Skill Level and Normative Evaluations among Summer Recreationists at Alpine Ski Areas

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Abstract. This article examines acceptability norms regarding use density reported by hikers and mountain bikers with varying skill levels. It was hypothesized that highly skilled recreationists would rate increasing use densities as less acceptable. In addition, it was predicted that as skill increases, normative agreement/consensus (crystallization) and importance (norm intensity) would increase. Data were obtained from surveys of hikers (n = 275) and mountain bikers (n = 125) at the Whistler Mountain ski area in British Columbia, Canada. Skill level was measured on a four-point scale from "novice" to "expert." Norms were measured by acceptability ratings of photographs containing increasing densities of hikers and mountain bikers. As predicted, when hikers' skill level increased, acceptability of greater hiker densities decreased and norm crystallization and intensity increased. Conversely, no relationships were found between mountain bikers' skill and their acceptability, agreement, and importance of mountain biker density. Possible explanations for these findings and implications for management and future research are discussed.

Keywords. crowding, image capture technology, norms, ski areas, skill level, standards of quality

Résumé. Cet article examine les normes d'acceptabilité envers la densité d'utilisation rapportée par des randonneurs et cyclistes tout-terrain de divers niveaux d'habiletés.

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***Leisure/Loisir, 29*(1): 71-94**

L'hypothèse était que les individus récréatifs plus habiles considèreraient la densité d'utilisation croissante comme étant moins acceptable. De plus, c'était prédit que plus que l'habileté augmente, plus que l'accord de norme (cristal) et l'importance (norme d'intensité) augmenterait. Les données sont obtenues de questionnaires complétés par des randonneurs ($n = 275$) et cyclistes tout-terrain ($n = 125$) situés à la région de ski Whistler Mountain en Colombie-Britannique, Canada. Le niveau d'habileté a été mesuré avec une échelle de quatre niveaux, de « novice » à « expert ». Les normes ont été mesuré par cote d'acceptabilité de photos contenant des densités croissantes de randonneurs et cyclistes tout-terrain. Comme prédit, plus que l'habileté des randonneurs augmentait, plus que l'acceptabilité de plus grande densité de randonneurs diminuait et la norme cristal et intensité augmentaient. Inversement, aucune relation n'a été trouvé entre les habiletés de cyclistes tout-terrain et leur acceptabilité, accord, et importance de densité de cycliste tout-terrain. Des explications possibles pour ces résultats et les implications pour la gérance et la recherche additionnelle sont discutées.

Mots-clefs. Tassage, appareil à saisie d'images, normes, régions de ski, niveaux d'habileté, standards de qualité

Introduction

The influence of recreation and tourism at mountain resorts such as Aspen, Colorado and Whistler, British Columbia (BC) has received considerable research attention (Gill, 1996, 2000; Gill & Hartmann, 1992; Gill & Williams, 1994; Godde, Price, & Zimmermann, 2000; Hudson & Shephard, 1998; Klenosky, Gengler, & Mulvey, 1993; Socher, 1992). Alpine ski areas (e.g., Aspen Highlands, Colorado; Blackcomb and Whistler Mountains, BC) are focal points of recreation at many mountain resorts, and activities such as skiing and snowboarding have dominated ski areas for decades. Research has examined the social dimensions (e.g., activity conflict, visitor demographics) of winter use at ski areas (e.g., Ormiston, Gilbert, & Manning, 1998; Thapa & Graefe, 2003; Vaske, Carothers, Donnelly, & Baird, 2000; Vaske, Dyar, & Timmons, 2004; Williams, Dossa, & Fulton, 1994). In addition, studies have examined biophysical impacts (e.g., trail erosion, vegetation trampling) associated with summer use at ski areas (Good & Grenier, 1994; Pickering, Harrington, & Worboys, 2003; Price, 1983; Wood, 1987). Pickering and Buckley (2003) and Saremba and Gill (1991) discussed activities and social impacts (e.g., crowding) related to summer use at ski areas, but their discussions were not based on empirical data (e.g., visitor surveys). Hence, the social aspects of visitor use at alpine ski areas during the summer season have received little empirical attention.

The popularity of operating chairlifts at alpine ski areas in the summer to accommodate activities such as hiking and mountain biking is growing. For example, 12% of the ski areas in BC had chairlifts operat-

ing in the summer of 1991. A decade later, summer chairlift operations occurred at 65% of these areas (BC Assets & Land Corporation, 2000). Most major ski areas now have at least one chairlift operating in the summer, with mountains such as Vail (Colorado) and Whistler (BC) receiving over 250,000 visitors each summer (Needham, 2002).

Increasing use, however, has generated concerns about the ability of alpine ski areas to sustain acceptable levels of social impacts (e.g., activity conflict, crowding) during the summer season (Good & Grenier, 1994; Pickering & Buckley, 2003; Pickering et al., 2003). To disperse use and minimize conflict, operators often zone/segment ski areas in the winter based on the skill level of visitors (e.g., green ski runs for "novices," black diamond runs for "experts"). This strategy may also be appropriate for managing summer use at ski areas. To inform this type of strategy, however, it is necessary to understand: (1) the types of summer activity groups at ski areas and the skill levels among these groups, and (2) the conditions that these groups feel are acceptable / unacceptable for ski areas in the summer. This article examines the relationship between recreationists' skill level and their acceptability of summer use densities at a ski area.

