with that specified in the *a priori* model. This first test examined the suitability of the imposed factor structure for the four groups of hikers; three dimensions of activity involvement and two dimensions of place attachment. The models were hypothesized to have the same pattern of fixed and free values in the matrices containing factor loadings, structural coefficients, and the variance/covariance matrices. Non-fixed parameters were not restricted to have the same value across groups in H₁. The fit of this unconstrained model, shown in Table 3, was considered adequate, thereby offering support for H₁ ($\chi^2_{(564)} = 1593.13$; RMSEA = .065; GFI = .90; CFI = .95; NFI = .92). This unconstrained model served as a point of comparison for H₂. The chi-square difference was used to assess support for equality constraints (Byrne, 1998).

The minimum condition for factorial invariance is the invariance of factor loadings (Marsh & Grayson, 1990). In this study, the fit of the model that required all factor loadings to be the same (H₂) was compared with the fit of the model that did not require this invariance (H₁). The chi-square

difference test (Byrne, 1998) did not indicate significantly worse fit ($\Delta\chi^2 = 43.56$; $\Delta df = 42$) and therefore the hypothesis of invariant factor variance/covariances was shown to be tenable. Therefore, we can conclude that the factor structure being tested does not vary across each of the groups of hikers.

The third hypothesis (H_3) required holding factor variance/covariances to be invariant across groups. The fit of this model was compared to the fit of the final model in H_2 . The chi-square difference test (Byrne, 1998) indicated significantly worse fit ($\Delta\chi^2 = 43.56$; $\Delta df = 27$) and therefore the hypothesis of invariant factor variance/covariances was rejected. The rejection of this hypothesis indicated variation among groups in factor variances and covariances. Successive independent tests were then conducted to determine which parameter estimates in the phi (Φ) and psi (Ψ) matrices were contributing to this overall matrix inequality. Consequently, all elements were constrained to be equal across the four groups of hikers except for the variance of *self expression* and *attraction* (ϕ_{2_1}) and *place identity* and *place dependence* (ψ_{2_1}). From the correlations among each of the constructs presented in Table 4, it can be seen that the correlation between *self expression* and *attraction* steadily decreased by type of hiker with the exception of *through hikers*. For the correlation between *place identity* and *place dependence*, the strength of the correlations declined from *overnight* through to *through hikers*.

For the final hypothesis test (H_4), the same procedure described for H_3 was used to test for invariant beta (β) weights. Model comparison with H_3 indicated this constraint did not significantly impair the model's fit indices ($\Delta\chi^2 = 11.50$; $\Delta df = 15$) and therefore the hypothesis of invariant beta weights was shown to be tenable. Consequently the strength and directionality of the beta weights was held to be equal for all four groups (see Table 3).

The standardized structure coefficients are presented in Table 5. These results fail to provide support for our hypothesis suggesting that the strength of the effect of activity involvement on place attachment would increase congruently with the length of hikers' visit along the AT (i.e., use behavior). More specifically, we hypothesized that each dimension of activity involvement would predict each dimension of place attachment and the effects of each predictor would increase with the length of visit to the AT. These results indicate that the effect of activity involvement on place attachment was relatively consistent for all four groups of hikers.

For all groups, *place identity* was positively and significantly predicted by *attraction* ($\beta = .27$, $t = 5.66$) and *self expression* ($\beta = .21$, $t = 3.86$), whereas *place dependence* was only predicted by *self expression* ($\beta = .28$, $t = 4.60$). All other structural coefficients were not significant. For all types of hikers, *place identity* was more strongly predicted by the dimensions of activity involvement (R^2 ranged from .22 to .23) than was *place dependence* (R^2 ranged from .04 to .05).

TABLE 4
Correlations Among Constructs

	Construct (<i>t</i> -value)				
	Self Expression <i>r</i> (<i>t</i> -value)	Attraction <i>r</i> (<i>t</i> -value)	Centrality <i>r</i> (<i>t</i> -value)	Place Identity <i>r</i> (<i>t</i> -value)	Place Dependence <i>r</i> (<i>t</i> -value)
<i>Day Hikers</i>					
Self Expression	1.0 (14.45)	—	—	—	—
Attraction	.78 (16.53)	1.0 (19.21)	—	—	—
Centrality	.66 (17.83)	.66 (19.27)	1.0 (26.03)	—	—
Place Identity	—	—	—	1.0 (15.75)	—
Place Dependence	—	—	—	.68 (18.28)	1.0 (21.00)
<i>Overnight Hikers</i>					
Self Expression	1.0 (14.45)	—	—	—	—
Attraction	.72 (14.77)	1.0 (19.21)	—	—	—
Centrality	.66 (17.83)	.66 (19.27)	1.0 (26.03)	—	—
Place Identity	—	—	—	1.0 (15.75)	—
Place Dependence	—	—	—	.70 (18.35)	1.0 (21.00)
<i>Section Hikers</i>					
Self Expression	1.0 (14.45)	—	—	—	—
Attraction	.62 (10.40)	1.0 (19.21)	—	—	—
Centrality	.66 (17.83)	.66 (19.27)	1.0 (26.03)	—	—
Place Identity	—	—	—	1.0 (15.75)	—
Place Dependence	—	—	—	.65 (15.17)	1.0 (21.00)
<i>Thru Hikers</i>					
Self Expression	1.0 (14.45)	—	—	—	—
Attraction	.74 (12.88)	1.0 (19.21)	—	—	—
Centrality	.66 (17.83)	.66 (19.27)	1.0 (26.03)	—	—
Place Identity	—	—	—	1.0 (15.75)	—
Place Dependence	—	—	—	.48 (10.03)	1.0 (21.00)

