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SEGMENTATION OF CYCLING EVENT PARTICIPANTS: A TWO-STEP CLUSTER METHOD UTILIZING RECREATION SPECIALIZATION

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Recreation specialization is a widely applied concept for segmenting recreation participants according to their levels of skill and expertise in particular activities; however, few studies have employed this concept as a segmentation variable in event management research. A segmentation method incorporating two-step cluster analysis, underpinned by recreation specialization, is proposed and tested for segmenting attendees at a participatory sporting event. The research used data collected through a survey conducted at the 2010 Audax Alpine Classic, a participatory cycling event held each February (Summer) in Australia's Victorian Alpine region. Participants in this event exhibited high levels of recreation specialization in relation to cycling and could be segmented into two distinct clusters: Intermediate cyclists and Expert cyclists. The two clusters demonstrated statistically significant differences in terms of the distance they chose to ride, their motivations for participating in the event, and their opinions regarding a variety of operational aspects to do with the event. Data indicated that the event catered to a specialized, yet nuanced, participant base. The advantages of employing exploratory segmentation methods through application of the concept of recreation specialization in event management research are discussed.

Keywords: Recreation specialization; Cycling; Segmentation; Sport events; Amateur athletes

Introduction

Segmentation is a method used by event managers and event management researchers to identify subgroups of event attendees sharing common characteristics and to compare and contrast such groups who vary in their traits, behaviors, needs, and motivations (Barbieri, Mahoney, & Palmer, 2008; Mackellar, 2006a; Thompson & Schofield, 2009). However, previous segmentation studies conducted in the context of sports events have largely discounted individual participant's levels of experience, skill, knowledge, and physical ability and affect relating to the activity in which participants are engaged (e.g., running, cycling, and swimming). Such studies (e.g., Pennington-Gray & Holdnak, 2002) have thus arguably failed to

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adequately link the demand dimensions of events (e.g., participants' needs, skills, motivations, and experiences) with supply dimensions (e.g., event setting, accessibility, and facilities). This situation may be particularly problematic for events where factors such as physical ability, commitment to the activity, experience, skills, and knowledge can influence the quality of an event participant's experience. As McIntyre (1990) asserted, "the diverse needs and preferences of recreationists necessitate the development of means of appropriately identifying sub-groups in specific activity populations that differ with respect to characteristics that are relevant to the provision of satisfying recreation experiences" (p. 5).

The purpose of this article is to examine the utility of recreation specialization as a basis for segmenting participants in a cycling event, the Audax Alpine Classic (AAC), held during late summer in the Alpine region, south eastern Australia. Based on data acquired through a survey of participants, an exploratory two-step cluster method is used to segment amateur cycling participants. This article then draws upon Bryan's (1977) recreation specialization concept and critically analyzes its usefulness as a basis for segmenting recreational participants in an event, where the activity of cycling is the central focus of participants' engagement in the event. This article therefore presents an opportunity to assess McIntyre's (1990) assertion and also addresses Phelps and Dickson's (2010) call for research into active participation at events by amateur athletes—an issue that has attracted only scant attention.

Literature Review

Recreation Specialization

In presenting the recreation specialization concept, Bryan (1977) noted that "a major weakness of past research efforts has been the assumption of sportsmen group homogeneity" (p. 175). From his study of trout fishermen, Bryan concluded that these recreationists could be positioned along a continuum beginning with low-level specialization, where the fisherman is a "beginner" at the activity and exhibits only basic knowledge of and commitment to the activity; at the other end of the continuum is a high level of specialization where the fisherman is highly committed to the activity, possesses a great deal of knowledge about fishing, and may invest significant sums of money in specialized equipment. Also implicit in Bryan's original conceptualization was an assumption that recreationists yearn to develop skills and expertise in their chosen leisure pursuit, increase their frequency and intensity of involvement, and thus progress along the specialization continuum over time. However, this assumption has been refuted in recent literature. Indeed, a host of studies have recently presented evidence indicating that, while progression is a goal for some, it is the exception rather than the rule (e.g., Kuentzel & Heberlein, 2006, 2008; Oh, Sorice, & Ditton, 2010; Scott & Lee, 2010).

Bryan's (1977) work and the concept of recreation specialization have been widely used in leisure and recreation studies examining many aspects of participants' engagement in a variety of outdoor recreation activities. These have included studies of participant motivations (Burr & Scott, 2004; Kerstetter, Confer, & Graefe, 2001; Scott, Ditton, Stoll, & Eubanks, 2005), environmental behaviors and practices (Dyck, Schneider, Thompson, & Virden, 2003; Thapa, Graefe, & Meyer, 2005, 2006), setting preferences (McFarlane, Boxall, & Watson, 1998; McFarlane, 2004), attitudes toward management (McIntyre & Pigram, 1992; Oh & Ditton, 2006; Salz & Loomis, 2005), satisfaction (Burr & Scott, 2004), and place attachment (Bricker & Kerstetter, 2000).

Scott and Shafer (2001) presented a comprehensive summary of activities to which recreation specialization was applied to prior to 2001, along with the dependent variables used in those studies. With the exception of two studies, which examined participation in and social worlds within contract bridge (Scott & Godbey, 1992, 1994), Scott and Shafer concluded that recreation specialization research has focused almost exclusively on outdoor recreation activities. Although this focus seems to have been largely maintained since the publication of Scott and Shafer's review article, a handful of studies have deviated from this trend, with one study examining how golf tourists can be segmented according to recreation specialization levels and how their travel preferences can be better understood

(S. Kim, Kim, & Ritchie, 2008). Another study segmented cyclists using recreation specialization to understand bicycle route preferences for urban planning purposes (Chen & Chen, 2012).