This article is structured as follows. The next section presents an overview of the literature that provides a theoretical foundation for this article (e.g., norm theory, specialization/skill). Based on this literature, six hypotheses are advanced. This is followed by a discussion of the methodological techniques used to address the hypotheses. The results are then presented, along with a discussion of the findings and implications for management and additional research.

Conceptual Background

Crowding and Norms

The concepts of crowding and norms have received considerable attention in the recreation literature (see Manning, 1999; Shelby & Heberlein, 1986 for reviews). *Perceived crowding* refers to a negative evaluation that the number of encounters or people actually observed in an area is too many (Vaske, Donnelly, & Petruzzi, 1996). Understanding perceived crowding, however, may not reveal maximum acceptable use densities or how use should be managed and monitored. *Norms* offer a theoretical and applied basis for addressing these issues. One line of research defines norms as standards that individuals use for evaluating activities, environments, or management strategies as good or bad, better or worse (Donnelly, Vaske, Whittaker, & Shelby, 2000; Vaske, Shelby, Graefe, & Heber-

lein, 1986). Norms clarify what people believe conditions or behaviour should be.

Indicators and Standards of Quality

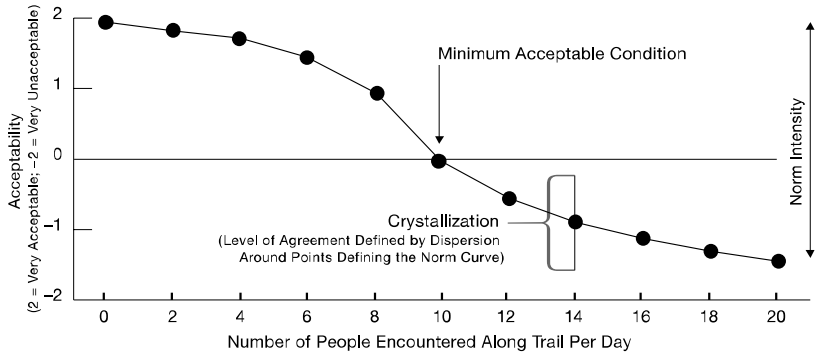
Norm theory has provided a basis for measuring various indicators and formulating standards of quality (Manning, 1999). *Indicators* (e.g., litter) are social, resource, or managerial variables that define quality settings and experiences (Manning, Lawson, Newman, Laven, & Valliere, 2002). Indicators are measured to reveal *standards of quality* (e.g., two pieces of litter seen per day), or thresholds at which indicator conditions reach unacceptable levels (Manning, 1999). Indicators can be monitored to ensure that standards are maintained. If standards are violated, management action may be required. This approach to recreation management is central to frameworks such as the Limits of Acceptable Change (LAC) (Stankey et al., 1985), Visitor Experience and Resource Protection (VERP) (Manning, 2001), and Visitor Impact Management (VIM) (Graefe, Kuss, & Vaske, 1990).

The Normative Approach

Much of the normative work in outdoor recreation is based on Jackson's (1965) model. This approach describes norms (evaluative standards) using a graphic device called a *social norm curve* (Manning, Valliere, Wang, & Jacobi, 1999) or an *impact acceptability curve* (Vaske et al., 1986) (Figure 1). Social norms are depicted as averages of evaluations provided by individuals within a population. Figure 1 represents indicator impacts increasing from left to right along the horizontal axis. The vertical axis represents the evaluative responses with the most positive evaluation at the top of the axis, the most negative on the bottom, and a neutral category in between. The majority of recreation studies have used *acceptability* as the evaluative response (see Manning et al., 1999 for a list of evaluations used in other studies). The curve can be analyzed for several structural characteristics including the minimum acceptable condition, intensity or strength of the norm, and level of consensus about the norm (norm crystallization).

The *minimum acceptable condition* is the point where the norm curve crosses the neutral line and impacts become unacceptable. In several studies (see Shelby, Vaske, & Donnelly, 1996; Vaske, Donnelly, & Shelby, 1993 for reviews), this point represented the standard of quality for the measured indicator. *Norm intensity* (i.e., importance of the indicator to respondents) is the relative distance from the neutral line at each point on the curve, independent of the direction of the evaluation

Figure 1
Hypothetical Social Norm Curve



Note. Modified from Manning et al., 1999

(e.g., acceptable or unacceptable). Intensity is often measured as the sum of these distances across all points on the curve (Shelby & Heberlein, 1986; Vaske et al., 1986). The greater the cumulative distance from the neutral line, the higher the intensity. A flat curve close to the neutral line suggests that few people will be upset if a standard is violated, whereas a curve that declines sharply and remains negative implies that more people may be impacted (Freimund, Vaske, Donnelly, & Miller, 2002). *Crystallization* measures the consensus among respondents for the indicator impacts. This measure of normative agreement is often presented as the average of the standard deviations (i.e., interval around the mean containing the majority or 68% of responses) for the points comprising the curve (Ormiston et al., 1998; Shelby & Heberlein, 1986; Shelby et al., 1996). If crystallization is high (i.e., small standard deviation), managers may have more confidence in using normative data to formulate standards (Manning, 1999).

