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Voluntary environmental programs at an alpine ski area: Visitor perceptions, attachment, value orientations, and specialization

Mark D. Needham*, Christopher M. Little

Department of Forest Ecosystems and Society, Oregon State University, Corvallis, OR 97331, USA

HIGHLIGHTS

- ► Examines how specialization, attachment, and values influence perceptions of VEPs.
- ► Data were from surveys of 429 visitors at Mt. Bachelor ski area in Oregon.
- ► Visitors did not know much about VEPs and few visited due to these programs.
- ► Many intended to visit more in the future if this area increases its VEPs.
- ► Specialization, attachment, and values influenced these perceptions of VEPs.

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ABSTRACT

This article examines visitor perceptions of voluntary environmental programs (VEPs) at the Mt. Bachelor ski area in Oregon, USA by examining what they know about VEPs, how these programs influence motivations to visit this area currently and in the future, and how place attachment, value orientations, and specialization influence these motivations and knowledge associated with VEPs. Data from an onsite survey of skiers and snowboarders ($n = 429$, 89.7% response rate) showed that few were knowledgeable of VEPs at this ski area or motivated to visit on their current trip because of these programs, but many intended to visit more often in the future if this area increases and promotes its VEPs. Respondents who were motivated to visit because of VEPs were more attached to this area and biocentric or environmentally oriented. Those who are likely to visit more often in the future if VEPs at this area increase were also more biocentric. Visitors who were knowledgeable about VEPs at this ski area were more biocentric, specialized in their activity, and attached to this area. Implications for management and future research are discussed.

1. Introduction

Alpine ski areas use resources such as water for snowmaking, energy for operating chairlifts, and forests and wildlife habitat for activity terrain. Environmental impacts at these areas include air pollution from maintenance equipment, as well as erosion, habitat fragmentation, exotic species introduction, and clearcutting on ski slopes (Tsuyuzaki, 1994; Watson, 1985). Ski areas have taken steps to reduce these impacts by implementing voluntary environmental programs (VEPs), which are "programs, codes, agreements, and commitments that encourage organizations to voluntarily reduce their environmental impacts beyond the requirements established by the environmental regulatory system" (Carmin, Darnall, & Mil-Homens, 2003, p. 528). In 2000, the United States National Ski Areas Association (NSAA) created the Sustainable Slopes Charter, an initiative developed with the Environmental Protection Agency, Forest Service, and other agencies to promote VEPs at ski areas (Rivera & de Leon, 2004). This charter encourages, but does not mandate, ski areas to mitigate negative impacts by adopting VEPs. Examples of VEPs in this charter include water and energy conservation, wildlife habitat protection, and waste and vegetation management (NSAA, 2012b). As of 2011, over 190 areas had endorsed this charter.

Research has examined VEPs at ski areas relative to environmental performance (e.g., Donohoe, 2004; George, 2003; Rivera & de Leon, 2004; Rivera, de Leon, & Koerber, 2006), stakeholder interests (Steelman & Rivera, 2006), and manager perspectives (Blust, 2004). Donohoe (2004), for example, evaluated the extent that ski areas have adopted the Sustainable Slopes Charter and found that although many areas were making progress

* Corresponding author. Tel.: +1 541 737 1498; fax: +1 541 737 1393.
E-mail address: mark.needham@oregonstate.edu (M.D. Needham).

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implementing charter principles, environmental ethics were important for distinguishing resorts that are demonstrating environmental leadership with a higher implementation rate. Blust (2004) examined perceptions of ski area managers regarding sustainability in this industry and found that reducing financial costs was one of the most important incentives to becoming more environmentally sustainable.

This body of research, however, has focused little on the importance of VEPs to winter visitors such as skiers and snowboarders, especially what they know about VEPs and if these programs may influence motivations to visit these areas presently and in the future. This article helps to address this knowledge gap by measuring visitor knowledge and motivations associated with VEPs, and examining if other cognitions such as place attachment, value orientations, and specialization may influence these motivations and knowledge. It is plausible that visitors who are knowledgeable about VEPs and motivated to visit a ski area because of these programs are strongly attached to the area, have more biocentric or environmentally oriented values, and are more skilled and committed to their activity. Understanding if these other cognitions influence knowledge and motivations associated with VEPs may help managers understand groups of visitors attracted to an area because of its VEPs and can assist in targeting advertising efforts.

2. Conceptual foundation

2.1. Knowledge about VEPs

Studies examining knowledge of tourists and recreationists regarding environmental issues such as wildlife diseases (e.g., Vaske, Needham, Stafford, Green, & Petchenik, 2006) and fossil fuel exploration (e.g., Teel, Bright, Manfredo, & Brooks, 2006), and conservation behaviors such as catch and release fishing (e.g., Sutton & Ditton, 2001) have found that many of these individuals are not highly knowledgeable of some environmental issues and behaviors. In the context of ski areas, for example, Holden (2000) reported that the majority of skiers were highly appreciative of the esthetic surroundings at these areas, but their knowledge about ecosystems and specific impacts at ski areas was low with less than 30% being aware of these issues. Similarly, Hudson and Ritchie (2001) also found a general lack of knowledge and even confusion among skiers about most environmental issues associated with this activity at ski areas.

Little is known, however, about visitor (e.g., skiers, snowboarders) knowledge of VEPs at alpine ski areas. Studies have identified ski area attributes that are important to visitors, but this does not mean that they are aware of every attribute at an area (e.g., Alexandris, Kouthouris, & Girgolas, 2007; Klenosky, Gengler, & Mulvey, 1993). Unlike well-known attributes such as chairlifts and terrain, VEPs are a relatively recent phenomenon at many ski areas, so this article examines what visitors know about these programs. Understanding how much visitors know about VEPs and if other cognitions influence this knowledge may allow ski area managers to assess the effectiveness of their marketing of environmental programs and performance.

2.2. Motivations and intentions associated with VEPs

Although visitors may or may not be knowledgeable about VEPs at a ski area, this does not necessarily mean that they are motivated to visit the area because of its participation in these programs. Motivations are internal or external factors arousing and directing human behavior (Iso-Ahola, 1999), and tourism and recreation motivations typically are reasons for participating in activities or visiting areas (Manfredo, Driver, & Tarrant, 1996). Motivations to visit an area *currently* or *on the present trip* have received substantial attention in the literature. Iso-Ahola (1999) identified two dimensions of these motivations. The first dimension, "seeking," involves motivations associated with searching for rewards from participation (e.g., challenge, competence). The second dimension is "escaping" or the desire to escape from life experiences (e.g., escape pressure, daily routine). The recreation experience preference (REP) scales are one of the most common measures of these motivations and contain over 300 social psychological motivations that can be grouped into fewer broad domains (e.g., exercise, exploration, escape; Manfredo et al., 1996). Most of these motivations are internal forces that "push" people to visit an area or engage in an activity (e.g., escape, relax, adventure, stress relief, challenge). There are also, however, external motivations that "pull" or attract people to an activity or destination such as ease of access, activities offered, reputation, and scenery (Dann, 1981). Motivations pulling individuals to an area tend to be related to features of the destination, whereas push factors tend to be internal cognitions that can be independent from these features. This push − pull framework is one approach for explaining motivations of why people visit an area on their current trip.

Studies at alpine ski areas have found that motivations pushing people to visit in the winter include excitement, relaxation, exercise, and testing skill and ability (e.g., Holden, 1999; Klenosky et al., 1993; Williams, Dossa, & Fulton, 1994). Attributes pulling visitors to these areas include terrain, scenery, snow conditions, number of runs, and ticket prices (e.g., Alexandris et al., 2007; Hudson & Shephard, 1998; Klenosky et al., 1993). The focus of this study is VEPs, which may be additional attributes that pull visitors to a ski area on their current trip.

Motivations to visit an area or participate in an activity *in the future* are related to the concept of behavioral intentions, and research has shown that an individual's future behavior can be partially predicted by his or her intention to perform that behavior (Fishbein & Ajzen, 1975). Hudson and Ritchie (2001) found that some skiers intended to visit alpine ski areas in the future if these areas were considered to be environmentally responsible instead of ski areas not addressing environmental performance. Many skiers in their study also intended to pay more to visit ski areas attempting to reduce environmental impacts. This article builds on this research by examining intentions to visit a ski area in the future if it promotes and adopts more VEPs.

2.3. Place attachment

It is possible that visitors who feel highly attached to a ski area may be more aware of its VEPs and motivated to visit because of these types of programs. Place attachment identifies bonds between people and places, and "what begins as undifferentiated space becomes place as we get to know it better and endow it with value" (Tuan, 1977, p. 6). A number of dimensions related to place attachment have been reported in the literature (e.g., belongingness, rootedness, bonding), but the most commonly studied are place dependence and identity (Hammitt, Kyle, & Oh, 2009; Kyle, Graefe, & Manning, 2005; Williams & Vaske, 2003). Place dependence is the functionality associated with an area and is represented by its physical characteristics (e.g., snow, terrain; Proshansky, Fabian, & Kaminoff, 1983). Place identity refers to emotional ties to a place, can develop over time, and is related to symbolic meanings of an area (Proshansky et al., 1983). People engender connections to places through these functional and emotional associations.