There has been considerable debate over recreation specialization's conceptual purpose and how the construct should be operationalized and measured. It is now generally accepted that recreation specialization is a multidimensional construct. However, the structure of the construct is yet to be agreed upon. Some early specialization studies made use of a single measurement variable such as frequency of participation (Ditton, Loomis, & Choi, 1992; Graefe, 1980; Schreyer, Lime, & Williams, 1984). However, as Salz, Loomis, and Finn (2001) pointed out, "a single variable … cannot adequately measure these distinct dimensions of specialization and may result in high misclassification rates" (p. 242). Currently, there is widespread agreement that recreation specialization comprises three interrelated dimensions: the behavioral, cognitive, and affective dimensions (McFarlane, 2004; McIntyre & Pigram, 1992; Oh & Ditton, 2006; Thapa et al., 2005, 2006). or as Scott and Shafer (2001) described it, "a progression in behaviors, skills, and commitment" (p. 337). The *behavioral* dimension of recreation specialization considers an individual's frequency and intensity of participation in a particular activity; the *cognitive* dimension takes into account skills, knowledge, and setting attributes/preferences; and the *affective* dimension acknowledges the intrinsic meaning that an activity has for the individual, as reflected by the levels of importance, enjoyment, self-expression, and centrality attached to that activity (McIntyre & Pigram, 1992).

The application of recreation specialization in event management research is limited. Burr and Scott (2004) explored how recreation specialization can facilitate a more in-depth understanding of participants at a bird-watching event in the US state of Utah, while Scott, Baker, and Kim (1999) used recreation specialization to examine motivations and behaviors of participants at a bird-watching event in Texas in the US. Burr and Scott's study revealed that only a small proportion of attendees were highly specialized in the activity of bird-watching. They also found that individual dimensions of recreation specialization (such as skill and commitment) related to dependent variables (such as motivations and satisfaction with the event) in different ways. Their study concluded that recreation specialization is indeed suited to studies seeking to more comprehensively understand visitors to events tied to particular leisure activities, due to its focus on individuals' behavior, skill, and commitment.

The present study applies recreation specialization as a concept for identifying heterogeneity in participation (product) preferences among attendees at a bicycling event. Despite the recent rapid growth of cycling as a recreational activity (Australian Sports Commission, 2011) and the potential usefulness of recreation specialization as a concept for segmenting cyclists, there are only two published studies that have previously applied the recreation specialization concept to this activity. Hopkin and Moore (1995) explored activity setting preferences among a sample of 141 mountain bikers who made use of unpaved trails in Raleigh, North Carolina, in the US. Using correlation analysis, they found that the level of specialization significantly and positively correlated with 6 of 18 trail attributes. Broadly, the study indicated that as specialization increased so too did cyclists' desires for challenge in the form of speed, trail technicality, and obstacles. Accordingly, Hopkin and Moore concluded that one type of trail does not suit all and that recreation specialization provides a suitable framework through which the preferences of the wider spectrum of mountain bikers can be understood.

More recently, Chen and Chen (2012) applied recreation specialization to segment recreational cyclists. Their study aimed to explore preferences for cycling route design for the purposes of informing urban planning policy in Taiwan. A self-completion questionnaire was distributed along specified cycling routes in southern Taiwan and also to members of various cycling clubs, resulting in 232 returned questionnaires (77.3% response rate). Chen and Chen's analysis revealed two main groups of cyclists: high specialization and low specialization. High specialization cyclists preferred longer, more challenging routes (e.g., with challenging hills and technical sections), while low specialization respondents preferred shorter, less challenging routes. Both groups expressed a strong desire for routes which segregated bicyclists from

vehicular traffic. Chen and Chen also noted that "the concept of recreational specialization is still rarely applied when exploring cyclist preferences" (p. 1), indicating that there is broad scope to apply recreation specialization in studies of cyclists' participation in cycling events.

Participatory Sports Events

Based on a review of the special interest tourism literature, Mackellar (2006b) suggested that, in addition to typologies categorizing special events on the basis of content (e.g., sport, cultural, business) and/or size (e.g., major event, hallmark event), events may be further distinguished according to their potential or actual audience. Mackellar subsequently proposed a spectrum ranging from general interest to special interest events. General interest events were described as community-based in nature, offering little specialized programming. In contrast, Mackellar described special interest events as catering to narrow, specialized (or themed) audiences relating to specific leisure interests. Mackellar argued that categorizing events on the basis of audience interest "allows event managers and regional planners to better understand the motivations and behaviors of audiences. Further it allows segmentation of audiences based upon their understanding of specialized recreational needs" (p. 54).

Events tied to particular recreational or sporting activities can thus be considered "special interest events" in the sense that they cater to audiences interested in a single or very narrow range of activities. It can be further argued that recreational and sport-based special events vary according to the accessibility of the event and the scope of settings within which attendees are able to participate. Some events cater only to elite participation, such as the Olympic Games. Other events (e.g., marathons, triathlons, and ocean swims) are broader in scope, allowing for concurrent participation by professional and amateur participants with often vastly different levels of commitment, skills, motivations, and experience. In these "other" events competition may therefore be a primary objective for some participants and not an objective at all for others, with the social setting perhaps a primary motivation for participating. Examples of such events include the London Marathon, which was the subject of a recent study by Davies, Coleman, and Ramchandani (2010).

For some events, participation is the main focus. A competitive element is either absent or is only one of a number of factors encouraging participation. Often events of this nature are tied in with the promotion of certain social causes, such as the work of charities and other nongovernment organizations. A prominent example of this type of event is the *Ride for the Roses Weekend*, a charity bike ride in Austin, Texas, in the US, which raises money for cancer research (Livestrong, 2011).

For the purposes of this article, organized sporting events, open to all, and in which participation for a variety of reasons is promoted over competition in and of itself, are referred to as "participatory sports events." Participatory sports events are used commonly as a vehicle for place or destination marketing and may also be used to stimulate repeat visitation among participants (Kaplanidou & Vogt, 2007). Such events are typically staged in public places, including roads, parks, beaches, and waterways, and thus are generally free for spectators to attend (Davies et al., 2010). Coleman and Ramchandani (2010) note that participatory events tend to make use of existing infrastructure and can therefore deliver sustainable economic benefits for host communities. This is in contrast to elite participation events, which often require construction of specialized facilities and thus substantial financial, human, and other resource commitments (e.g., Coleman & Ramchandani, 2010; Federal Department of Industry, Science and Resources, 2000; Walo, Bull, & Breen, 1996).