At least 75 articles have been published on the normative approach and its empirical applications in recreation research (see Donnelly et al., 2000; Manning, 1999; Shelby et al., 1996; Vaske et al., 1986, 1993 for reviews). The approach has been used to understand encounter norms, or the maximum number of people that recreationists will accept seeing in a setting (Donnelly et al., 2000). Norms have also been used to measure other indicators including noise (Freimund et al., 2002), campsite impacts (Kim & Shelby, 1998; Needham & Rollins, 2005; Shelby, Vaske, & Harris, 1988), and litter (Heywood & Murdock, 2002). Most studies have been conducted in public parks and related recreation areas in the United States, but some have occurred in Canada (Freimund et al., 2002;

Vaske et al., 1996) and other countries (Inglis, Johnson, & Ponte, 1999; Kim & Shelby, 1998; Saarinen, 1998). Despite this breadth of research, few studies have applied the normative approach to commercial recreation areas (Ormiston et al., 1998). This article addresses this issue by examining the norms of summer recreationists at an alpine ski area.

Research has mainly assessed the norms of recreationists engaged in different activities (e.g., anglers, kayakers) or at different locations (e.g., backcountry, frontcountry) (Manning, 1999; Shelby et al., 1996). Fewer studies have examined normative differences among subgroups engaged in the same activity (Wellman, Roggenbuck, & Smith, 1982; Young, Williams, & Roggenbuck, 1991). Efforts to disaggregate recreationists into homogeneous subgroups (e.g., according to their skill level) have appeared in the literature (e.g., Donnelly, Vaske, & Graefe, 1986; Ewert & Hollenhorst, 1994; Thapa & Graefe, 2003; Vaske et al., 2004), but the influence of skill on normative evaluations has received less empirical attention (Graefe, Donnelly, & Vaske, 1985; Inglis et al., 1999; Ormiston et al., 1998). This article addresses this knowledge gap, as it examines the relationship between hikers' and mountain bikers' skill level and their acceptability norms regarding summer use densities at an alpine ski area.

Skill Level and Recreation Specialization

Given the diversity of experiences desired by recreationists and the variability in norms among activities and resources, researchers have emphasized the importance of differentiating users into meaningful homogeneous groups (Vaske, Beaman, Stanley, & Grenier, 1996; Virden & Schreyer, 1988). *Recreation specialization*, for example, segments participants into subgroups based on "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).

The specialization concept has been applied across a variety of activities and settings (see Manning, 1999; Scott & Shafer, 2001 for reviews). Studies have shown that "specialists" differ from "generalists" on numerous attributes including motivations and conflict (see Manning, 1999; Salz, Loomis, & Finn, 2001; Scott & Shafer, 2001 for reviews). In addition, the relationship between recreationists' norms and degree of specialization has been investigated, with more specialized or experienced recreationists often having lower acceptability norms (evaluative standards) for impacts (e.g., crowding, encounters, discourteous behaviour) (Graefe et al., 1985; Inglis et al., 1999; Tarrant, Cordell, & Kibler, 1997; Wellman et al., 1982; Young et al., 1991).

Both single-item (e.g., frequency of participation) and multidimensional (e.g., equipment, previous visits) approaches to specialization have been employed to segment recreationists (Bricker & Kerstetter, 2000; Donnelly et al., 1986; Miller & Graefe, 2000; Schreyer, Lime, & Williams, 1984). Recreationists' *self-reported skill level* in an activity, however, is often noted as an important dimension of specialization and is one of the most frequently used measures of the concept (e.g., Cole & Scott, 1999; Donnelly et al., 1986; Ewert & Hollenhorst, 1994; Inglis et al., 1999; Richards, 1996; Sutton & Ditton, 2001; Thapa & Graefe, 2003; Vaske et al., 2004). Understanding recreationists' skill in an activity is important because it: (1) provides a more comprehensive understanding of the types of recreationists in a setting, and (2) can inform management actions such as zoning. For example, ski area operators often designate ski runs as green for beginners, blue for intermediate skiers, and black diamond for more advanced skiers.

Skill level has been found to influence conflict (Vaske et al., 2004), place attachment (Bricker & Kerstetter, 2000), and crowding (Graefe et al., 1985). Except for Ormiston et al. (1998) who reported that skiers of "beginner" and "expert" skill level possessed different normative standards for lift ticket costs, little research has explored the relationship between individuals' self-reported skill level in an activity and their norms for setting or experiential indicators. Based on this literature, the following hypotheses are advanced for summer recreationists at ski areas:

H_1: As hikers' self-reported skill level increases, their normative standards (*minimum acceptable condition*) toward increased hiker density will decrease.

H_2: As hikers' self-reported skill level increases, their normative agreement (*norm crystallization*) for increased hiker density will increase.

H_3: As hikers' self-reported skill level increases, the importance (*norm intensity*) of hiker density will increase.

H_4: As mountain bikers' self-reported skill level increases, their normative standards (*minimum acceptable condition*) toward increased mountain biker density will decrease.

H_5: As mountain bikers' self-reported skill level increases, their normative agreement (*norm crystallization*) for increased mountain biker density will increase.

H_6: As mountain bikers' self-reported skill level increases, the importance (*norm intensity*) of mountain biker density will increase.