Note: Bolded correlation coefficients indicate freely estimated parameters across groups. All other correlations were held invariant.

Discussion

The theoretical expectation that activity involvement is an antecedent of place attachment was partially confirmed by these data. While it has been assumed that increasing activity involvement leads to increased attachments to recreation settings, the dimensionality of activity involvement and place attachment in addition to type of use (e.g., *day hikers*, *overnight hikers*, *section hikers*, and *through hikers*) suggests that this assumption may be superficial and misleading. In support of previous research (Havitz & Dimanche, 1997, 1999; Jorgensen & Stedman, 2001), it was shown that multidimensional measures of activity involvement and place attachment provide greater insight

TABLE 5
Structural Model Analysis

Direct Effects	β (Structure Coefficients)	<i>t</i> -value	R^2 (Total Coefficient of Determination)
<i>Day Hikers</i>			
Attraction \rightarrow Place Identity	.27	5.66	.23
Self Expression \rightarrow Place Identity	.21	3.86	
Centrality \rightarrow Place Identity	.03	.92	
Attraction \rightarrow Place Dependence	-.09	-1.71	.04
Self Expression \rightarrow Place Dependence	.28	4.60	
Centrality \rightarrow Place Dependence	-.03	-.84	
<i>Overnight Hikers</i>			
Attraction \rightarrow Place Identity	.27	5.66	.23
Self Expression \rightarrow Place Identity	.21	3.86	
Centrality \rightarrow Place Identity	.03	.92	
Attraction \rightarrow Place Dependence	-.09	-1.71	.04
Self Expression \rightarrow Place Dependence	.28	4.60	
Centrality \rightarrow Place Dependence	-.03	-.84	
<i>Section Hikers</i>			
Attraction \rightarrow Place Identity	.27	5.66	.22
Self Expression \rightarrow Place Identity	.21	3.86	
Centrality \rightarrow Place Identity	.03	.92	
Attraction \rightarrow Place Dependence	-.09	-1.71	.05
Self Expression \rightarrow Place Dependence	.28	4.60	
Centrality \rightarrow Place Dependence	-.03	-.84	
<i>Through Hikers</i>			
Attraction \rightarrow Place Identity	.27	5.66	.23
Self Expression \rightarrow Place Identity	.21	3.86	
Centrality \rightarrow Place Identity	.03	.92	
Attraction \rightarrow Place Dependence	-.09	-1.71	.04
Self Expression \rightarrow Place Dependence	.28	4.60	
Centrality \rightarrow Place Dependence	-.03	-.84	

into the nature of an individual's involvement with leisure activities and settings. While these measures have the potential to complicate interpretation, the information they provide extends beyond that provided by unidimensional scales. Given that activities and settings differ in terms the meanings recreationists derive from them, multidimensional measures are better equipped to tap into these meanings and provide researchers with profiles of their involvement or attachment rather than a single summative score where subjects can then only be placed along a continuum from low to high.

For all hikers, the statistically significant relationships suggested that as *self expression* and *attraction* increased, so too did respondents' scores on the *place identity* dimension. In other words, as (a) the importance and pleasure derived from hiking increased, and (b) the perceived self expressive

value of hiking increased, so too did respondents' emotional bond (self-identification) with the AT. Additionally, *self expression* had a significant and positive effect of *place dependence*. This relationship suggests that as the self expressive value of hiking increases, so too does hikers' dependence on the trail to provide specific leisure experiences.