Place attachment has received considerable research attention and has been applied to many activities and settings (see Manning,

2011; Williams & Vaske, 2003 for reviews). Studies have also examined this concept relative to cognitions such as motivations, intentions, and knowledge. A few studies have modeled cognitions such as motivations as antecedent to place attachment, suggesting that they influence attachment (e.g., Kyle, Mowen, & Tarrant, 2004). The majority of studies, however, consider place attachment as an independent variable, especially when cognitions such as motivations focus on specific characteristics pulling visitors to a site (e.g., setting attributes, management programs) instead of general motivations for participating in activities (e.g., Kyle, Graefe, & Manning, 2004; White, Virden, & van Riper, 2008). Stedman (2002), for example, found that people who felt attached to a place were more likely to intend to engage in behaviors that maintained or enhanced setting attributes. Similarly, studies of skier and snowboarder attachment have shown that those who are more attached to a particular place are often more sensitive to impacts in the area and can have different motivations for visiting than those who are less attached (Fredman & Heberlein, 2005; Gibbons & Ruddell, 1995). It is plausible, therefore, that visitors who are highly attached to an alpine ski area may be more knowledgeable of its VEPs and consider these programs to be a reason why they visited on their current trip and intend to visit the area again in the future. The following hypotheses, therefore, are examined in comparison to visitors who do not feel much attachment to a ski area:

H_1: Visitors attached to a ski area will be more motivated to visit on their current trip because of its VEPs.
H_2: Visitors attached to a ski area will intend to visit more in the future if the area increases its VEPs.
H_3: Visitors attached to a ski area will be more knowledgeable about its VEPs.

2.4. Value orientations

Visitors are heterogeneous in how attached they are to a setting; some people feel highly connected to a site, whereas others may feel little attachment. As a result, researchers often classify visitors into smaller more homogeneous groups based on characteristics such as their amount of attachment. Studies have also grouped people by other cognitions such as their value orientations (e.g., Fulton, Manfredo, & Lipscomb, 1996; Needham, 2010). Value orientations are revealed through the pattern and intensity of basic beliefs about general classes of objects such as wildlife, forests, and the environment (Fulton et al., 1996; Vaske & Donnelly, 1999), and often factor into bipolar continuums such as protection – use (Fulton et al., 1996; Needham, 2010) and biocentric – anthropocentric (Steel, List, & Shindler, 1994; Vaske & Donnelly, 1999). Biocentric or protectionist orientations are more nature centered and support the value of ecosystems and species, whereas anthropocentric or use orientations represent a more human centered view by considering humans as more important than the environment. These orientations are not mutually exclusive; they can be arrayed along continuums with biocentric or protectionist orientations at one end and anthropocentric or use at the other. The midpoint represents a mix of these extremes.

Studies have examined value orientations toward forests (e.g., Steel et al., 1994; Vaske & Donnelly, 1999), wildlife (see Manfredo, Teel, & Bright, 2003; Vaske & Needham, 2007 for reviews), coral reefs (Needham, 2010), and more general environmental issues (e.g., Dunlap, Van Liere, Mertig, & Jones, 2000). A few studies have also examined relationships between these orientations and both motivations and intentions. Manfredo et al. (2003), for example, found that environmentally oriented individuals were less motivated to hunt wildlife. Vaske and Donnelly (1999) reported that people with a biocentric orientation toward wilderness and forests were more likely to intend to vote in favor of protecting these natural resources. Little research, however, has examined environmental value orientations of visitors at ski areas, which may be important for understanding their motivations, intentions, and knowledge associated with visiting areas with VEPs. Individuals with a biocentric or environmental orientation, for example, may be more knowledgeable of VEPs and motivated to visit ski areas participating in these programs because of their environmental focus. The following hypotheses, therefore, are advanced in comparison to visitors with a more anthropocentric orientation toward the environment:

H_4: Visitors with a biocentric value orientation will be more motivated to visit a ski area on their current trip because of its VEPs.
H_5: Visitors with a biocentric value orientation will intend to visit a ski area more in the future if the area increases its VEPs.
H_6: Visitors with a biocentric value orientation will be more knowledgeable about VEPs at a ski area.

2.5. Recreation specialization

Similar to value orientations, the concept of recreation specialization has also been used for classifying and understanding groups of visitors. Specialization has been conceptualized as "a continuum of behavior from the general to the particular, reflected by equipment and skills used in the sport and activity setting preferences" (Bryan, 1977, p. 175). At one end of this continuum are generalists or novices who have little experience or commitment to a particular activity. At the other end are more specialized individuals who are highly committed, experienced, and skilled in the activity. Individuals are thought to progress to higher stages along this continuum reflected by increasing participation, skill, and commitment (see Bryan, 1977; Manning, 2011; Needham, Vaske, Donnelly, & Manfredo, 2007; Scott & Shafer, 2001 for reviews).

Researchers generally agree that specialization is a multidimensional concept, consisting of behavioral, cognitive, and affective components (McFarlane, 2004; Scott & Shafer, 2001). Indicators of the behavioral dimension include equipment investment and previous participation experience (e.g., Ditton, Loomis, & Choi, 1992). Cognitive indicators include self-reported skill level and knowledge about an activity (e.g., Needham, Rollins, & Vaske, 2005). Affective indicators include centrality to lifestyle and commitment (e.g., McIntyre & Pigram, 1992). Research has shown that affective indicators such as centrality may be the most important measures of specialization, followed by cognitive characteristics such as skill and behaviors such as equipment purchases and frequency of participation (Lee & Scott, 2004; Needham et al., 2007).

Specialization has been studied relative to several other concepts, including motivations, environmental behavior, and perceptions about management (see Manning, 2011; Scott & Shafer, 2001 for reviews). A few studies have suggested that cognitions such as motivations influence specialization and related concepts (e.g., Kyle, Absher, Hammitt, & Cavin, 2006). Most studies, however, treat specialization as an independent variable particularly when cognitions such as motivations focus on specific characteristics that pull people to an area (e.g., setting attributes, management programs) instead of general motivations for engaging in activities (e.g., Kyle, Graefe, et al., 2004; Lee, Graefe, & Li, 2007; White et al., 2008). Chipman and Helfrich (1988), for example, found that specialized anglers were motivated to catch trophy size fish and visit places with catch and release fishing. Studies examining specialization of visitors at ski areas have shown that those who are

highly specialized tend to be more motivated by and sensitive to both environmental and social conditions (e.g., Needham et al., 2005; Ormiston, Gilbert, & Manning, 1998; Thapa & Graefe, 2003; Vaske, Dyar, & Timmons, 2004). Research on other activities has also shown that specialists tend to be most likely to support environmental and conservation practices (e.g., leave no trace, volunteer or donate to environmental causes; Dyck, Schneider, Thompson, & Virden, 2003; Hvenegaard, 2002). Oh and Ditton (2008), for example, found that visitor concerns about the environment and conservation increased with specialization. It is conceivable, therefore, that more specialized skiers and snowboarders may be more knowledgeable about VEPs at alpine ski areas and motivated to visit areas attempting to mitigate negative impacts by supporting these types of environmental programs. The following hypotheses, therefore, are examined in comparison to visitors who are not highly specialized in their activity:

H_7: Specialized visitors will be more motivated to visit a ski area on their current trip because of its VEPs.
H_8: Specialized visitors will intend to visit a ski area more in the future if the area increases its VEPs.
H_9: Specialized visitors will be more knowledgeable about VEPs at a ski area.

Specialization is also often correlated with other cognitions such as place attachment. Bricker and Kerstetter (2000), for example, found that among whitewater enthusiasts, place identity was positively related to activity experience. Similarly, Hammitt, Backlund, and Bixler (2004) reported that more experienced anglers felt a stronger bond to some fishing locations, and Kyle, Graefe, Manning, and Bacon (2003) found that hikers who were most experienced in this activity reported higher place identity with a specific trail than those who were less experienced. The following hypothesis, therefore, is advanced in the context of skiers and snowboarders:

H_{10}: More specialized visitors to a ski area will be more attached to this area.

3. Methods

3.1. Study site and context

Data were collected at the Mt. Bachelor ski area in central Oregon, USA for two reasons. First, this ski area is one of the largest in the country, has over 350 inches of snow most winters, and its summit of 9065 feet is the highest of all ski areas in the USA's Pacific Northwest, creating a vertical drop of over 3000 feet. Mt. Bachelor's seven express chairlifts provide access to over 3500 acres of terrain and more than 70 ski runs. This ski area receives over 500,000 skier and snowboarder visits every winter, allowing the ability to obtain a large sample of respondents. Mt. Bachelor is located 22 miles from the city of Bend and its population of over 80,000 residents.

Second, Mt. Bachelor has a history of adopting managerial and operational VEPs to reduce emissions and support conservation. This ski area, for example, purchases its power from renewable energy sources, actively uses recycling and waste reduction programs, and operates bio-fuel powered shuttles to transport guests and employees to and from the area (Mt. Bachelor, 2012). In 1994, Mt. Bachelor was the first ski area to win the prestigious Golden Eagle Award for environmental excellence presented by the National Ski Areas Association (NSAA, 2012a). According to the environmental group, Ski Area Citizens Coalition (SACC, 2009), Mt. Bachelor ranked ninth among all ski areas in the nation for environmental stewardship in 2008 and 2009.