Participatory events are considered an important subsegment of sport tourism. They are often a catalyst for tourism (Getz, 2008), with local attendees usually representing a small proportion of the overall participation base. For example, a previous survey of participants at the 2008 AAC cycling event (Lamont, Axelsen, & Faulks, 2008) found that, of the 949 respondents, 92.4% were "tourists" and 97.3% of these visitors stayed away from home for one night or more to participate in the event. The survey also calculated an approximate economic benefit to the host community of AU$814,176 through the participants themselves,

without accounting for the additional expenditures by those who accompanied the participants.

Participatory Cycling Events

Participation in recreational cycling has increased in popularity in Australia since the mid-1990s. The 1996–1997 Population Survey Monitor indicated that 0.6% of the Australian population participated in cycling for recreational or sporting purposes (Australian Bureau of Statistics, 1998). Results from the same survey for 2001–2002 showed a marked increase from the 1996–1997 data, with 5.7% of the Australian population reported to have participated in cycling during this period. Furthermore, outcomes from the annual Participation in Exercise, Recreation and Sport Survey (Australian Sports Commission, 2011) indicated that cycling in Australia remained stable as the fourth most popular activity between 2001 and 2010, exhibiting a 45% increase in participant numbers for the same period.

Participatory cycling events provide cyclists with opportunities to cycle under highly regulated conditions and in the absence of competition. Participatory cycling events are common in Australia, with events varying in terms of distance cycled, duration (hours/single day vs. multiday), participant numbers, terrain (flat course vs. undulating or mountainous courses), setting (urban vs. countryside), and purpose (profit-making vs. charity fundraising). The *Great Victorian Bike Ride* and *Cycle Queensland* are events conducted in different regions of their respective Australian states annually, attracting thousands of participants (Faulks, Ritchie, & Fluker, 2006). Single-day participatory cycling events are also prevalent, with events conducted by not-for-profit organizations as well as private enterprise. For example, over 6,500 amateur cyclists participated in the 2013 *BUPA Challenge Tour*, a participatory event held in conjunction with the Tour Down Under, a major international professional cycle race held annually in Adelaide, Australia (South Australian Tourism Commission, 2013).

As with many participatory sports events, organizers of participatory cycling events face challenges in understanding and catering to the needs and expectations of participants who vary widely in their demographics, psychographics, skills, abilities, and experiences. For example, persons new to cycling may not have the ability nor the desire to attempt a long, arduous course. Conversely, experienced cyclists may not be satisfied with, or even attracted to, events not offering sufficient physical challenge. Therefore, in staging participatory cycling events, consideration should be given to course design and layout, distances, terrain, and the provision of information and support services to meet participants' expectations. Knowledge of participants gleaned through segmentation research may be of particular value in this regard.

Segmentation Research and Special Events

Gathering and critically analyzing feedback following an event is a crucial part of event planning and management processes, with postevent participant surveys, a common tool used for event evaluation. These surveys assist event managers in soliciting feedback from attendees regarding their experiences and satisfaction with various aspects of the event (Allen, O'Toole, McDonnell, & Harris, 2002). Through this evaluation process, event managers are able to identify weaknesses and implement improvements to deliver future events that are congruent with market expectations (Allen et al., 2002).

Market segmentation refers to "dividing a market into distinct groups of buyers with different needs, characteristics or behavior that might require separate products or marketing mixes" (Kotler, Brown, Adam, Burton, & Armstrong, 2007, p. 344). Designing postevent surveys in which subgroups can be identified and analyzed in isolation allows for more in-depth analysis, facilitating a nuanced understanding of the overall participation base. Event managers face a dilemma in that there are no universally accepted guidelines for segmenting populations of event attendees. Instead, a marketer "has to try different segmentation variables, alone and in combination, to find the best way to view the market structure" (Kotler et al., 2007, p. 345).

Several studies have segmented populations of event attendees using a variety of approaches. Thompson and Schofield (2009) segmented attendees at a cultural festival in Mongolia according to motivation for attending. Barbieri et al. (2008) conducted a similar study at four recreational

vehicle/camping shows in Michigan (USA). Thompson and Schofield (2009) found no significant differences between motivation clusters, while Barbieri et al. (2008) identified significant between-cluster differences for product purchase cycle stage, product usage, and show behaviors. Other approaches have included activity preferences (K. Kim, Sun, Jogaratnam, & Oh, 2007), activity participation (Gillis & Ditton, 1998), and a combination of motivations, demographics, and event participants' behavioral characteristics (Formica & Uysal, 1995). Conversely, a study of travel patterns and the behavior of spectators at a drag racing event in Florida (USA) (Pennington-Gray & Holdnak, 2002) used only elementary demographic variables such as age and income to segment spectators, and as a result, the analysis of between-group differences was constrained.

Recreation specialization is, however, a potentially useful basis for segmenting attendees at participatory sporting events. The concept links participants' experiences with the resource (in this case, an event) and its management and is indicative of a person's level of involvement and engagement in a particular leisure activity—a likely source of variance among recreationists (McIntyre, 1990). Although participatory sports events may appeal to narrow audiences, that is, those with a specific interest in that particular sport, attendees may still be heterogeneous with respect to their skills, knowledge, and involvement. Heterogeneity in these areas may underpin differences in motivations for attending an event and a broad range of expectations in terms of product offerings. As Bryan (1977) suggested:

> outdoor recreation participants can be placed on a continuum from general interest and low involvement to specialized interest and high involvement. Each level of specialization carries distinctive behaviors and orientations. These include equipment preference, type of experience sought, desired setting for the activity, attitudes toward resource management, preferred social context, even vacation patterns. (p.18)

Subsequently, the present study is indeed significant. First, because it is among the first to apply the recreation specialization construct to an event linked with sport. Second, because it is the first event management study to propose and test a segmentation method utilizing recreation specialization and two-step cluster analysis to investigate heterogeneity among attendees at participatory sports events.