Methods

Study Area

Data for this article were drawn from a study designed to develop a baseline understanding of summer use at the Whistler Mountain ski area (Needham, 2002). This area is located 120 km (75 miles) north of Vancouver near the Whistler resort in southwest BC, Canada. The ski area contains 16 chairlifts, but only the Whistler Village Gondola is used in the summer for shuttling visitors from Whistler Village (elevation: 652 m, 2140 ft) to the Roundhouse lodge and restaurant area on the mountain (1809 m, 6030 ft). Over one million skiers and snowboarders visit this mountain each winter. Approximately 183,700 and 225,000 people visited in the summers (July to October) of 2000 and 2002, respectively (Needham, 2002; Needham & Rollins, 2003).

Data Collection

After two pilot tests, a 10-page, 37-question survey was conducted on-site with visitors at one of five separate sites on Whistler Mountain from July 1 to September 4, 2000. The two pilot tests were used to elucidate potential survey administration and design concerns before main data collection. As a result, several questions and response items were either redesigned or eliminated. The items analyzed in this article, however, did not require changes as a result of the pilot tests.

In total, 651 visitors were contacted and 548 surveys were completed (84.2% response rate). This article focuses on hikers ($n = 275$) and mountain bikers ($n = 125$), the two main user groups in this ski area during the summer of 2000 (hikers = 50%, bikers = 23%) (Needham, 2002; Needham & Rollins, 2003; Needham, Wood, & Rollins, 2004). This sample ($n = 400$) yields a 95% confidence interval with a margin of error of ± 4.8%.

Analysis Variables

Identical to past research (Bricker & Kerstetter, 2000; Donnelly et al., 1986; Miller & Graefe, 2000; Thapa & Graefe, 2003; Vaske et al., 2004), a single-item asked hikers and mountain bikers to rate their ability in their activity as "novice," "intermediate," "advanced," or "expert" (independent variable). For this sample of respondents, there were no hikers that mountain biked and no mountain bikers that hiked in the study area on the same day (Needham, 2002). As a result, all respondents were kept in their assigned categories.

The dependent variables involved respondents' acceptability ratings (norms) of photographs measuring two crowding-related indicators of

summer use at ski areas: (1) increasing densities of hikers, and (2) increasing densities of mountain bikers. To avoid conflicts and ensure visitor safety, the ski area operators implemented a zoning scheme segregating mountain bikers to the Mountain Bike Park near the base of the ski hill and hikers to the high alpine area. Hikers are prohibited in the Bike Park and mountain bikers are not allowed in the high alpine. Given that these two user groups rarely encounter each other in the ski area, this article focuses on hikers' acceptability norms for the *density of hikers* indicator and mountain bikers' acceptability norms regarding the *density of mountain bikers* indicator.

Visual Approach to Normative Theory

Image capture technology (ICT) was used to measure the two indicators (hiker density, mountain biker density). ICT involves the use of computer software for manipulating and creating visuals (Lime, 1990). The use of visuals has become a popular method for depicting multiple levels of indicator impacts associated with recreation use (Freimund et al., 2002; Manning, Lime, Freimund, & Pitt, 1996). Respondents rate the acceptability of several photographs or video clips depicting impacts to the indicator of concern (e.g., use density) varied from low to high. Plotting the acceptability evaluations on a social norm curve provides a mechanism for devising standards.

Several recent studies have used ICT for measuring recreationists' norms regarding social (e.g., crowding, encounters) and resource (e.g., bare ground at campsites) indicators (Freimund et al., 2002; Hall & Roggenbuck, 2002; Inglis et al., 1999; Manning et al., 1996, 1999, 2002; Martin, McCool, & Lucas, 1989; Shelby & Harris, 1985; Shelby et al., 1988). Compared to the alternative where respondents rate the acceptability of written descriptions of indicator conditions, visuals provide a cognitively easier and more realistic assessment of conditions because they allow respondents to see and/or hear what conditions would be like. This is especially important in high-use frontcountry areas such as alpine ski areas where it may be unrealistic to expect respondents to ascertain from a set of written numbers what would be the maximum acceptable impact (e.g., number of visitors, use density). There are, however, disadvantages of the visual approach. For example, evaluating several sets of visuals can be time consuming, which may increase respondent burden. In addition, images often depict "snapshots" of indicator conditions at one moment in time, thus indicators such as noise or the amount of time in sight of others throughout the day may be difficult to measure with visual techniques (see Freimund et al., 2002; Hall & Roggenbuck,

2002; Lime, 1990; Manning et al., 1996, 1999, 2002; and Shelby et al., 1996 for discussions of the advantages and disadvantages of ICT and using visuals to measure norms).

In this study, the density of hikers indicator was measured with five photographs depicting 0 to 16 people per 20 m^2 (65 ft^2) with the number of hikers doubling in each image (i.e., 0, 2, 4, 8, 16 people/20 m^2) (Figure 2). The density of mountain bikers was portrayed with five visuals of 0 to 8 riders per 15 m × 2 m (50 ft × 6.5 ft) section of trail (SOT) with the number increasing by two in each image (i.e., 0, 2, 4, 6, 8 riders/15 m × 2 m SOT) (Figure 3). Similar to past research then, "cueing" was used to portray user densities (Basman, Manfredo, Barro, Vaske, & Watson, 1996).