3.2. Data collection

Methods were similar to those in other studies of winter visitors at alpine ski areas (e.g., Klenosky et al., 1993; Ormiston et al., 1998; Thapa & Graefe, 2003; Vaske et al., 2004). An onsite survey of adult skiers and snowboarders was conducted at the Mt. Bachelor ski area (i.e., 18 years of age and older). Employees of this ski area and visitors under the age of 18 were not surveyed because of university institutional review board and regulatory compliance protocols regarding research on human subjects that discouraged data collection on employees and visitors under the age of 18. Data were collected onsite using questionnaires administered from the middle of January to end of March 2010 during which sampling days were randomly selected with the number averaging five days per week. Sampling occurred from 11:30 a.m. to 3:00 p.m. in restaurant facilities on the mountain and at its base. On each sampling day, one of the three dining facilities (Pine Marten Lodge, West Village Lodge, Sunrise Lodge) was randomly selected for sampling and potential respondents were approached at these facilities using a systematic random sampling method where every fifth table was systematically selected after randomly choosing a starting table (Vaske, 2008). At each table, the person in each household with the most recent birthday was asked to complete a questionnaire. If all individuals were from different households, they were each asked to complete questionnaires. If a person refused to participate, was under 18 years of age or an employee, or had already answered a questionnaire, a person at the next table was selected. Questionnaires took approximately 10–15 minutes to complete and after an onsite pilot test of this instrument, the final sample size was $n = 429$ ($n = 303$ skiers, $n = 126$ snowboarders) with an overall response rate of 89.7%.

3.3. Analysis variables

Multiple variables and response scales were used for measuring knowledge of VEPs (12 items, Table 1), current trip motivations related to VEPs (8 items, Table 2), future visit intentions related to VEPs (14 items, Table 3), place attachment (6 items, Table 4), environmental value orientations (10 items, Table 5), and specialization (15 items, Table 6). Similar to Vaske et al. (2006), knowledge was measured using a true/false format with statements identifying VEPs that were and were not occurring at Mt. Bachelor. Most of these statements were based on lists of VEPs that were occurring at this ski area and these lists were provided on this ski area's internet website and during discussions with managers of this area (Mt. Bachelor, 2012; Table 1). These variables measuring knowledge of VEPs were asked early in the questionnaire before the other questions used in this article to avoid any potential order effects or starting point bias. Responses were recoded as 0 "did not answer correctly" and 1 "answered correctly," and total knowledge of VEPs at this ski area was calculated by summing correctly answered questions. Current trip motivations related to existing VEPs were measured with reasons associated with programs that were already occurring at Mt. Bachelor that could pull people to visit this ski area, and these items were informed by this ski area's managers and website (Table 2). Respondents reported the extent that they disagreed or agreed that each existing VEP influenced them to visit this ski area on their current trip. Future intentions to visit Mt. Bachelor in response to VEPs were measured with questions asking if respondents would change how often they would visit in the future if the number of existing VEPs was increased or new VEPs were added (Table 3).

Items measuring place attachment (Table 4) were identical to those in many other studies and included questions measuring both place dependence and identity (see Williams & Vaske, 2003

Table 1
Visitor knowledge of VEPs currently existing at Mt. Bachelor.

VEP knowledge statements – Are these true/false at Mt. Bachelor[b]:	Correct response	Percent correct (%)[a]			χ^2-value	*p*-value	ϕ
		Skiers	Snowboarders	Total			
Has a recycling program	True	70	66	68	0.67	.411	.04
Conserves water by never using snowmaking equipment	False	42	41	42	0.04	.848	.01
Uses energy efficient lighting in facilities	True	28	23	27	1.13	.289	.05
Provides incentives to visitors who carpool to this ski area	False	24	26	25	0.18	.673	.02
Uses bio-diesel to fuel some of its vehicles	True	24	24	24	0.00	.999	.00
Purchases all food related products from local suppliers	False	21	25	22	0.93	.335	.05
Has reintroduced native wildlife animals on the mountain	False	20	16	20	1.10	.294	.05
Promotes a "no vehicle idling" program in parking/drop off areas	True	10	15	12	2.61	.106	.08
Purchases 100% of its power from renewable energy sources	True	11	11	11	0.02	.901	.01
Donates 5% of ticket revenue to local environmental organizations	False	10	14	11	1.43	.232	.06
Allows visitors to buy a "green tag" to help offset vehicle emissions	True	7	15	9	7.11	.008	.14
Has won awards for environmental conservation	True	8	12	9	1.96	.161	.07

[a] Responses originally measured on 5-point scales of 1 = very certain this is false, 2 = somewhat certain this is false, 3 = unsure, 4 = somewhat certain this is true, 5 = very certain this is true. Responses of 1 = very certain this is false and 2 = somewhat certain this is false were recoded as a "false" response, and 4 = somewhat certain this is true and 5 = very certain this is true were recoded as a "true" response. A response of 3 = unsure was coded as an incorrect response.
[b] Correct responses/total responses (total percentage of respondents): 0/12 (18%), 1/12 (16%), 2/12 (18%), 3/12 (13%), 4/12 (15%), 5/12 (7%), 6/12 (8%), 7/12 (5%), 8/12 (1%), 9/12 (1%), 10/12 (0%), 11/12 (0%), 12/12 (0%). Mean = 2.71/12 (skiers), 2.86/12 (snowboarders), 2.76/12 (total). The total number of correct responses was used in the multivariate SEM models analyzed in this article (e.g., Fig. 1). There were no differences in mean knowledge scores between skiers and snowboarders, $t = 0.64$, $p = .522$, $r_{pb} = .03$.

for a review). Value orientations were measured using Dunlap et al.'s (2000) revised New Ecological Paradigm (NEP) scale and included both anthropocentric and biocentric statements (Table 5). Consistent with other studies (e.g., McFarlane, 2004; Needham et al., 2007), skiing or snowboarding specialization was measured in terms of affective, cognitive, and behavioral dimensions. Multiple variables measured the affective dimension of centrality to lifestyle, cognitive dimension of self-reported skill, and behavioral dimension of equipment for skiing or snowboarding (Table 6). An additional behavioral dimension of past experience was measured with a single item where respondents reported how many years they had skied or snowboarded in their life. To control for age, this experience was expressed as a percentage and calculated as:

Number of years spent skiing or snowboarding in life/age*100
= proportion of life spent skiing or snowboarding

These items are consistent with those in Barro and Manfredo (1996) and Needham et al. (2007).

3.4. Data analysis

Percentages, chi-square tests and *t*-tests, and phi (φ) and point–biserial correlation (r_{pb}) effect size statistics described responses to all variables and tested for differences between skiers and snowboarders. Cronbach alpha coefficients measured reliability of the multiple-item indices. Reliability is the internal consistency or inter-correlation among variables, and alpha coefficients $\geq$.65 and item total correlations $\geq$.40 generally suggest that variables are reliably measuring the same concept and justify combining them in further analyses (Vaske, 2008). Knowledge of VEPs was an observed manifest variable of the summed true/false responses. SPSS 19.0 software was used for these analyses. Confirmatory factor analysis (CFA) then examined if variables measuring these concepts demonstrated construct validity, which is how variables and concepts relate to each other, and is demonstrated if variables are explained by latent concepts (Vaske, 2008). Similar to Needham et al. (2007), construct validity of variables measuring the specialization dimensions (centrality, skill, equipment, experience) was assessed with a second-order CFA to test if variables measuring these first-order factors had acceptable factor loadings and provided a good fit, and if these factors were explained by a higher second-order factor (i.e., specialization). Factor loadings should generally be $\geq$.40 (Byrne, 1994).

Structural equation modeling (SEM) then tested relationships examining if place attachment, value orientations, and specialization each influence motivations, intentions, and knowledge associated with VEPs. SEM is a statistical technique somewhat similar to regression path analysis for estimating relationships among latent concepts often derived from multiple variables (Vaske, 2008). Although SEM has traditionally been used to test and confirm models where all concepts are linked together based on larger

Table 2
Visitor current trip motivations associated with VEPs currently existing at Mt. Bachelor.

VEP motivations – I visited Mt. Bachelor today because it:	Percent agree (%)[a]			CFA factor loading	Item total correlation	Alpha if item deleted[c]
	Skiers	Snowboarders	Total			
Participates in recycling[b]	15	27	19	.83	.84	.97
Uses renewable energy (wind, solar)[b]	10	19	13	.89	.88	.97
Tries to reduce their emissions	10	15	12	.92	.91	.97
Uses energy efficient facilities[b]	8	15	10	.94	.93	.97
Is committed to environmental conservation	8	15	10	.90	.89	.97
Is concerned about effects of ski areas on climate change	9	11	10	.90	.85	.97
Is an environmental leader in the ski industry	7	13	9	.91	.90	.97
Has won awards for environmental conservation	5	10	7	.92	.91	.97

[a] Measured on 5-point scales of 1 = strongly disagree to 5 = strongly agree. Cell entries are only percent 4 = agree or 5 = strongly agree. The full original 5-point scale, however, was retained for the Cronbach alpha reliability, CFA, and multivariate SEM models analyzed in this article (e.g., Fig. 1). Aggregate scale means = 2.77/5.00 (skiers), 2.89/5.00 (snowboarders), 2.81/5.00 (total).
[b] Variables were significantly different between skiers and snowboarders ($\chi^2 \leq 6.84$, $p \leq .040$, $\phi \leq .13$).
[c] Overall Cronbach alpha reliability = .98.