Methods

Study Setting

The AAC is an annual single-day participatory cycling event held in the Australian Alps. The event is based in Bright, North East Victoria. Audax events are not promoted as being competitive in nature. They are best described as a challenge involving cycling long distances within a prescribed time limit. The AAC is regarded as the toughest single-day, noncompetitive cycling event in Australia, because of the lengthy, strenuous mountain passes riders must negotiate. These include Tawonga Gap (altitude 885 m), Falls Creek (altitude 1560 m), and Mount Buffalo (altitude 1330 m). Six distance options are offered to participants ranging from 70 to 250 km, for which a 13.5-h time limit applies. The difficulty of the event is often exacerbated by high summer temperatures. In 2010, the event was held on January 24 and attracted a total of 2,352 cyclists, each of whom participated in one of the six distance options. Table 1 summarizes the participation characteristics for each distance option as well as offering a description of each course. From this table, the proportion of male and female participants among the various ride distance options is noteworthy. Participation by females was much more concentrated in the shorter rides (i.e., 130 km and less), while the longer rides were dominated by male participants.

Data Collection

A survey instrument was developed and administered using a web-based survey program (Qualtrics). The survey opened approximately 3 weeks after the event (February 15) and closed 4 weeks later. With the cooperation of event organizers, a hyperlink to the survey website was e-mailed to all AAC cyclists inviting them to participate in the survey, of which 623 responded (a response rate of 26.5%). By contrasting the actual number of cyclists that participated in each ride distance option (as reported

Table 1
Descriptions of the Audax Alpine Classic Courses

	250 km Course	200 km Course	140 km Course	130 km Course	72 km Course	70 km Course
No. of participants in 2010	406	1105	285	347	87	122
Proportion of overall event participants (%, n = 2,352)	17.3	47.0	12.1	14.6	3.7	5.2
Proportion of male participants (%)	96.1	91.1	80.4	76.9	54.0	70.5
Proportion of female participants (%)	3.9	8.9	9.6	23.1	46.0	29.5
Course description	Single loop course from Bright to Omeo and return via Mt Beauty. All sealed roads. Two major climbs of 1,600 m above sea level or higher.	Hub-and-spoke route with Bright being the start/finish. All sealed roads. Two major climbs of 1,400 m above sea level or higher. Two minor climbs to approx. 900 m above sea level.	Hub-and-spoke route with Bright being the start/finish. All sealed roads. One major climb to 1,400 m above sea level and two minor climbs to approx. 900 m above sea level.	Out-and-back course from Bright to Falls Creek and return via Mt Beauty. All sealed roads. One major climb to 1,500 m above sea level and two minor climbs to approx. 900 m above sea level.	Out-and-back course from Bright to Mt Beauty and return. All sealed roads. Two minor climbs to approx. 900 m above sea level.	Out-and-back course from Bright to Dingo Dell and return. All sealed roads. One major climb to 1,400 m above sea level.

in Table 1) with the proportion of cyclists in each distance option within the study's sample, it was evident, albeit anecdotally, that the proportions of respondents closely matched the overall proportions of participants across the six distance options. The exception for this pattern was the 140 km event, where the sample proportion was 7.7% compared with a proportion of 12.1% of participants.

The use of a self-selection sampling (nonprobability) method limits the ability to generalize from the findings to the wider population of AAC participants and to other cycling events. However, this study is less concerned with generating representative information about cyclists than it is with proposing and testing a segmentation method aimed at identifying heterogeneous groups at participatory sporting events.

Variable Measurement

The survey instrument contained six sections: Section 1 collected information about respondents' participation in the AAC; Section 2 collected feedback regarding operational aspects of the event; Section 3 explored respondents' motivations for participating in the AAC; Section 4 contained the recreation specialization measures; and Sections 5 and 6 gathered information regarding participants' demographics, cycling behaviors, and reasons for visiting the Bright region.

For the purpose of this study, recreation specialization was conceptualized as a multidimensional construct. Fourteen items measured recreation specialization adapted from studies by McIntyre and Pigram (1992), Hopkin and Moore (1995), and Thapa et al. (2006). Five items measured the behavioral dimension, of which respondents gave a numerical (whole number) response. These items measured length of time involved in cycling and frequency of participation. The affective and cognitive dimensions were measured using four and five items, respectively, where respondents indicated their response on a 5-point Likert-type scale. The affective items required respondents to indicate their level of agreement with statements such as "cycling is one of the most enjoyable things I do" and "I like other people to recognize me as a cyclist." The cognitive dimension relied on a self-reported level of competency in tasks specific to cycling such as riding safely in a "bunch" (or "peloton") of cyclists, performing basic mechanical tasks, and riding through corners at speed.

A measure of participation motives was also included for the purpose of testing for variations in attendance motivations between the recreation specialization clusters. Motivations for participation in the AAC were measured using 31 items adapted from the Leisure Motivation Scale (LMS) (Beard & Ragheb, 1983). The LMS is a generic scale that has been applied previously to measuring participant motives in a range of leisure activities (e.g., Mohsin & Ryan, 2007; Ryan & Glendon, 1998; Ryan & Huyton, 2000). Respondents indicated their agreement or disagreement on a 5-point Likert-type scale (strongly disagree to strongly agree) with 31 statements adapted for the theme of the study, for example, "To learn about [cycling]" and "To be good at [cycling]."

Data Analysis

AAC participants were segmented into distinct groups according to their level of recreation specialization using a two-step cluster analysis procedure utilizing the 14 recreation specialization measures. *Cluster analysis* is a term describing a range of statistical techniques for classifying individuals or objects into distinct groups ("clusters") with maximal intragroup homogeneity and maximal intergroup heterogeneity (Hair, Black, Babin, Anderson, & Tatham, 2006). Cluster analysis has been advocated by McIntyre and Pigram (1992) as suitable for segmenting specialized populations because it caters appropriately for the multidimensional nature of the recreation specialization construct.