Figure 2
Sample Photographs Depicting Density of Hikers Indicator

For the density of hikers indicator, the image containing 16 people/20 m^2 was created first and people were randomly removed to create four other visuals of different densities. Using Adobe Photoshop 5.5, hikers were randomly positioned, but their age, sex, number walking in different directions, and number in the foreground and background was balanced. In addition, people were placed on trails, as opposed to the alpine vegetation. The density scale for the visuals was measured in the field at approximately 20 m^2.

Figure 3
Sample Photographs Depicting Density of Mountain Bikers Indicator

For the density of mountain bikers indicator, the image of 8 riders was created first and riders were randomly removed to produce four more visuals of use density. Riders were placed on a trail in linear fashion to reflect their movement pattern given the narrow and descending nature of the trails in the ski area. The density scale for the trail section on which the mountain bikers were placed in the visuals was measured in the field at 15 m long and 2 m wide.

The colour photographs were printed in 20 cm × 15 cm (8in × 6in) size and shown to respondents in cue-card fashion (i.e., one at a time). In the pilot tests, the visuals were presented in random order (e.g., 4, 16, 0, 8, 2 people/20 m^2), chronological/increasing in impact (e.g., 0, 2, 4, 8, 16 people/20 m^2), and decreasing order (e.g., 16, 8, 4, 2, 0 people/20m^2) to check for *starting point bias* (i.e., order effects). No significant differences were observed (hiker visuals: Kruskal-Wallis $H = .01$ to .99, df = 2, $p = .61$ to .99; mountain biker visuals: $H = .62$ to 4.10, df = 2, $p = .13$ to .74), so the sets of visuals were shown in chronological order during main data collection. These results are similar to those reported by Manning et al. (2002), suggesting that starting point bias may not be a major concern for recreation norm measurement.

Respondents rated the conditions in each photograph on a scale of −2 "very unacceptable" to +2 "very acceptable" with interior narratives of −1 "somewhat unacceptable," 0 "neither," and +1 "somewhat acceptable." Respondents were asked to ignore the generic backgrounds, focus on the density of use in each visual, and assume that it was consistently occurring in the ski area in the summer. This is similar to past studies (Basman et al., 1996; Freimund et al., 2002), but an improvement warranting future research may come from using images of the exact study area.

Results

Activity Group Profiles

In total, 87% of the mountain bikers and 55% of the hikers were under 40 years of age. On average, hikers ($M = 34.4$ years) were significantly ($t = 7.60$, df = 393, $p < .001$) older than mountain bikers ($M = 25.8$ years). The effect size of $r_{pb} = .31$ suggests a "typical" (Vaske, Gliner, & Morgan, 2002) or "medium" (Cohen, 1988) relationship between age and activity participation. There were more males (80%) than females (20%) mountain biking in the study area, whereas there was a relatively equal proportion of male (51%) and female (49%) hikers ($\chi^2 = 32.23$, df = 1, $p < .001$, $\phi = .28$). There was a significant ($t = 2.01$, df = 391, $p = .045$),

but "minimal" or "weak" (r_{pb} = .10) difference in mean annual household income between hikers (M = CDN $74,127) and mountain bikers (M = CDN $64,492). Most of the hikers and mountain bikers resided in Canada (60% and 66%, respectively), the United States (27% and 28%, respectively), or Europe (9% and 4%, respectively) (χ^2 = 9.19, df = 12, p = .686, V = .13). Most of these findings are generally consistent with other studies of hiker and mountain biker characteristics (Carothers, Vaske, & Donnelly, 2001; Chavez, 1999; Hollenhorst, Schuett, Olson, & Chavez, 1995).

Research has demonstrated relationships between recreationists' socio-demographic characteristics and acceptability norms (Inglis et al., 1999; Manning, 1999; Saarinen, 1998; Vaske et al., 1996). In this study, however, ancillary analyses revealed no significant (p > .05) relationships between hikers' demographics and normative evaluations of increasing densities of hikers. Likewise, there were no significant relationships between mountain bikers' demographics and normative evaluations of increasing densities of mountain bikers.

Table 1
Hiker and Mountain Biker Self-reported Skill Levels[a]

	Hikers		Mountain bikers	
Skill level	Sample size (n)	Percentage (%)	Sample size (n)	Percentage (%)
Novice	38	14	28	22
Intermediate	143	52	48	39
Advanced	74	27	33	26
Expert	20	7	16	13
Total	275	100	125	100

a χ^2 = 9.86, df = 3, p = .020; Cramer's V = .159.

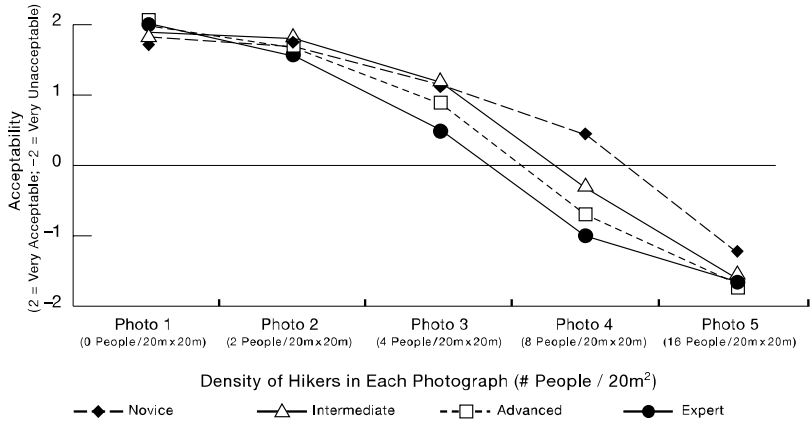
Table 1 shows the distribution of the four skill levels for hikers and mountain bikers. The two distributions differed significantly (χ^2 = 9.86, df = 3, p = .02). Mountain bikers were distributed among the four skill levels, whereas there were more "intermediate" (52%) and less "novice" (14%) and "expert" (7%) hikers. Despite the statistical significance, the difference among groups was relatively "minimal" (Vaske et al., 2002) or "weak" (Cohen, 1988), as shown by the Cramer's V effect size of .16.