Table 3
Visitor intentions to visit more often in the future if the number of existing VEPs was increased or new VEPs were added at Mt. Bachelor.

VEP future visit – How would you change how often you visit if Mt. Bachelor:	Percent visit more often (%)[a]			CFA factor loading	Item total correlation	Alpha if item deleted[b]
	Skiers	Snowboarders	Total			
Offered incentives to people who carpool (e.g., park closer to chairlifts)	38	38	38	.74	.78	.97
Used as many products as possible from local suppliers	38	36	38	.82	.87	.97
Did more to inform visitors of its environmental conservation programs	39	32	37	.83	.84	.97
Offered food supplies that are more sustainable/biodegradable	36	30	34	.87	.87	.97
Donated a portion of revenue to environmental organizations	34	30	33	.81	.83	.97
Encouraged more people to use public transportation to this ski area	33	34	33	.68	.71	.97
Used more energy efficient facilities	33	28	32	.94	.91	.97
Was a top ranked ski area in environmental conservation	32	31	31	.87	.85	.97
Used as many recycled products as possible	31	26	30	.94	.90	.97
Did more to reduce their emissions	31	25	29	.93	.90	.97
Donated a portion of revenue to offset vehicle emissions	30	26	29	.78	.81	.97
Was more committed to environmental conservation	29	23	28	.88	.87	.97
Increased their recycling program	28	25	27	.90	.87	.97
Won more awards for environmental conservation	25	23	24	.88	.85	.97

[a] Measured on 5-points scales of 1 = visit much less often, 2 = visit slightly less often, 3 = visit about the same, 4 = visit slightly more often, 5 = visit much more often. Cell entries are only percent 4 = visit slightly more often or 5 = visit much more often. The full original 5-point scale, however, was retained for the Cronbach alpha reliability, CFA, and multivariate SEM models analyzed in this article (e.g., Fig. 1). Aggregate scale means = 3.39/5.00 (skiers), 3.35/5.00 (snowboarders), 3.38/5.00 (total). No variables differed between skiers and snowboarders.
[b] Overall Cronbach alpha reliability = .98.

encompassing theories (e.g., Maruyama, 1998), it does allow the potential for some exploratory modeling by specifying a possible corresponding model and using data to estimate the values of specific parameters (e.g., Bollen & Long, 1993; Byrne, 1994). Little research has examined visitor perceptions of VEPs, especially at alpine ski areas. As discussed earlier, however, most of the relationships among concepts specified in the hypotheses have been supported by several studies in other contexts (e.g., influence of place attachment on motivations for visiting a place, influence of environmental value orientations on knowledge and intentions associated with natural resource issues).

EQS 6.1 software and its Satorra–Bentler Robust estimation procedure to correct for multivariate non-normality were used for these CFA and SEM analyses because multivariate skewness, kurtosis, and the Mardia's coefficient of 71.10 indicated some violations of the normal distribution assumption required for these types of analyses. Although most variables in the data were relatively normally distributed, CFA and SEM analysis also typically assume multivariate normality, which is when variables are not only normally distributed individually, but also with respect to the other variables and concepts being examined (Bollen & Long, 1993). The Mardia's coefficient offers one test for multivariate normality and should be close to zero and generally less than three or four to assume normality and allow the default maximum likelihood estimation procedure to be used for model evaluation (Maruyama, 1998). When these parameters are not met, the Satorra–Bentler Robust estimation procedure is one approach for correcting potential bias introduced when data are not multivariate normal in distribution (Byrne, 1994). Model evaluation, therefore, was based on the Satorra–Bentler scaled chi-square (S-B χ^2) and Robust corrected comparative fit index (CFI*), non-normed fit index (NNFI*), incremental fit index (IFI*), root mean square error of approximation (RMSEA*), and normed χ^2/df (* denotes Robust estimation and correction). CFI*, NNFI*, and IFI* values $\geq$.90, RMSEA* values $\leq$.08, and normed χ^2/df ratios of 2:1 to 5:1 generally suggest acceptable model fit (Browne & Cudeck, 1993; Byrne, 1994). Consistent with this approach, Robust corrected standard errors were used for test statistics and errors were not correlated (Byrne, 1994).

4. Results

4.1. Descriptive findings

In total, 56% of respondents were male and 44% were female with 60% of snowboarders being male and 57% of skiers being male, but this difference was not statistically significant, $\chi^2 = 0.17$, $p = .677$, $\varphi = .02$. The average age of respondents was 39.8 years, but skiers were significantly older ($M = 43.4$ years) than snowboarders ($M = 30.5$ years), $t = 11.43$, $p < .001$. Using guidelines from Cohen (1988) and Vaske (2008), the point–biserial correlation effect size of $r_{pb} = .42$ suggests that this difference in age between groups was "large" or "substantial," respectively. Over 87% of respondents had visited Mt. Bachelor previously, whereas 13% were first time visitors on the day they were surveyed. There was no

Table 4
Visitor place attachment associated with Mt. Bachelor.

Place identity and dependence variables	Percent agree (%)[a]			CFA factor loading	Item total correlation	Alpha if item deleted[c]
	Skiers	Snowboarders	Total			
Mt. Bachelor is one of the best places for doing what I like to do	74	68	72	.71	.64	.87
Mt. Bachelor is very special to me[b]	63	50	59	.85	.71	.86
I am very attached to Mt. Bachelor	42	37	41	.91	.78	.85
I identify strongly with Mt. Bachelor	35	27	33	.86	.82	.84
No other place compares to Mt. Bachelor[b]	19	30	22	.50	.56	.88
I would not substitute any other area for doing what I do at Mt. Bachelor	13	15	13	.63	.67	.87

[a] Measured on 5-point scales of 1 = strongly disagree to 5 = strongly agree. Cell entries are only percent 4 = agree or 5 = strongly agree. The full original 5-point scale, however, was retained for the Cronbach alpha reliability, CFA, and multivariate SEM models analyzed in this article (e.g., Fig. 1). Aggregate scale means = 3.23/5.00 (skiers), 3.16/5.00 (snowboarders), 3.21/5.00 (total).
[b] Variables were significantly different between skiers and snowboarders ($\chi^2 \leq 6.43$, $p \leq .015$, $\phi \leq .12$).
[c] Overall Cronbach alpha reliability = .88.

Table 5
Visitor environmental value orientations.

NEP anthropocentric and biocentric statements	Percent agree (%)[a]			CFA factor loading	Item total correlation	Alpha if item deleted[c]
	Skiers	Snowboarders	Total			
Humans are severely abusing the environment	70	71	70	.80	.75	.88
Plants and animals have as much right as humans to exist	67	73	69	.67	.61	.89
When humans interfere with nature, it often produces disastrous consequences	58	60	58	.73	.69	.89
If things continue on their present course, we will soon experience a major ecological catastrophe	59	57	58	.74	.70	.89
The balance of nature is very delicate and easily upset	59	55	58	.69	.64	.89
We are approaching the limit of the number of people the earth can support	52	50	51	.67	.62	.89
Humans have the right to modify the natural environment to suit their needs[b]	28	29	28	.56	.55	.90
The so-called ecological crisis facing humankind has been greatly exaggerated[b]	18	17	17	.71	.66	.89
Humans were meant to rule over the rest of nature[b]	14	17	15	.70	.69	.89
The balance of nature is strong enough to cope with impacts of modern industrial nations[b]	12	13	12	.65	.61	.89

[a] Measured on 5-point scales of 1 = strongly disagree to 5 = strongly agree. Cell entries are only percent 4 = agree or 5 = strongly agree. The full original 5-point scale, however, was retained for the Cronbach alpha reliability, CFA, and multivariate SEM models analyzed in this article (e.g., Fig. 1). Aggregate scale means = 3.62/5.00 (skiers), 3.63/5.00 (snowboarders), 3.62/5.00 (total). No variables differed between skiers and snowboarders.
[b] Variables reverse coded for reliability, CFA, and SEM analyses.
[c] Overall Cronbach alpha reliability = .90.

significant difference in repeat visitation between skiers (88% previously visited) and snowboarders (82%), $\chi^2 = 2.33$, $p = .127$, $\varphi = .08$. In total, 29% of respondents resided in communities within approximately 60 miles (100 km) of Mt. Bachelor (e.g., Bend, Redmond), but most were tourists visiting from other areas of Oregon (37%) or other states (32%) and countries (2%). Snowboarders (39%) were more likely than skiers (25%) to be from local communities, whereas skiers (40%) were slightly more likely than snowboarders (30%) to live in other areas of Oregon, $\chi^2 = 12.87$, $p = .005$, $\varphi = .16$. These characteristics are consistent with those reported by internal marketing and consulting studies of adult visitors at Mt. Bachelor, suggesting that the data are likely quite representative of visitors.