Two-step cluster analysis is appropriate in situations where the sample size is large and where the researcher does not know in advance the number of clusters required to adequately segment the sample (Norusis, 2009). Two-step cluster analysis was appropriate for this study because of the large sample size ($n = 623$) and because there was no a priori basis for specifying the number of clusters required to segment the sample. A similar approach utilizing two-step cluster analysis has been used and advocated in segmenting tourists by Tkaczynski, Rundle-Thiele, and Beaumont (2010).

Two-step clustering is a useful means of segmenting participants at special events because it extracts the ideal number of clusters based on the

Table 2
Recreation Specialization Cluster Solution

Recreation Specialization Items	Item Importance	Cluster 1 ($n = 263$)	Cluster 2 ($n = 276$)
Ride defensively in traffic[a]	1.00	4.22	4.92
Cycling is an important part of my life[b]	0.86	4.30	4.94
Safely ride in a "bunch" of cyclists[a]	0.83	4.01	4.83
Take sharp corners at speed[a]	0.75	3.72	4.59
Ride in a straight line[a]	0.65	4.50	4.97
Cycling is one of the most enjoyable things I do[b]	0.63	4.24	4.83
I organize a lot of my life to fit around my cycling commitments[b]	0.53	3.65	4.45
Perform basic mechanical tasks (e.g., change a flat tire, adjust gears and other components)[a]	0.51	4.02	4.72
I like other people to recognize me as a cyclist[b]	0.27	3.66	4.24
For how many years have you been a regular recreational cyclist?[c]	0.20	8.94	14.64
How many competitive events have you actively participated in during the previous 12 months?[c]	0.17	1.23	5.92
For how many years have you been actively participating in events to do with cycling?[c]	0.14	8.36	13.05
On average, how many recreational rides do you go on each week?[c]	0.09	2.83	3.69
How many noncompetitive cycling events have you actively participated in during the previous 12 months?[c]	0.02	3.70	5.08

Average silhouette measure of cohesion and separation = 0.3. Items listed in order of variable importance (i.e., importance of the variable in differentiating the clusters).
[a]Cognitive specialization items (measured on 5-point Likert scale, 1 = *Not competent at all*, 5 = *Extremely competent*).
[b]Effective specialization items (measured on 5-point Likert scale, 1 = *Strongly disagree*, 5 = *Strongly agree*).
[c]Behavioral specialization items (measured using open-ended, whole number response).

data itself. The researcher therefore does not need to specify a certain number of clusters in advance as is necessary in other forms of cluster analysis, the validity of which has been questioned previously (Norusis, 2009). That the number of clusters does not need to be predetermined is a highly useful characteristic of two-step cluster analysis for segmenting attendees at special events. Indeed, it is unlikely that any a priori basis for knowing how many distinct groups of attendees will be present. Event organizers are also unlikely to have an understanding of the characteristics through which attendees might exhibit variance given that segmenting event audiences is inherently exploratory in nature; hence, the utility of two-step cluster analysis as an exploratory data analysis tool in event segmentation studies.

Once the cluster solutions were settled upon, cluster membership was deployed as the independent variable for several between-cluster analyses. First, tests of significance were performed to determine if motivations for participating in the AAC varied according to recreation specialization cluster membership. Second, cluster membership was employed as the independent variable in identifying differences in AAC participants' choice of event distance and satisfaction levels with various aspects of the event according to their level of recreation specialization. Between-cluster differences were examined using independent sample *t* tests and one-way analysis of variance (ANOVA) with Tukey post hoc tests. In instances where unequal group sizes violated homogeneity of variance parameters, Welch's *f*(*F*w) was utilized in lieu of one-way ANOVA in conjunction with Games–Howell post hoc tests as recommended by Field (2005).

Results

Two-Step Cluster Analysis

With regard to the sample, 88.1% of respondents were male. Those aged between 40 and 59 years accounted for 60.6% of the sample. Respondents were generally well educated, with 70.9% holding either an undergraduate or postgraduate university qualification. Most respondents were employed full time (86.4%), while almost half (45.6%) earned a weekly gross income of ≥AU$1,800.

In segmenting AAC participants according to their level of recreation specialization, two-step cluster analysis was used, through which a solution consisting of two clusters was produced. Table 2 contrasts the mean scores for the 14 recreation specialization items between the two clusters. The *silhouette measure of cohesion and separation* is an index ranging from −1 to 1. It reflects the efficacy of a cluster solution in maximizing within-cluster homogeneity and maximizing between-cluster heterogeneity. An average silhouette coefficient of 1

Table 3
Descriptive Statistics for Leisure Motivation Scale (LMS) Items

LMS Items	*n*	Mean[a]	*SD*
To challenge my abilities	585	4.63	0.595
To be active	581	4.34	0.673
To keep in shape physically	582	4.33	0.698
To develop physical fitness	578	4.22	0.805
To improve my skill and ability in cycling	584	4.14	0.852
To develop physical skills and abilities	580	4.12	0.800
To be good at cycling	580	3.98	0.888
To interact with others	581	3.70	0.905
To learn about myself	583	3.58	1.126
To build friendships with others	581	3.49	0.964
To meet new and different people	580	3.34	0.938
To discover new things	579	3.31	1.156
To develop close friendships	578	3.21	0.961
To relax mentally	577	3.16	1.149
To avoid the hustle and bustle of daily activities	579	3.11	1.123
To relieve stress and tension	578	3.07	1.115
To expand my knowledge	579	3.03	1.105
To satisfy my curiosity	584	2.92	1.169
To gain others' respect	578	2.89	0.995
To explore new ideas	578	2.85	1.141
To gain a feeling of belonging	579	2.82	0.962
To be socially competent and skillful	579	2.71	0.960
To reveal my thought, feelings, or physical skills to others	577	2.67	0.991
To relax physically	574	2.66	1.110
To use my imagination	577	2.53	0.944
To be creative	579	2.53	0.958
To unstructure my time	572	2.48	0.964
Because I sometimes like to be alone	575	2.47	1.042
To rest	576	2.32	0.961
To learn about cycling	580	2.26	0.986
To slow down	572	2.07	0.867

[a]Measured on a 5-point Likert scale, 1 = *Strongly disagree*, 5 = *Strongly agree*.