Hikers' Acceptability Norms

Hypotheses 1 predicted that as hikers' skill level increases, acceptability (standards) toward increased hiker density will decrease. As shown by the

minimum acceptable condition (point where curve crosses the neutral point) on the mean social norm curves, the "novice" hikers accepted a maximum of 9.18 people/20 m^2, the "intermediate" hikers accepted a maximum of 7.84 people/20 m^2, and the "advanced" and "expert" hikers accepted a maximum of 6.64 and 5.33 people / 20 m^2, respectively (Figure 4, Table 2). There was a significant ($F = 7.12$, df = 3,271, $p < .001$) difference in normative standards among the four skill levels of hikers. The Eta (η) effect size was .28. Using guidelines suggested by Cohen (1988) and Vaske et al. (2002), the strength of this difference can be characterized as "medium" or "typical," respectively. Tamhane's T2 post-hoc tests showed that "novice" and "intermediate" hikers accepted significantly ($p < .05$) higher densities than "advanced" and "expert" hikers. These findings support Hypothesis 1; when hikers' skill increased, normative standards for greater hiker density decreased.

Figure 4
Social Norm Curves of Hikers for Density of Hikers Indicator



Photograph 1: $F = 22.2$, df = 3,271, $p = .086$, Eta = .155
Photograph 2: $F = .72$, df = 3,271, $p = .544$, Eta = .089
Photograph 3: $F = 3.56$, df = 3,271, $p = .015$, Eta = .194
Photograph 4: $F = 8.09$, df = 3,271, $p < .001$, Eta = .287
Photograph 5: $F = 3.49$, df = 3,271, $p = .016$, Eta = .193
Minimum Acceptable Condition: $F = 7.12$, df = 3,271, $p < .001$, Eta = .276

Table 2 shows that the normative agreement (crystallization) increased as skill increased. Crystallization was higher for the "advanced" ($SD = .72$) and "expert" ($SD = .69$) hikers. This is represented by the lower average standard deviations for the norm curves of these groups compared to "novice" ($SD = .84$) and "intermediate" ($SD = .82$)

hikers. The Levene's test for homogeneity revealed a significant (F = 10.19, df = 3,271, $p < .001$) difference in crystallization among the four skill levels. Consistent with Hypothesis 2, these findings show that as hikers' skill increased, normative agreement for acceptable levels of hiker density increased.

Table 2
Social Norm Curve Characteristics of Hikers for the Density of Hikers Indicator

Social norm curve characteristics	Hikers' self-reported skill level in hiking[1]							
	Novice	Inter-mediate	Advanced	Expert	*F*-value	df	*p*-value	Eta (η)
Norm intensity (max. = 10)	7.26[a]	7.88	7.82	8.05[b]	4.02	3, 271	.008	.206
Minimum acceptable condition[2]	9.18[a]	7.84[ac]	6.64[bc]	5.33[b]	7.12	3, 271	< .001	.276
Norm crystallization[3]	.84	.82	.72	.69	10.19[4]	3, 271	< .001	

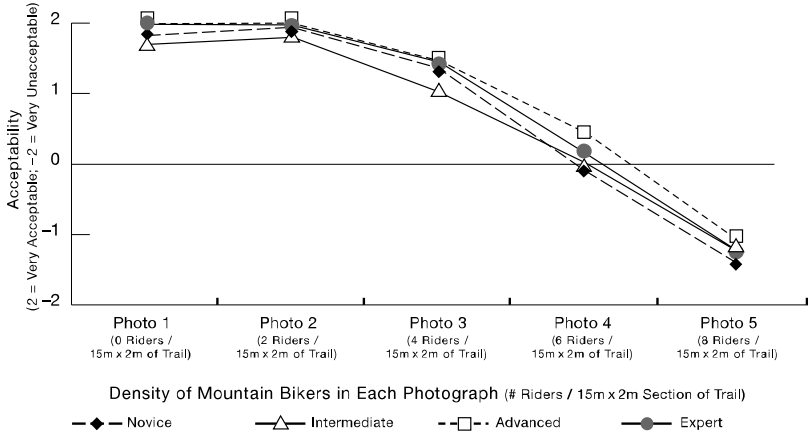
1 Means with different letter superscripts differ at $p < .05$ using Tamhane's T2 post-hoc tests for unequal variances.
2 Cell entries are the mean number of hikers per 20 m².
3 Cell entries are the average standard deviations of the points comprising each norm curve.
4 Represents the *F*-value for the Levene's test for homogeneity.