Responses to the 12 true/false questions about VEPs at this ski area showed that visitors were most knowledgeable about recycling at this area, as 70% of skiers and 66% of snowboarders knew that there was a recycling program (Table 1). Less than half of respondents, however, answered the other questions correctly. Only 27% of respondents, for example, knew that Mt. Bachelor uses energy efficient lighting and 24% knew that it uses bio-diesel to fuel some of its vehicles. The fewest respondents (9%) were aware that this ski area had received awards for environmental conservation. There were no significant differences between skier and snowboarder answers to 11 of 12 questions, $\chi^2 \leq 2.61$, $p = .106$ to .999. Snowboarders (15%) were significantly more aware than skiers (7%)

Table 6
Visitor degree of specialization in skiing or snowboarding.

Specialization dimensions and variables	Percent agree (%)			CFA factor loading	Item total correlation	Alpha if item deleted	Cronbach alpha[f]	2nd order CFA
	Skiers	Snowboarders	Total					
Centrality[a]							.85	.90
If I stopped participating, an important part of my life would be missing	75	70	73	.80	.70	.81		
Participation in this activity is a large part of my life	54	54	54	.87	.77	.79		
This activity is becoming a more important part of my life each year[d]	39	58	45	.50	.55	.85		
I would rather participate in this activity than do most anything else[d]	39	50	43	.81	.77	.78		
Most recreation activities do not interest me as much as this activity	38	44	40	.56	.55	.84		
Skill							.78	.81
Given skills I have developed, it is important that I continue to participate[a]	76	75	76	.57	.52	.75		
I am becoming more skilled in this activity each year[a,d]	64	78	69	.41	.41	.78		
Self-reported skill level[b,d]	63	49	59	.81	.56	.73		
Testing my skills in this activity is very important to me[a]	56	62	58	.64	.65	.70		
I feel that I am more skilled in this activity than most other people[a,d]	52	33	46	.83	.63	.71		
Equipment[a]							.87	.79
I have accumulated a lot of equipment for this activity	65	68	66	.80	.76	.82		
I have invested a lot of money on equipment for this activity	68	60	66	.82	.74	.83		
I am obtaining more equipment for this activity each year	35	43	38	.70	.67	.86		
I spend a lot of time learning about the newest equipment for this activity	22	22	22	.79	.73	.83		
Experience[c,e]	58	32	50	–	–	–	–	.45

[a] Measured on 5-point scales of 1 = strongly disagree to 5 = strongly agree. Cell entries are only percent 4 = agree or 5 = strongly agree unless specified otherwise (e.g., self-reported skill level, experience). The full original 5-point scale, however, was retained for the Cronbach alpha reliability, CFA, and multivariate SEM models analyzed in this article (e.g., Fig. 1).
[b] Measured as 1 = beginner, 2 = novice, 3 = intermediate, 4 = advanced, 5 = expert. Cell entries are only percent 4 = advanced or 5 = expert. The full original 5-point scale, however, was retained for the Cronbach alpha reliability, CFA, and multivariate SEM models analyzed in this article (e.g., Fig. 1).
[c] Item calculated by (number of years in life participating in activity/age *100) = proportion of life skied or snowboarded. Cell entries are mean proportions (%).
[d] Variables were significantly different between skiers and snowboarders ($\chi^2 \leq 14.01$, $p \leq .045$, $\phi \leq .18$).
[e] Variable was significantly different between skiers and snowboarders ($t = 10.21$, $p < .001$, $r_{pb} \leq .21$).
[f] Overall specialization index Cronbach alpha reliability = .91.

that Mt. Bachelor offers the purchase of a "green tag" to help offset vehicle emissions, $\chi^2 = 7.11$, $p = .008$. The phi effect size of $\varphi = .14$, however, shows that the strength of this difference was "minimal" (Vaske, 2008) or "small" (Cohen, 1988).

Although the overall knowledge score could range from 0 (i.e., no questions answered correctly) to 12 (i.e., all correct), the highest score was 9 (i.e., 75% answered correctly) and only 1% of respondents answered this many questions correctly. On average, visitors answered only 2.76 of the 12 questions correctly (i.e., 23%) with the highest proportions answering no questions correctly (18%) or just two questions correctly (18%). There was no significant difference in average knowledge scores between skiers ($M = 2.71$ answered correctly) and snowboarders ($M = 2.86$), $t = 0.64$, $p = .522$, $r_{pb} = .03$. Taken together, skiers and snowboarders were not highly knowledgeable of existing VEPs at the Mt. Bachelor ski area.

Similarly, fewer than 20% of respondents were motivated to visit Mt. Bachelor on their current trip because of existing VEPs at this ski area (Table 2). Only 19% of respondents, for example, agreed that they visited this ski area because it participates in recycling and 12–13% visited because of its renewable energy use and emission reduction strategies. Only 10% or fewer respondents visited because of this ski area's use of energy efficient facilities, commitment to conservation, concerns about effects of climate change, environmental leadership in the industry, and receipt of environmental awards. There were a few differences between activity groups with snowboarders being slightly more motivated than skiers to visit because this ski area recycles and uses renewable energy and efficient facilities, but effect sizes revealed that these differences were "minimal" (Vaske, 2008) or "small" (Cohen, 1988), $\chi^2 \leq 6.84$, $p \leq .040$, $\varphi \leq .13$.

On the other hand, 24–38% of respondents intend to visit Mt. Bachelor more often in the future if this ski area promotes and increases its existing VEPs or adds new VEPs (Table 3). The largest proportions of respondents intend to visit more often if Mt. Bachelor offers incentives to people who carpool to this ski area (e.g., parking closer to chairlifts, 38%), uses as many products as possible from local suppliers (38%), and does more to inform visitors of what this ski area is doing in terms of environmental conservation (37%). The fewest respondents intend to visit more often if Mt. Bachelor receives more environmental awards (24%) and recycles more (27%). There were no differences between skiers and snowboarders, $p > .05$.

Agreement with the place attachment statements ranged from only 13% ("I would not substitute any other area for doing what I do at Mt. Bachelor") to 72% ("Mt. Bachelor is one of the best places for doing what I like to do; " Table 4). Many respondents enjoyed Mt. Bachelor as one of the best places for recreating (72%) and felt that this area was special to them (59%). Relatively few, however, agreed that absolutely no other place compares to Mt. Bachelor (22%) and there are no other places that would serve as comparable substitutes (13%). Skiers were slightly more likely to agree that Mt. Bachelor was special to them and snowboarders were more likely to agree that no other places compare to this ski area, but these statistically significant differences were "minimal" (Vaske, 2008) or "small" (Cohen, 1988), $\chi^2 \leq 6.43$, $p \leq .015$, $\varphi \leq .12$.

The majority of respondents agreed with the biocentric NEP statements measuring environmental value orientations and disagreed with the anthropocentric variables (Table 5). For example, visitors were most likely to agree that "humans are severely abusing the environment" (70%) and disagree that "the balance of nature is strong enough to cope with impacts of modern industrial nations" (12% agree, 88% disagree). There were no statistically significant differences between skier and snowboarder responses to these value orientation statements, $p > .05$.

Across the four dimensions of specialization (centrality, skill, equipment, experience), the majority of skiers and snowboarders agreed with many of the 15 variables measuring these dimensions (Table 6). A total of 73% of respondents, for example, agreed with the centrality statement that if they stopped skiing or snowboarding, an important part of their life would be missing. For the skill dimension, 69% agreed that they were becoming more skilled in skiing or snowboarding each year and 59% rated their skill level as advanced or expert. Similarly, 66% of respondents had accumulated a substantial amount of skiing or snowboarding equipment and invested substantial money on this equipment. Responses to nine of these 15 items did not differ between skiers and snowboarders, $p > .05$. Skiers, however, were more likely than snowboarders to have participated in the activity for a larger part of their life, $t = 10.21$, $p < .001$. Skiers also felt slightly more skilled currently, whereas snowboarders were more likely to feel that they were becoming more skilled in the activity each year and that it was becoming more important than most of their other activities, $\chi^2 \leq 14.01$, $p \leq .045$. Effect sizes ($\varphi \leq .18$, $r_{pb} \leq .21$), however, revealed that most of these differences were relatively "minimal" or "small" (Cohen, 1988; Vaske, 2008). Given that these descriptive and bivariate results revealed insignificant or minimal differences between skiers and snowboarders, data from the entire sample aggregated across these two activity groups were used in further analyses.

4.2. Measurement models

Fit indices from the CFA demonstrated that the data provided an extremely strong measurement model fit (CFI* = .98, NNFI* = .97, IFI* = .98, RMSEA* = .05, χ^2/df = 2.47). All factor loadings were acceptable (i.e., ≥.40), as they ranged from .83 to .94 for current trip motivations related to existing VEPs, .68 to .94 for future visit intentions related to more or new VEPs, .50 to .91 for place attachment, and .56 to .80 for value orientations (Tables 2–5). For the second-order CFA of specialization, first-order factor loadings ranged from .50 to .87 for centrality, .41 to .83 for skill, and .70 to .82 for equipment (Table 6). The centrality dimension most strongly represented overall degree of specialization in skiing or snowboarding (second-order factor loading = .90), followed by skill (.81), equipment (.79), and past experience (.45).[1]

Reliability coefficients showed high internal consistency for each concept, suggesting that the variables reliability measured their respective concepts (i.e., ≥.65; Tables 2–6). Cronbach alphas were .98 for current trip motivations and future intentions related to VEPs, .88 for place attachment, and .90 for value orientations. For specialization, alphas were .85 for centrality, .78 for skill, and .87 for equipment. Reliability of the overall specialization index was high at .91. All item total correlations exceeded .40 and deletion of any of the variables would not improve reliability.