The predictive power of the *self expression* dimension was unexpected in light of recent suggestions in the leisure literature indicating that *attraction* is the most robust predictor of psychological commitment; a construct that shares conceptual similarity with place attachment (Pritchard et al., 1999). Upon closer examination of *self expression* and *place identity* and the wording of their measures, however, the conceptual tie becomes more readily apparent in that they both provide information about an individual's external self (i.e., values that are expressed to others through the cognitive association of the self and an attitude object). This contention is also supported in the psychology literature examining ego-involvement. Greenwald's (1982) analysis of the psychology literature's various treatments of ego-involvement identified three different meanings of ego-involvement. One of these meanings, *impression management*, assists in helping to understand the relationships among these dimensions. Impression management refers to manipulations or treatments of ego-attitudes that reveal the external self.⁹ These treatments typically involved the performance of a task in front of an audience that reveals an aspect of the self. We contend that *self expression* and *place identity* reveal an aspect of the self similar to impression management. The distinguishing characteristic of *self expression* and *place identity* is the level of specificity at which they are both conceptualized and measured. For *self expression* the attitude object is an activity, whereas for *place identity* the attitude object is a geographic setting. Thus, the association of *self expression* (where the self is reflected in the activity) and *place identity* (where the self is reflected in the setting) is conceptually consistent.

For the *self expression—place dependence* relation, however, the association is less obvious. This relationship suggests that as the symbolic value of hiking increases, so too does AT hikers' dependence on the trail. For some hikers, it appears that expression of the self is best accomplished through hiking on the AT only. Clearly, much remains to be learned about the association between these two constructs. Future investigations should continue to examine these relationships in varied contexts.

Overall, the dimensions of activity involvement were better predictors of the *place identity* dimension than they were of *place dependence*. This may be due to the availability of substitute settings offered along the Appalachian Range. All along the eastern seaboard, from Georgia though Maine, literally hundreds of hiking trails intersect and run alongside the AT. While these

⁹While somewhat similar to Johnson and Eagly's (1989) analysis of ego-attitudes, Greenwald's analysis provides a stronger framework for understanding the relationship between these two constructs.

trails lack the popular reputation of the AT, they do represent viable alternatives with respect to experiences hikers seek. Thus, setting dependence may not be a strong component of hikers' place attachment which is also reflected in the mean of the *place dependence* component.

It is important to note that the primary attitude object measured by our activity involvement scale was hiking. Items were worded to measure an individual's involvement with hiking only. Additionally, two of the *place dependence* items refer to hiking. Given that a multitude of activities can be enjoyed along the length of the AT (e.g., birdwatching, botany, swimming, camping, picnicking, etc.), respondents may have had other primary activities of interest that can be enjoyed along the AT. While hiking is a necessary component of all users' experience along the trail,¹⁰ it is possible that *place dependence* may be a stronger component of other activities and, consequently, the effect of activity involvement could potentially be more pronounced. This highlights the difficulty in addressing involvement with activities such as hiking that potentially mask other activities or behaviors. Techniques in questionnaire design that allow respondents to identify their primary activity and then respond to questionnaire items may be better suited in such contexts.

While previous research has suggested that activity involvement is an antecedent to place attachment (McFarlane et al., 1998; Moore & Graefe, 1994; Schreyer & Lime, 1984) this research has been limited in explaining how the two constructs are related. Our results indicate that the *self expression* component of activity involvement was the strongest predictor of *place identity* and *place dependence*. It is also acknowledged that activity involvement is but one of several likely predictors of place attachment. Regardless of whether or not attached recreationists are considered an asset or burden to management, an understanding of how and why recreationists develop attachments to recreation settings may enable the agency to better design programs and maintain settings that are consistent with their level and type of attachment.

The separation of hikers by their self-reported use behavior and subsequent analysis of their covariance structures can also be considered a method of examining moderation effects for categorical and ordinal scaled variables. Had the tests of invariance (i.e., H_1 , H_2 , H_3 , and H_4) produced non-significant results (i.e., no variation among groups) convention would have required the pooling of samples and single group analysis only (Byrne, 1998; Jöreskog, 1971). It was shown that only the relationships between the involvement dimensions of *self expression* and *attraction* and the place attachment dimensions of *place identity* and *place dependence* varied by type of hiker (i.e., the rejection on of H_3). The pattern of these correlations presented in Table 4, at first, appear to make little sense. Viewed along with means of the items reported in Table 1, however, it appears that the correlations between these constructs declines as respondents level of activity involvement or attachment

¹⁰Bicycles, horses (with the exception of a small section), and motorized transportation are prohibited along most sections of the trail.

on these dimensions increases. This result suggests that the discriminant validity of the activity involvement and place attachment scales improves as respondents more readily identify with the attitude object used in the item wording. While this is likely to be a problem with most scales addressing subjects' attitudes toward stimuli, it does suggest the need to examine more closely the samples that investigators randomly draw from leisure settings. If we are to assess the performance of scales in measuring certain constructs, should we also examine more closely the characteristics of the sample these scales are being tested upon? Given the heterogeneity of recreating populations, tests of invariance among covariance structures provide a more rigorous and meaningful method of examining models of leisure behavior.

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