Hypothesis 3 predicted that as hikers' skill increases, the importance (norm intensity) of the hiker density indicator will increase. Intensities increased from 7.26 (maximum = 10) for "novice" hikers to 7.88 for "intermediate" hikers and to 8.05 for "expert" hikers (Table 2). There was a significant (F = 4.02, df = 3, 271, p = .008) and "minimal" to "typical" relationship (η = .21) between hikers' skill level and norm intensity for this indicator. Tamhane's T2 post-hoc tests indicated that hiker density was significantly ($p < .05$) more important to the "expert" hikers than the "novices." These findings support Hypothesis 3; as hikers' skill increased, norm intensity for hiker density increased.

Mountain Bikers' Acceptability Norms

Figure 5 and Table 3 examine the influence of mountain bikers' skill on their normative evaluations of mountain biker density. It was hypothesized that bikers with higher skill levels (e.g., "advanced," "expert") would rate increasing densities of mountain bikers as less acceptable (Hypothesis 4). No significant relationship, however, was found between mountain bikers' skill and their normative standards (minimum accept-

Figure 5
Social Norm Curves of Mountain Bikers for Density of Mountain Bikers Indicator



Photograph 1: F = .76, df= 3.121, p = .521, Eta = .136
Photograph 2: F = 1.50, df= 3.121, p = .217, Eta = .190
Photograph 3: F = 2.52, df= 3.121, p = .061, Eta = .243
Photograph 4: F = 1.12, df= 3.121, p = .342, Eta = .165
Photograph 5: F = .45, df= 3.121, p = .719, Eta = .105
Minimum Acceptable Condition: F = .90, df= 3,121, p = .442, Eta = .148

Table 3
Social Norm Curve Characteristics of Mountain Bikers for the Density of Mountain Bikers Indicator

Social norm curve characteristics	Mountain bikers' self-reported skill level in mountain biking				F-value	df	p-value	Eta (η)
	Novice	Inter-mediate	Advanced	Expert				
Norm intensity (max. = 10)	7.64	7.63	7.94	7.69	.51	3, 121	.677	.112
Minimum acceptable condition[a]	5.96	6.10	6.58	6.42	.90	3, 121	.442	.148
Norm crystallization[b]	.78	1.04	.80	.72	1.46[c]	3, 121	.229	

a Cell entries are the mean number of mountain bikers per 15 m × 2 m section of trail (SOT).
b Cell entries are the average standard deviations of the points comprising each norm curve.
c Represents the F-value for the Levene's test for homogeneity.

able condition) for increased biker density ($F = .90$, df = 3,121, $p = .442$, $\eta = .15$). Hypothesis 5 predicted that as mountain bikers' skill increases, crystallization (normative agreement) would increase. Again, no difference was found (Levene's $F = 1.46$, df = 3,121, $p = .229$). In addition, it was expected that the density of mountain bikers indicator would be more important (norm intensity) to highly skilled mountain bikers (Hypothesis 6). However, this was not supported ($F = .51$, df = 3,121, $p = .677$, $\eta = .11$). Taken together, these findings fail to support Hypotheses 4 through 6.

Discussion

This article examined the relationships between hikers' and mountain bikers' skill level and their acceptability norms regarding densities of hikers and mountain bikers at the Whistler Mountain ski area. Consistent with Hypotheses 1 through 3, as hikers' skill increased, the acceptability of increased hiker densities (normative standards) decreased and the agreement (crystallization) and importance (norm intensity) increased. Conversely, there were no significant relationships between mountain bikers' skill level and normative standards, crystallization, and intensity for increased mountain biker density. Hypotheses 4 through 6 were not supported.

Several factors may help to explain why mountain bikers of all skill levels do not differ with respect to their norms for increased densities of mountain bikers. Chavez (1999), Hollenhorst et al. (1995), and Ramthun (1995), for example, suggested that mountain bikers sometimes ride in relatively large groups for safety reasons. Mountain bikers in this study traveled in larger groups ($M = 2.87$) than hikers ($M = 2.51$) (Needham, 2002). Due to safety concerns, bikers of all skill levels may feel that a certain amount of trail use is appropriate. In addition, research suggests that: (1) mountain biking is a competitive "social" sport among all ability levels, and (2) most mountain bikers do not ride alone, but prefer to ride with friends or family members (Chavez, 1999; Hollenhorst et al., 1995). Research on mountain biker conflict reflects this social nature of the sport, as mountain bikers seldom experience a large degree of direct conflict with other mountain bikers (Carothers et al., 2001; Ramthun, 1995). These studies of mountain bikers coupled with the findings presented here suggest that use levels / densities of mountain bikers may not be a contentious issue among mountain bikers of all abilities. Other indicators, however, such as trail conditions and discourteous behaviour may generate stronger normative differences among mountain bikers of various skill levels (Symmonds, Hammitt, & Quisenberry, 2000).