Table 4
Significant Between-Cluster Comparison for Leisure Motivation Scale (LMS) Items (at $p \leq 0.05$, Independent Samples *t* Test)

LMS Items	Cluster Membership	*n*	Mean	*SD*
To learn about cycling	Intermediate	260	2.40	0.983
	Expert	269	2.14	0.945
To satisfy my curiosity	Intermediate	262	3.04	1.146
	Expert	270	2.77	1.151
To explore new ideas	Intermediate	261	2.99	1.088
	Expert	267	2.71	1.171
To challenge my abilities	Intermediate	261	4.58	0.607
	Expert	274	4.71	0.523

indicates perfect internal homogeneity within the clusters and perfect partitioning between the clusters. A coefficient of 0.5 indicates a "reasonable solution," and less than 0.2 indicates a "problematic solution" that does not represent any cluster structure (Tsiptis & Chorianopoulos, 2009, p. 100). The average silhouette coefficient for this solution was 0.3, indicating an acceptable but near problematic and not ideal solution.

Table 2 lists the 14 recreation specialization items in order of their importance in distinguishing between the clusters. Items that had the most impact in distinguishing between the two clusters were the cognitive specialization items. Behavioral measures were the least important, despite there being some visibly large differences in behavioral mean scores between the two clusters.

The two clusters comprised approximately equal numbers. Of the 623 respondents to this survey, 539 were included in the final cluster solution. The excluded cases are attributable to the two-step cluster algorithm's *outlier handling feature*, which during the initial clustering process excludes clusters with few members compared to other clusters (Tsiptis & Chorianopoulos, 2009). This feature reduces the effect of outliers in determining an optimal cluster solution.

In summary, the cluster solution segmented the 539 respondents into two distinct groups according to respondents' level of recreation specialization. Both clusters exhibited quite high mean scores across all specialization measures; however, scores among Cluster 2 were higher than Cluster 1. Members of Cluster 1 were subsequently labeled "Intermediate," and members of Cluster 2 were labeled "Expert." The next section presents the results of statistical tests aimed at exploring differences within the AAC participant base attributable to levels of recreation specialization.

Between-Cluster Analyses

Table 3 displays the LMS items in descending rank order according to respondents' endorsements of the various motivational items. Items relating to physical challenge, being physically active and developing skills pertinent to cycling, were the most strongly endorsed motives for participating in the AAC. Items to do with social interaction were also quite strongly endorsed. In contrast, items reflecting rest and relaxation were the least endorsed.

Mean scores and standard deviations for each of the 31 LMS items were calculated separately for the two clusters. An independent samples *t* test was then performed for each LMS item with cluster membership employed as the grouping variable. Table 4 presents the data from these calculations. Significant differences at $p \leq 0.05$ were identified for four of the LMS items. These were "to learn about cycling" [$t(527) = 2.997$, $p = 0.003$], "to satisfy my

Table 5
Event Distance Choice According to Recreation Specialization Cluster

Event Distance Choice	Intermediate	Expert
250 km ($n = 138$)	35.5%	64.5%
200 km ($n = 254$)	44.9%	55.1%
140 km ($n = 42$)	61.9%	38.1%
130 km ($n = 68$)	63.2%	36.8%
72 km ($n = 15$)	93.3%	6.7%
70 km ($n = 22$)	77.3%	22.7%

Table 6
Between-Cluster Tests of Significance: Operational Questions

Dependent Variable	*t* Value (if Applicable)
How satisfied are you with your experience at the 2010 Audax Alpine Classic?[a]	
The catering provided on the course I rode was adequate[b]	
More nutrition such as energy gels and sports drinks should be available on the course[b]	
The use of electronic timing enhanced my overall satisfaction of participating in this year's event[b]	$t = -2.09$, $df = 537$, $p = 0.037$
Any queries I submitted to the event organizers by e-mail were answered in a timely and satisfactory manner[b]	
Would you be interested in a 300 km ride option starting at Bright, with additional hills?[b]	$t = -3.53$, $df = 536$, $p = 0.000$
Would you be interested in a 250 km ride option starting at Omeo?[b]	
How many nights did you spend away from home to participate in the 2010 Audax Alpine Classic?[c]	

[a]Measured on a 5-point Likert scale (1 = *Extremely dissatisfied*, 5 = *Extremely satisfied*).
[b]Measured on a 5-point Likert scale (1 = *Strongly disagree*, 5 = *Strongly agree*).
[c]Measured using open-ended, whole number response.

curiosity" [$t(530) = 2.765$, $p = 0.006$], "to explore new ideas" [$t(526) – 2.852$, $p = 0.005$], and "to challenge my abilities" [$t(513) = –2.369$, $p = 0.009$]. Aside from the item "to challenge my abilities," members of the Intermediate cluster exhibited a significantly higher mean score for these motives.

As the AAC offers six distance options ranging from 70 km through to 250 km, a reasonable hypothesis is that there is a significant difference between participants' choice of event distance according to recreation specialization cluster membership. That is, persons with a higher level of recreation specialization will be more likely to choose longer distance options, while less specialized participants will choose shorter distance options. A chi-square test supported this hypothesis [$\chi^2(5) = 538.6$, $p = 0.000$]. Indeed, Table 5 illustrates that there were significantly more cyclists belonging to the Expert cluster in the 200 km and 250 km cells than there were in the Intermediate cluster. Furthermore, for ride distances of 140 km and less, there were significantly higher numbers of Intermediate cyclists than there were Expert cyclists.