4.3. Structural models

The hypotheses examined structural relationships among these concepts. Final structural model fit was acceptable and extremely strong (CFI* = .98, NNFI* = .98, IFI* = .99, RMSEA* = .06, χ^2/df = 2.45). Hypotheses H_1 to H_3 examined if place attachment influences motivations, intentions, and knowledge associated with

[1] A single principal components exploratory factor analysis (EFA) with varimax rotation of all variables in this article produced factors reflecting almost identical concepts as the CFA and all loadings were ≥.40 (i.e., knowledge of VEPs, motivations and intentions related to VEPs, attachment, value orientations, specialization dimensions [centrality, equipment, experience, skill]). This is equivalent to a Harman single factor test for testing common method variance or bias (Vaske, 2008). Given that all variables did not load on one single factor and instead loaded on their different respective factors, common method variance or bias was generally absent.

VEPs. Statistically significant ($p < .05$) positive relationships were found between attachment and both motivations associated with VEPs and knowledge of these programs, supporting H_1 and H_3 (Fig. 1). There was no significant relationship, however, between attachment and intentions to visit more in the future if there were more VEPs, so H_2 was not supported. Attachment had a stronger influence on current trip motivations associated with VEPs ($\beta = .31$) than knowledge about these programs ($\beta = .13$). The next three hypotheses (H_4 to H_6) examined if environmental value orientations influence motivations, intentions, and knowledge associated with VEPs. All of these hypotheses were supported, as value orientations significantly influenced all three of these cognitions associated with VEPs, but had a stronger influence on future intentions ($\beta = .41$) than both knowledge ($\beta = .18$) and current trip motivations associated with VEPs ($\beta = .15$). The next three hypotheses (H_7 to H_9) examined if specialization in skiing or snowboarding influences motivations, intentions, and knowledge associated with VEPs. A significant positive relationship was found between specialization and knowledge of VEPs ($\beta = .19$), supporting H_9. There were no significant relationships, however, between specialization and both current trip motivations and future intentions associated with VEPs, so both H_7 and H_8 were not supported. The final hypothesis (H_{10}) examining a relationship between specialization and place attachment was supported, as there was a significant positive correlation between these two concepts ($r = .32$).

Taken together, visitor attachment and value orientations influenced current motivations associated with VEPs and explained 12% ($R^2 = .12$) of the variance in these motivations (Fig. 1). In other words, visitors who were more likely to be motivated to visit Mt. Bachelor because of its existing VEPs were more attached to this area and were more likely to have a biocentric orientation. Intentions to visit more often in the future if there were more VEPs was influenced by value orientations, which explained 17% of the variance in these intentions. This finding suggests that visitors with a biocentric orientation would be most likely to visit more often in the future if VEPs increase at this ski area. Place attachment, value orientations, and specialization in skiing or snowboarding influenced knowledge of VEPs, explaining 10% of this knowledge. Visitors who were more knowledgeable about VEPs at Mt. Bachelor were more specialized, felt more attached to this ski area, and were more likely to have a stronger biocentric orientation.[2]

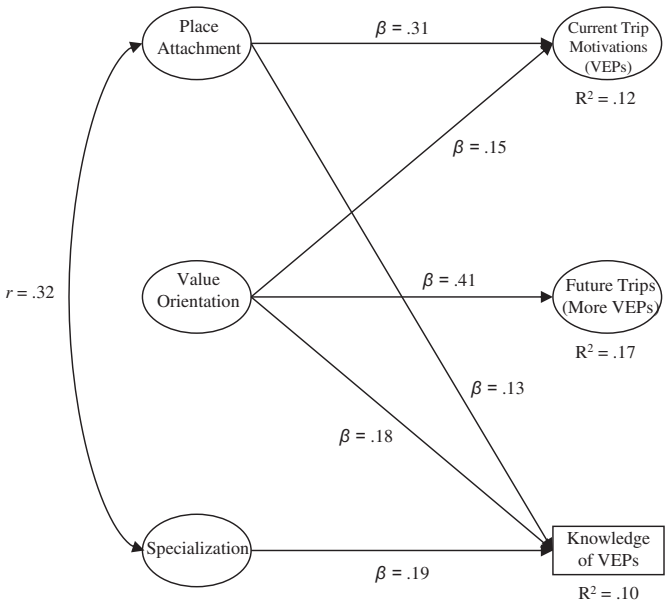

Fig. 1. Final structural equation model (SEM) of relationships among concepts related to VEPs at Mt. Bachelor. All factor loadings and path coefficients shown are standardized and were significant at $p < .05$. Non-significant ($p > .05$) paths are not shown. Factor loadings are provided in the tables. The full original continuous scales (e.g., 5-point scales) were used for this analysis. Based on Satorra–Bentler Robust estimation to correct for multivariate non-normality, structural model fit indices: S-B $\chi^2 = 3342.38$, $p < .001$, CFI* = .98, NNFI* = .98, IFI* = .99, $\chi^2/df = 2.45$, RMSEA* = .06.

5. Discussion

This article focused on visitor motivations, intentions, and knowledge associated with VEPs at the Mt. Bachelor ski area, and whether place attachment, value orientations, and specialization influenced these perceptions of VEPs. Few visitors were knowledgeable of VEPs or motivated to visit on their current trip because of these programs, but many intended to visit more often in the future if this area increases and promotes its VEPs. Respondents who were motivated to visit on their current trip because of VEPs were more biocentric and attached to this ski area. Those who are likely to visit more often if VEPs at this ski area increase were also more biocentric. Visitors who were most knowledgeable about VEPs at this ski area were more biocentric, attached, and specialized. These findings have implications for management and future research.

5.1. Management implications

From a management perspective, most respondents were not highly knowledgeable about existing VEPs at this ski area and were not motivated by these programs on their current trip, but may visit more often in the future if VEPs increase and more is done to inform visitors about these programs. VEPs are relatively new at alpine ski areas and most visitors may not be aware of environmental issues at these areas. Although Mt. Bachelor has adopted several VEPs and provides information about them on its internet website and other materials (e.g., brochures, signs), this information is less prominent and harder to find than information about other attributes such as scenery, snow conditions, chairlifts, ticket prices, and other amenities and services. Obscurity of information about VEPs may have prevented visitors from learning about these programs, but given that almost 40% intend to visit more often in the future if this area does more to inform visitors of what it is currently doing in terms of environmental conservation, managers may be in a position to increase visitation simply by doing more to promote VEPs that are already operational. Managers should consider increasing interpretive information about VEPs to inform visitors about what is being done to reduce impacts. Managers could, for example, increase visibility of information about environmental performance on their website, at ticket purchasing booths, on chairlifts and signs at dining facilities, and in promotions and advertising. By also expanding the number of VEPs (e.g., local products, carpool incentives, biodegradable supplies), managers may be able to increase visitor knowledge of VEPs and attract more people to this

[2] Ancillary analysis involved examining relationships among the concepts associated with VEPs to test for discriminant validity (Vaske, 2008) and also conducting multigroup structural equation models to determine if relationships in Fig. 1 differed between people who were skiing or snowboarding on the day that they were surveyed (i.e., moderation effect). All correlations among the dependent variables and concepts were minimal and not statistically significant (e.g., current trip motivations – future intentions associated with VEPs $r = .13$, motivations – knowledge of VEPs $r = .09$, future intentions – knowledge $r = .17$; $p > .05$). All tests for invariance of factor loadings and structural model paths were also not significant, and the chi-square difference test indicated that the paths in Fig. 1 did not differ between snowboarders and skiers, $\Delta\chi^2 = 6.77$, $df = 3$, $p = .079$. Moderation, therefore, was not present.

area, which could improve its share of the competitive ski area market.

A strong predictor of future visitation related to VEPs was value orientations, which suggests that marketing targeting environmental topics may be effective for attracting visitors. States in the USA's Pacific Northwest such as Oregon have large proportions of residents with biocentric values toward forests and other resources (Steel et al., 1994), so managers at Mt. Bachelor could increase marketing campaigns disseminating information about this ski area's VEPs to target these populations. Similarly, visitors who felt attached to this ski area were more knowledgeable of VEPs and motivated to visit on their current trip because of these programs. Managers may want to explore options for distinguishing this ski area from other nearby areas to increase the level of place attachment among visitors and then target these populations with marketing aimed at increasing knowledge about VEPs and motivations related to these programs.

Visitors who were more biocentric, specialized, and attached to Mt. Bachelor were more knowledgeable of VEPs at this area. Specialization was a significant predictor of this knowledge, suggesting that specialized visitors may be most likely to seek and respond to information about these environmental programs. Managers could focus on attracting more highly specialized visitors to the ski area or help existing visitors become more specialized, which in turn may help to increase visitor knowledge about VEPs. This could be done by providing attributes such as more terrain parks, difficult and less accessible terrain, and quality equipment typically desired by more specialized users. Managers could also target activity proficiency programs such as ski schools, camps, and competitions to increase specialization and thereby possibly increase visitor knowledge of VEPs. Consistent with past studies (e.g., Bricker & Kerstetter, 2000), there was also a correlation between specialization and place attachment. If managers want guests to feel more attached to their ski area, they could implement strategies that increase the specialization of guests including increasing ski school programs, promoting quality equipment sales, extending operating seasons, reducing season pass prices, and promoting progressive technologies.