Conversely, studies of hikers have shown that as hikers mature in their experience with the activity, they become more "purist" (Manning, 1985; Shafer & Hammitt, 1995; Virden & Schreyer, 1988). Experienced hikers are more likely to avoid certain types of user groups and prefer more solitude. In this study, the "advanced" and "expert" hikers may have been more purist, as they reported significantly more restrictive normative standards compared to the less skilled hikers. The "advanced" and "expert" hikers also reported the highest acceptability ratings of the photograph containing no hikers. The strong ratings for the absence of other hikers suggest that solitude may be important for the experience sought by skilled hikers in the ski area. Conversely, the "novice" hikers were more likely to rate increased use densities as acceptable. Their evaluations of hiker density may have been partially based on concern for safety in an alpine setting. Summer conditions on Whistler Mountain present hazards including bears and rapid inclement weather changes. Given these conditions and the fact that "novice" hikers may be less confident about their hiking ability, they may be less inclined to accept situations whereby they might be alone or accompanied by very few people.

For managers and researchers, this study has methodological, theoretical, and applied implications. For example, frontcountry recreationists often: (1) have difficulty reporting encounter norms, and (2) show considerable variability in normative standards and crystallization (Donnelly et al., 2000; Manning et al., 1996; Vaske et al., 1996). Stating a minimum acceptable condition in high use areas is more difficult. The importance of use decreases in areas where visitors expect many others to be present (Donnelly et al., 2000). Segmenting recreationists into meaningful homogeneous subgroups based on their skill level may explain some of the variability in normative standards and agreement, especially in frontcountry areas such as alpine ski areas.

Understanding the norms of these activity subgroups may help managers design ski areas for summer use. Basing management actions on how much and what kinds of uses and impacts are acceptable among recreationists of different skill levels may allow managers to better address their clientele's attitudes, needs, and wants. For example, ski area managers segment ski runs in the winter according to skill level (e.g., green runs for "novices," black diamond runs for "experts"). Separating use in this fashion allows: (1) the potential for reducing conflict between highly skilled and less experienced activity participants, and (2) recreationists of differing skill levels to engage in their activity in the type of setting desired (e.g., moderate use densities versus low use with more

opportunities for solitude or quietude) (Johnston & Elsner, 1972; Klenosky et al., 1993; Richards, 1996; Thapa & Graefe, 2003). The findings here suggest that ski area managers should consider adopting a similar type of zoning scheme during the summer, especially for hiking trails.

Future Research

To increase the generalizability of these findings, the following future research considerations are offered. First, the visuals measuring the two social indicators (density of hikers, density of mountain bikers) represent a subset of the possible indicators of summer use at alpine ski areas. Future research should consider other indicators such as noise, discourteous behaviour, litter, trail width and depth, and aircraft over-flights, and how these impacts may affect individuals with varying skill levels in different activities.

Second, similar to previous work (Basman et al., 1996; Freimund et al., 2002), this research used generic backgrounds in the photographs. Respondents were told to assume that the indicator conditions were occurring in the ski area. Using area specific backgrounds, however, may provide better visual cues. The visuals showed hikers and mountain bikers per unit area ($20\,m^2$, $15\,m \times 2\,m$ of trail). Given that people do not space themselves evenly across an area, it should not be assumed that a setting's capacity can be estimated by dividing its total area by the corresponding unit standard. Research is required to explore the extent to which this approach can be extrapolated to a landscape level. The photographs also depicted static representations of indicator conditions. Research using video techniques (Freimund et al., 2002) and other graphic devices (Manning et al., 1996; Martin et al., 1989) may provide a more realistic representation of potential indicator conditions.

Third, this study assessed respondents' acceptance of indicator conditions. Recent studies have shown that measures such as respondents' preference and absolute maximum tolerance of indicator conditions can differ from their acceptance (Manning et al., 1999, 2002). Future research should continue to explore differences between these evaluative response categories.

Fourth, when the data for this study were collected (summer, 2000), hikers and mountain bikers were the two main summer user groups on Whistler Mountain (Needham, 2002; Needham & Rollins, 2003; Needham et al., 2004). Research is needed to examine the extent to which summer activity participation may have changed at this ski area and

how participants' skill level in different activities may or may not influence their normative evaluations of conditions related to summer use at this and other alpine ski areas.

Fifth, this study asked hikers and mountain bikers to self-report their skill level in their activity as either "novice," "intermediate," "advanced," or "expert." Although this is identical to past research (Bricker & Kerstetter, 2000; Donnelly et al., 1986; Miller & Graefe, 2000; Thapa & Graefe, 2003; Vaske et al., 2004), alternative methodological approaches have been proposed. For example, Bryan (1977) used interviews and participant observation techniques to classify anglers' skill level based on their activity preferences, orientation toward the recreation resource, and angling experience and interest. Heberlein and Dunwiddie (1979) and McFarlane (2001) contend that these qualitative approaches may provide more depth and detail necessary for delineating underlying dimensions and stages of progression related to activity skill. Empirical research is required on alternative approaches for measuring recreationists' skill level and the extent to which these techniques provide similar results to those observed here.

Finally, the findings presented here are limited to one alpine ski area; the results may not generalize to all ski areas where chairlifts operate during the summer season. The applicability of these findings to other activity groups, ski areas, and commercial recreation settings remains a topic for further empirical investigation.

Acknowledgment

The authors thank the Intrawest Corporation at Whistler/Blackcomb for allowing this research to be conducted at the Whistler Mountain ski area. Colin Wood, Philip Dearden, and Paul West (all at University of Victoria) are acknowledged for their assistance. The lead author was at the Department of Geography, University of Victoria when this study was conducted.

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