Further analyses were undertaken to identify significant between-cluster differences regarding operational aspects of the AAC (refer to Table 6). A significance level of $p \leq 0.05$ was used throughout. The purpose of these tests was to identify differences in respondents' opinions about various aspects of the event and to determine if these might be attributable to the level of recreation specialization. A selection of operational questions from the 2010 AAC participant evaluation survey were used as dependent variables in tests of significance with recreation specialization cluster membership as the independent variable. A range of other independent variables were also tested to identify the most effective segmentation variables in uncovering differences in respondents' opinions.

Of the eight dependent variables, significant differences according to recreation specialization cluster membership were detected for only two. These were in relation to the role of electronic timing in enhancing cyclists' event experiences and in gauging interest for an additional distance option of 300 km for the following year's event. In both instances, the Expert cluster exhibited a significantly higher mean importance score than the Intermediate cluster.

Discussion

Participatory sports events are increasing in number and in participation levels (Coleman & Ramchandani, 2010; Phelps & Dickson, 2010). At the same time, event managers face increasing competition for people's leisure time and budgets (Allen et al., 2002). Therefore, having an intimate understanding of attendees' needs, expectations, and satisfaction with their event experience is

crucial for developing and maintaining competitive advantage and conducting events that are satisfying for all participants.

Postevent surveys are a vehicle through which event managers are able to gauge their customers' expectations and satisfaction (Allen et al., 2002). However, failure to consider heterogeneity among event attendees in postevent surveys can result in superficial findings, which do not adequately reflect varying opinions within relatively homogeneous subgroups. Surveys that do not adequately capture heterogeneity among event attendees may not reveal participants' experiences and opinions in relation to different aspects of the event, some of which may require significant alterations for subsequent editions of an event. It is therefore essential that context-specific segmentation variables be integrated into postevent evaluation surveys. For events themed around sport, context-specific variables can include skill level, personal ability (such as fitness levels, etc.), and desired level of challenge, for reasons spelt out earlier. This article has argued that recreation specialization, a concept reflecting an individual's involvement, experience, and skills in a leisure activity (Bryan, 1977; Scott & Shafer, 2001), is useful for identifying heterogeneity among attendees at participatory sport events because the concept links participants' experience with the resource.

Using data collected from the 2010 AAC cycling event, a segmentation method employing two-step cluster analysis was tested, resulting in two distinct groups, or "clusters," of cyclists at the AAC. One cluster exhibited very high levels of recreation specialization and the other, moderately high levels: Members of Cluster 2 had a higher level of recreation specialization than members of Cluster 1. Members of Cluster 2 exhibited higher mean scores across all 14 recreation specialization measures than those in Cluster 1. Closer examination of the recreation specialization scores revealed not a great difference between the two clusters. Indeed, for many of the measures, particularly cognitive and affective measures, mean scores were high. However, the possibility of bias induced through the self-report procedure used to measure recreation specialization in this study should be acknowledged. Respondents may have overestimated their abilities resulting in some misclassification, though this is well recognized as an issue within the wider recreation specialization research field (Oh et al., 2010; Thapa et al., 2006). As such, participants in the AAC could be plotted toward the "expert" pole of the recreation specialization continuum. This finding contrasts with Burr and Scott's (2004) study of attendees at a US bird-watching event, where they concluded the event attracted only a small proportion of highly specialized bird-watchers. Thus, further research might explore whether participatory (active) sports events attract higher proportions of specialized participants than events centered around more passive recreational activities.

Key differences between the two clusters manifested in terms of respondents' past participation in cycling. For example, members of Cluster 2 had a longer record of regular participation in cycling than those in Cluster 1. Those in Cluster 2 also participated more frequently in organized cycling events, particularly in terms of competitive cycle racing events. Furthermore, members of Cluster 2 exhibited marginally higher affective attachment to cycling, particularly in terms of their propensity to organize their lives around cycling-related commitments. On this basis, Cluster 1 was labeled "Intermediate" and Cluster 2 "Expert." Although it may appear condescending to label cyclists capable of riding up to 140 km in 1 day "Intermediate," such distances are not considered excessive within the road cycling fraternity and are manageable for most reasonably fit cyclists (see Brown, O'Connor, & Barkatsas, 2009, for a discussion of road cycling subculture). It was felt that labeling Cluster 1 "Intermediate" aptly reflected the pattern of self-reported scores for the various recreation specialization items, which tended to congregate around the middle-to-upper range of the measurement scales. This was in contrast to Cluster 2, where the item scores were highly concentrated around the upper range of the scales.

Given the nature of the AAC, the high levels of recreation specialization observed were probably not surprizing. Data from Table 1 indicate that 72.7% of respondents participated in either the 200 km or 250 km distance options. These distance options are not conducive to novice participation because of the arduous duration and terrain that participants must endure. Participants in these longer rides would likely have completed months, possibly

years, of specific training to develop the physical capacity needed to undertake this challenge. It is therefore logical and expected that the AAC would attract cyclists located mostly toward the expert end of the recreation specialization continuum. This finding supports categorizing the AAC as a "special interest event" within Mackellar's (2006b) event participant typology. Although Mackellar acknowledged individual events will attract a unique mix of special interest and general interest participants, the proportion of highly specialized attendees at the AAC suggests that this event serves as an outlet for specific recreational needs to be satisfied (Prentice & Andersen, 2003). Nonetheless, even among this highly specialized population, two groups were identified as differing significantly in their needs and expectations. For instance, data presented in Table 5 indicated that a significantly higher proportion of Experts participated in longer distance options at the AAC (e.g., 200 km and 250 km rides) than members of the Intermediate cluster. Conversely, members of the Intermediate cluster were more common participants in the shorter distance rides (i.e., ≤140 km).