5.2. Research implications

From a research perspective, there have been some studies on skier and snowboarder motivations and perceptions of resource impacts from these activities (e.g., Alexandris et al., 2007; Thapa & Graefe, 2003; Vaske et al., 2004). There has also been research on VEPs at ski areas such as studies of the Sustainable Slopes Charter (e.g., Donohoe, 2004; George, 2003). There has been little attention, however, on the importance of VEPs to skiers and snowboarders, especially what they know about VEPs and how these programs may influence motivations to visit ski areas. This study presents an initial attempt to help address this knowledge gap, so future research is needed to build on these findings and examine this topic in more detail.

In particular, little research has measured visitor knowledge, current trip motivations, and future visit intentions related to VEPs in general and at alpine ski areas in particular. This study, therefore, developed scales for measuring these three concepts and the high factor loadings and reliabilities suggested that these scales appear to be an appropriate starting point for measuring these concepts. It is important to recognize, however, that some variables measuring these concepts were specific to Mt. Bachelor and environmental programs at this ski area, so they may not be directly applicable to other locations or activities. Studies need to examine if these scales transfer to other contexts and if reliability and validity remain as strong as what was found here.

Responses to these scales showed that most skiers and snowboarders were not highly knowledgeable of VEPs at Mt. Bachelor, but intend to visit more often in the future if more of these programs are adopted and promoted at this ski area. This low knowledge of VEPs supports research showing that many tourists and recreationists are not highly knowledgeable of some environmental and conservation issues (e.g., Holden, 2000; Vaske et al., 2006). This knowledge of VEPs was also influenced by specialization in these activities. Consistent with most studies, specialization was treated as multidimensional consisting of affective, cognitive, and behavioral components (see Manning, 2011 for a review). Identical to Needham et al.'s (2007) study of hunters and Lee and Scott's (2004) study of bird watchers, factor loadings from the second-order CFA showed that affective (i.e., centrality) and cognitive (i.e., skill) dimensions represented skier and snowboarder specialization better than behavioral aspects (i.e., equipment, past experience). It is becoming apparent that irrespective of activity, specialization consists of multiple dimensions and may be best understood in terms of centrality and skill level, whereas experience and equipment may be less useful but still important. Research is needed, however, to examine knowledge of VEPs in other contexts and examine relationships between specialization and this knowledge to determine if findings from other contexts are similar to those found here.

This study improves understanding of skier and snowboarder motivations and intentions. Most studies of these activities have focused on internal factors that push people to visit ski areas (e.g., Alexandris et al., 2007; Klenosky et al., 1993). This study, however, showed that emerging attributes such as environmental programs can pull visitors to these areas. Consistent with studies in other contexts, current trip motivations, future visit intentions, and knowledge associated with environmental issues were also influenced by attachment to an area (Fredman & Heberlein, 2005; Gibbons & Ruddell, 1995), value orientations (Needham, 2010; Vaske & Donnelly, 1999), and specialization (Hvenegaard, 2002; Oh & Ditton, 2008). In total, seven of the 10 hypotheses examining relationships among these concepts were supported, but only 10% of knowledge of VEPs, 12% of motivations associated with these programs, and 17% of future intentions related to VEPs were explained by these other cognitions. In addition, three hypotheses were not supported (H_2, H_7, H_8). Some previous studies have revealed significant relationships between behavioral intentions (e.g., future trip visits) and attachment, intentions and specialization, and current trip motivations and specialization (e.g., Chipman & Helfrich, 1988; Stedman, 2002). Results from this study, however, did not support these three relationships. This study, however, focused on intentions and motivations that were highly specific to the topic of VEPs, whereas most previous studies have examined more general activity or trip motivations and intentions. It is possible that the specificity of the context examined here (i.e., VEPs) influenced relationships among concepts. More research, therefore, is needed examining these and other characteristics and cognitions that may influence perceptions of VEPs at ski areas and other settings.

Tourism and recreation studies, including the study reported here, are often bound by university institutional review boards and regulatory compliance protocols regarding research on human subjects that often encourage participants to be over a certain age (e.g., 18 years). Younger visitors who are often found at settings such as ski areas, therefore, are not always included in study samples and results may not always be completely representative of all visitors to these areas. It is important for tourism and recreation studies to sample younger visitors because they may be more sensitive than adults to environmental issues (Manfredo et al., 2003). From a marketing perspective, younger individuals are

also important because they may have different levels of attachment to a site and may be future guests of an area (Manning, 2011). This study focused on adult skiers and snowboarders at Mt. Bachelor, and their characteristics were consistent with those reported by internal marketing and consulting studies of users at this area. Research is needed, however, to determine if results are consistent across all visitor age groups and whether these types of sampling constraints impact this study and other related studies.

This study should also be viewed as a starting point for examining visitor knowledge, motivations, and intentions associated with VEPs at alpine ski areas, and the extent that these are influenced by other cognitions such as place attachment, value orientations, and specialization. Findings are limited to the Mt. Bachelor ski area and may not generalize to all ski areas or other settings participating in these types of environmental programs. Research is needed, therefore, to examine the applicability of these findings to other activities and geographical settings.

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References

Alexandris, K., Kouthouris, C., & Girgolas, G. (2007). Investigating the relationships among motivation, negotiation, and alpine skiing participation. *Journal of Leisure Research, 39*, 648–667.

Barro, S. C., & Manfredo, M. J. (1996). Constraints, psychological investment, and hunting participation: development and testing of a model. *Human Dimensions of Wildlife, 1*(3), 42–61.

Blust, K. (2004). *Perceptions of sustainability in the ski industry: a Delphi approach*. Unpublished Masters thesis, Colorado State University, Fort Collins.

Bollen, K. A., & Long, J. S. (1993). *Testing structural equation models*. Newbury Park, CA: Sage.

Bricker, K. S., & Kerstetter, D. L. (2000). Level of specialization and place attachment: an exploratory study of whitewater recreationists. *Leisure Sciences, 22*, 233–257.

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen, & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Newbury Park, CA: Sage.

Bryan, H. (1977). Leisure value systems and recreational specialization: the case of trout fishermen. *Journal of Leisure Research, 9*, 174–187.

Byrne, B. M. (1994). *Structural equation modeling with EQS*. Thousand Oaks, CA: Sage.

Carmin, J., Darnall, N., & Mil-Homens, J. (2003). Stakeholder involvement in the design of U.S. voluntary environmental programs: does sponsorship matter? *Policy Studies Journal, 31*, 527–543.

Chipman, B. D., & Helfrich, L. A. (1988). Recreation specialization and motivations of Virginia river anglers. *North American Journal of Fisheries Management, 8*, 390–398.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Erlbaum.

Dann, G. (1981). Tourist motivation: an appraisal. *Annals of Tourism Research, 8*, 187–219.

Ditton, R. B., Loomis, D. K., & Choi, S. (1992). Recreation specialization: re-conceptualization from a social worlds perspective. *Journal of Leisure Research, 24*, 33–51.

Donohoe, H. M. (2004). *Sustainable skiing: A North American environmental program evaluation*. Unpublished Masters thesis, Carleton University, Ottawa, Canada.

Dunlap, R., Van Liere, K., Mertig, A., & Jones, R. (2000). Measuring endorsement of the new ecological paradigm: a revised NEP scale. *Journal of Social Issues, 56*, 425–442.

Dyck, C., Schneider, I., Thompson, M., & Virden, R. (2003). Specialization among mountaineers and its relationship to environmental attitudes. *Journal of Park & Recreation Administration, 21*(2), 44–62.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.

Fredman, P., & Heberlein, T. A. (2005). Visits to the Swedish mountains: constraints and motivations. *Scandinavian Journal of Hospitality and Tourism, 5*, 177–192.

Fulton, D. C., Manfredo, M. J., & Lipscomb, J. (1996). Wildlife value orientations: a conceptual and measurement approach. *Human Dimensions of Wildlife, 1*(2), 24–47.

George, A. (2003). Managing ski resorts: perceptions from the field regarding the sustainable slopes charter. *Managing Leisure, 8*, 41–46.

Gibbons, S., & Ruddell, E. J. (1995). The effect of goal orientation and place dependence on select goal interferences among winter backcountry users. *Leisure Sciences, 17*, 171–183.

Hammitt, W. E., Backlund, E. A., & Bixler, R. D. (2004). Experience use history, place bonding and resource substitution of trout anglers during recreation engagements. *Journal of Leisure Research, 36*, 356–378.

Hammitt, W. E., Kyle, G. T., & Oh, C. (2009). Comparison of place bonding models in recreation resource management. *Journal of Leisure Research, 41*, 55–70.

Holden, A. (1999). Understanding skiers' motivation using Pearce's travel career construct. *Annals of Tourism Research, 26*, 435–438.

Holden, A. (2000). Winter tourism and the environment in conflict: the case of Cairngorm, Scotland. *International Journal of Tourism Research, 2*, 247–260.

Hudson, S., & Ritchie, J. R. B. (2001). Cross-cultural tourist behavior: an analysis of tourist attitudes towards the environment. *Journal of Travel and Tourism Marketing, 10*, 1–22.

Hudson, S., & Shephard, G. (1998). Measuring service quality at tourist destinations: an application of importance-performance analysis to an alpine ski resort. *Journal of Travel and Tourism Marketing, 7*, 61–77.

Hvenegaard, G. T. (2002). Birder specialization differences in conservation involvement, demographics, and motivations. *Human Dimensions of Wildlife, 7*, 21–36.

Iso-Ahola, S. (1999). Motivation foundations of leisure. In E. L. Jackson, & T. L. Burton (Eds.), *Leisure studies: Prospects for the twenty-first century* (pp. 35–51). State College, PA: Venture.

Klenosky, D. B., Gengler, C. E., & Mulvey, M. S. (1993). Understanding the factors influencing ski destination choice: a means-end analytic approach. *Journal of Leisure Research, 25*, 362–379.

Kyle, G. T., Absher, J. D., Hammitt, W. E., & Cavin, J. (2006). An examination of the motivation – involvement relationship. *Leisure Sciences, 28*, 467–485.

Kyle, G., Graefe, A., & Manning, R. (2004). Attached recreationists: who are they? *Journal of Park & Recreation Administration, 22*(2), 65–84.

Kyle, G., Graefe, A., & Manning, R. (2005). Testing the dimensionality of place attachment in recreational settings. *Environment and Behavior, 37*, 153–177.

Kyle, G., Graefe, A., Manning, R., & Bacon, J. (2003). An examination of the relationship between leisure activity involvement and place attachment among hikers along the Appalachian Trail. *Journal of Leisure Research, 35*, 249–273.

Kyle, G. T., Mowen, A. J., & Tarrant, M. (2004). Linking place preferences with place meaning: an examination of the relationship between place motivation and place attachment. *Journal of Environmental Psychology, 24*, 439–454.

Lee, S., Graefe, A. R., & Li, C. (2007). The effects of specialization and gender on motivations and preferences for site attributes in paddling. *Leisure Sciences, 29*, 355–373.

Lee, J., & Scott, D. (2004). Measuring birding specialization: a confirmatory factor analysis. *Leisure Sciences, 26*, 245–260.

McFarlane, B. (2004). Recreation specialization and site choice among vehicle-based campers. *Leisure Sciences, 26*, 309–322.

McIntyre, N., & Pigram, J. J. (1992). Recreation specialization reexamined: the case of vehicle-based campers. *Leisure Sciences, 14*, 3–15.

Manfredo, M. J., Driver, B. L., & Tarrant, M. A. (1996). Measuring leisure motivation: a meta-analysis of the recreation experience preference scales. *Journal of Leisure Research, 28*, 188–213.

Manfredo, M. J., Teel, T. L., & Bright, A. D. (2003). Why are public values toward wildlife changing? *Human Dimensions of Wildlife, 8*, 287–306.

Manning, R. E. (2011). *Studies in outdoor recreation: Search and research for satisfaction*. Corvallis, OR: Oregon State University Press.

Maruyama, G. M. (1998). *Basics of structural equation modeling*. Thousand Oaks, CA: Sage.

Mt. Bachelor. (2012). *Environmental program*. Retrieved 24.01.12, from. http://www.mtbachelor.com/site/info/environmental_program/index.html.

National Ski Area Association (NSAA). (2012a). *Golden eagle awards*. Retrieved 24.01.12 from. http://www.nsaa.org/nsaa/environment/gea/gea-winners-history.asp.

National Ski Area Association (NSAA). (2012b). *The green room: Ski industry environmental database*. Retrieved 24.01.12, from. http://www.nsaa.org/nsaa/environment/green_room_closed.asp.

Needham, M. D. (2010). Value orientations toward coral reefs in recreation and tourism settings: a conceptual and measurement approach. *Journal of Sustainable Tourism, 18*, 757–772.

Needham, M. D., Rollins, R. B., & Vaske, J. J. (2005). Skill level and normative evaluations among summer recreationists at alpine ski areas. *Leisure/Loisir: Journal of the Canadian Association for Leisure Studies, 29*, 69–92.

Needham, M. D., Vaske, J. J., Donnelly, M. P., & Manfredo, M. J. (2007). Hunting specialization and its relationship to participation in response to chronic wasting disease. *Journal of Leisure Research, 39*, 413–437.

Oh, C. O., & Ditton, R. B. (2008). Using recreation specialization to understand conservation support. *Journal of Leisure Research, 40*, 556–573.

Ormiston, D., Gilbert, A., & Manning, R. E. (1998). Indicators and standards of quality for ski resort management. *Journal of Travel Research, 36*(3), 35–41.

Proshansky, H. M., Fabian, A. K., & Kaminoff, R. (1983). Place-identity: physical world socialization of self. *Journal of Environmental Psychology, 3*, 57–83.

Rivera, J., & de Leon, P. (2004). Is greener whiter? Voluntary environmental performance of western ski areas. *Policy Studies Journal, 32*, 417–437.

Rivera, J., de Leon, P., & Koerber, C. (2006). Is greener whiter yet? The sustainable slopes program after five years. *Policy Studies Journal, 34*, 195–221.

Scott, D., & Shafer, C. S. (2001). Recreational specialization: a critical look at the construct. *Journal of Leisure Research, 33*, 319–343.

Ski Area Citizens Coalition (SACC). (2009). *Ski area environmental scorecard 2008/2009*. Retrieved 23.10.09, from. http://www.skiareacitizens.com/index.php.

Stedman, R. C. (2002). Toward a social psychology of place: predicting behavior from place-based cognitions, attitude, and identity. *Environment and Behavior, 34*, 561–581.
Steel, S., List, P., & Shindler, B. (1994). Conflicting values about federal forests: a comparison of national and Oregon publics. *Society and Natural Resources, 7*, 137–153.
Steelman, T. A., & Rivera, J. (2006). Voluntary environmental programs in the United States - Whose interests are served? *Organization and Environment, 19*, 505–526.
Sutton, S. G., & Ditton, R. B. (2001). Understanding catch-and-release behavior among US Atlantic bluefin tuna anglers. *Human Dimensions of Wildlife, 6*, 49–66.
Teel, T. L., Bright, A. D., Manfredo, M. J., & Brooks, J. J. (2006). Evidence of biased processing of natural resource related information: a study of attitudes toward drilling for oil in the Arctic National Wildlife Refuge. *Society and Natural Resources, 19*, 447–463.
Thapa, B., & Graefe, A. R. (2003). Level of skill and its relationship to recreation conflict and tolerance among adult skiers and snowboarders. *World Leisure Journal, 45*, 13–25.
Tsuyuzaki, S. (1994). Environmental deterioration resulting from ski-resort construction in Japan. *Environmental Conservation, 21*, 121–125.
Tuan, Y. F. (1977). *Space and place*. Minneapolis: University of Minnesota Press.
Vaske, J. J. (2008). *Survey research and analysis: Applications in parks, recreation and human dimensions*. State College: PA: Venture.
Vaske, J. J., & Donnelly, M. P. (1999). A value-attitude-behavior model predicting wildland preservation voting intentions. *Society and Natural Resources, 12*, 523–537.
Vaske, J. J., Dyar, R., & Timmons, N. (2004). Skill level and recreation conflict among skiers and snowboarders. *Leisure Sciences, 26*, 215–225.
Vaske, J. J., & Needham, M. D. (2007). Segmenting public beliefs about conflict with coyotes in an urban recreation setting. *Journal of Park & Recreation Administration, 25*(4), 79–98.
Vaske, J. J., Needham, M. D., Stafford, N., Green, K., & Petchenik, J. (2006). Information sources and knowledge about chronic wasting disease in Colorado and Wisconsin. *Human Dimensions of Wildlife, 11*, 191–202.
Watson, A. (1985). Soil erosion and vegetation damage near ski lifts at Cairngorm, Scotland. *Biological Conservation, 33*, 363–382.
White, D. D., Virden, R. J., & van Riper, C. J. (2008). Effects of place identity, place dependence, and experience-use history on perceptions of recreation impacts in a natural setting. *Environmental Management, 42*, 647–657.
Williams, P., Dossa, K., & Fulton, A. (1994). Tension on the slopes: managing conflict between skiers and snowboarders. *Journal of Applied Recreation Research, 19*, 191–213.
Williams, D. R., & Vaske, J. J. (2003). The measurement of place attachment: Validity and generalizability of a psychometric approach. *Forest Science, 49*, 830–840.

Mark D. Needham (Ph.D., Colorado State University) is Associate Professor and Director of the Natural Resources, Tourism, and Recreation (NATURE) Studies Laboratory in the Department of Forest Ecosystems and Society at Oregon State University. Dr. Needham's research and teaching involves applications of survey research and multivariate statistical analyses to human dimensions of recreation, tourism, and wildlife.

Christopher M. Little (M.S., Oregon State University) is East Idaho Field Representative for The Nature Conservancy. Mr. Little's professional interests involve conservation, collaborative management and partnerships, recreation and tourism management, wildlife habitat restoration, and planning and management of parks and protected areas.