The degree of recreation specialization does appear to be a variable explaining the level of challenge chosen by persons at participatory sports events. That is, cyclists with a longer history of participation in cycling and with higher cognitive skill levels and higher affect toward cycling were attracted to longer and more challenging route options at the AAC. Thus, the concept of recreation specialization itself might be helpful not only in understanding participants' experiences but also in explaining participation and in designing events. Indeed, previous studies of active participation in recreation support this notion. Bricker and Kerstetter's (2000) exploratory study of whitewater rafters and kayakers in California (USA) revealed that participants chose rapids congruent with their skill level. Furthermore, highly specialized mountain bikers identified in Hopkin and Moore's (1995) study preferred challenging "single track" settings offering technical sections, hills, and fast downhills. They concluded that "more specialized riders are more interested in the thrill of speed" (p. 74). As such, the finding above constitutes evidence that individual characteristics reflected in the recreation specialization construct including experience, frequency of participation, cognitive ability, and affective attachment are likely to influence event attendees' experience preferences and their evaluation of that experience.

At the AAC, choices (representing different products) were offered in terms of challenge. Cyclists gravitated toward product offerings congruent with their level of recreation specialization. Thus, integrating recreation specialization measures into postevent surveys at participatory sports events is useful because it enables analysis of subgroups within the heterogeneous populations that these events are likely to attract. For example, researchers may be able to assign respondents to groups based on recreation specialization cluster membership then split data files to compare and contrast qualitative and quantitative feedback offered by respondents from different clusters. As Oh et al. (2010) noted, the views of low specialization groups are often overlooked, and decision making may be flawed:

> Opinions and preferences of low specialization recreationists may not be well reflected in management actions, but the idea has been implicitly accepted that low specialization recreationists will adapt their view to support these management decisions as they progress toward higher stages of specialization over time. Our results suggest that this may be a faulty assumption that could result in displaced rather than returning users. (p. 27)

Segmentation based on specialization enables data from different clusters to be distilled and analyzed. Such analysis can subsequently inform decisions concerning product offerings that effectively cater to groups of varying specialization levels.

Some insights into participants' motivations for attending the AAC were also generated through the two-step cluster segmentation exercise. Significant differences were identified for three of the LMS items. Endorsement of the items "to learn about cycling," "to satisfy my curiosity," and "to explore new ideas" were significantly stronger among the Intermediate cluster than the Expert cluster. These items fell into a category of motivations labeled by Beard and Ragheb (1983) as "intellectual" in nature. This category acknowledges leisure participation driven by a desire for mental stimulation. However, mean endorsement scores for these intellectual items fell into the "disagree" category of the

measurement scale. While members of both clusters generally indicated these intellectual items were not strong motives for participating in the AAC, the between-cluster differences suggested that more highly specialized attendees were more driven by motives other than intellectual stimulation. This finding was in contrast to Kerstetter et al.'s (2001) study of heritage tourists, which found that highly specialized respondents were significantly more likely to be driven by intellectual motives than less specialized heritage tourists.

With the above in mind, it is plausible that the relationship between the level of recreation specialization and a participant's motivation is contingent upon the activity at hand. That is, as participants in more physically demanding activities become more specialized, challenge motives may take precedence, whereas in less physically demanding activities, intellectual motives may rise to the fore. Further support for this proposition may be drawn from data presented in Table 3, which suggests competence mastery (Beard & Ragheb, 1983) items were dominant motives for participation in the AAC (e.g., "to challenge my abilities," "to be active," and "to improve my skill and ability in cycling"). Indeed, a significant between-cluster difference was detected for the item "to challenge my abilities." Although this motive was strongly endorsed by members of both clusters, it was a more important motive for members of the Expert cluster. This finding confirms that highly specialized cyclists were attracted to the AAC by opportunities to physically challenge themselves, and although members of the Intermediate cluster strongly endorsed this challenge motive, it is possible that other motives may have been at play and of greater importance for members of this cluster, such as social interaction motives.

Significant between-cluster differences were also identified regarding operational aspects of the AAC. For instance, the Expert cluster was significantly more interested in the introduction of a 300 km option for 2011 than the Intermediate cluster (see Table 6). As such, there is probably a need to explore what changes (if any) to the AAC would enhance the event experience for the Intermediate cluster. Similarly, this finding has implications for how the AAC might market and promote a 300 km event. Because the Expert cluster exhibited a greater level of participation in competitive cycling events, it may be worthwhile promoting a 300 km distance option through cycling clubs and salient media, including magazines and advertising during television coverage of cycle racing events.

Conclusion

This article makes three main contributions to event management studies generally and sporting event studies specifically. First, it demonstrates that recreation specialization is a construct appropriate for tapping into variance among attendees at participatory sports events, as it takes into account salient factors affecting participants' satisfaction with the leisure experience at these events. Second, it is the first to make use of two-step cluster analysis in segmenting event attendees on the basis of recreation specialization. This method was shown to be useful because it is an exploratory technique not requiring the researcher to specify in advance the number of clusters required to segment the population (Norusis, 2009). Segmentation at events is inherently exploratory, and this study showed how the technique allowed two distinct clusters to emerge from the data, even within a physically challenging event that caters to a narrow range of leisure interests. Third, the study has contributed an insight into active participation in sports events by amateur athletes. It profiled attendees at a participatory cycling event in south eastern Australia, identified high levels of recreation specialization among these amateurs, and found that cycling played a central role in these peoples' lifestyles.

Future studies could apply the segmentation method described in this article to events that attract a more heterogeneous population than the AAC. The method, which employed two-step cluster analysis informed by the recreation specialization construct, identified two clusters. Although the clusters were distinct, differences in recreation specialization levels were not large enough to warrant major shifts in the design, conduct, and management of the AAC. However, studies of cycling events less physically taxing than the AAC and attracting a broader spectrum of participants may unearth more significant insights into heterogeneity among participants and

thus further demonstrate the utility of the segmentation method described and tested in this article. Scope also exists to apply and test the utility of this segmentation method in participatory events linked with sporting activities other than cycling, such as marathon running, ocean swimming, and triathlon events.

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