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Development of a Whole Agency Approach to Market Segmentation in Parks

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Abstract

Park agencies must plan to accommodate a diversity of visitors in order to satisfy visitor expectations and encourage future visitation. This study applies a market segmentation approach to develop a visitor typology that is effective across a broad spectrum of parks and applicable to a range of priorities, both strategic and operational, within park management agencies. Over a four-year period, data was sourced from over 11,000 interviews conducted at 33 diverse Australian national and metropolitan parks managed by the agency Parks Victoria. Factor analysis and cluster analysis was used to identify seven distinct visitor segments on the basis of numerous variables including, crucially, benefits sought. The applied and theoretical contributions of this study to the parks literature are discussed.

Keywords: *parks, visitor experience, benefits, market segmentation, visitor segment*

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The proverbial "happy camper" is an outcome many park management agencies seek. For over 40 years, researchers engaged in social science have sought to understand how they can assist managers in facilitating quality visitor experiences. Seminal work by Wagar (1966) on the notion of "quality experience" paved the way for increasingly sophisticated methods for understanding and managing visitors. Arising from the experienced-based management framework, the USDA Forest Service's Recreation Opportunity Spectrum (ROS) (Driver & Brown, 1978; Clarke & Stankey, 1979) provided an important method to differentiate settings and appropriate management associated with those settings. Importantly, it provided a tool that allowed for systematic analysis of recreation offerings within an individual park and also across a whole agency and between agencies. The dynamic nature of society means our understanding of the visitor experience associated with those settings is as relevant today as it was 40 years ago. Is it possible to develop an effective visitor typology across a whole agency? While unlike the ROS, such a system would likely be specific to a park agency, the concept and process could be applicable to many park agencies.

The value of market segmentation as a tool that recognizes the heterogeneity of customer needs is reflected in its application across a plethora of discipline areas (Wedel & Kamakura, 2000). Classic work by Shafer (1969) recognizing that there were different groups of campers, who preferred different experiences, was a catalyst for numerous studies worldwide examining market segments in individual parks. While this individual level information has proven useful, a visitor typology that can be used at both an agency and park level would potentially have many additional benefits, including promoting equity, efficiency, and effectiveness. Such benefits are desirable to park agencies, many of which are now operating in more commercial environments, often with an increasingly complex scope of operations. In the case of most Australian park agencies, for example, simple mission statements describing the "core business" as protection of cultural and natural assets, and the provision of sustainable recreation opportunities, have been replaced by long lists of strategic priorities, which include items as diverse as contributing to the environmental, social and economic well-being of communities (Parks Victoria, 2012), leading the implementation of climate change adaptation frameworks (Department of Environment, Water & Natural Resources, 2012); and partnering with indigenous communities, mining companies, and pastoralists to connect landscapes through wildlife corridors (Parks & Wildlife Commission Northern Territory, 2013). The scope of park agency responsibilities range from integration of conservation messages via social media to assisting in planning for green views from hospitals, the creation of community gardens, and facilitating opportunities to positively impact depression and obesity (Parks Forum, 2008). With no commensurate increase in the resources of park agencies, this more diverse role demands management tools that are highly efficient and integrated.

This paper takes a pragmatic approach to understanding park visitors across a whole agency. The genesis of the research was a desire by the then General Manager of Parks Victoria Corporate Strategy and Services for a rational set of market segments that could transcend the multifaceted aspects of a park organization and be as readily applied by a capital works manager, safety officer, or park ranger, as they could be a park recreation planner (Neil McCarthy, 2005, *pers. comm.)*. Specifically this research addresses three aims: (a) determining whether market segmentation can produce a manageable number of visitor segments (defined for the purpose of the study as nine or less based on Miller, 1956) that are relevant to multiple parks and ROS remoteness classes; (b) exploring whether such an approach offers sufficient differentiation to be useful to various subsets of groups within a park organization (for example, recreation plan-

ners, operation managers, and marketers); and (c) applying correlation resemblance measures to assess their effectiveness in validating segments formed using Euclidean distance resemblance measures. While this last methodologically focused aim seems out of context with the other two, it was crucial to addressing aims (a) and (b) and will be explained in more detail during the course of this paper.

Why Segmentation?

Traditionally, marketing and neoclassical economic theory held that businesses operated within homogenous markets, achieving competitive advantage and superior financial performance through economies of scale and market power attained by way of a mass marketing approach (Schiffman, Bednall, O'Cass, Paladino, Ward, & Kanuk, 2010). Through the segmentation of consumers into smaller homogeneous groups based on particular shared characteristics, organizations are better able to understand their customers, identify opportunities, tailor product offerings, and design positioning strategies to fulfill their needs, wants, and preferences (Cravens & Piercy, 2006; Palmer & Millier, 2004). Targeting specific market segments allows for more strategic business planning and assists with efficient and effective allocation of limited resources (Palmer & Millier, 2004). Johnson Tew, Havitz, and McCarville (1999) showed that agencies that don't make use of market segmentation in providing outdoor recreational programs spend more of their budgets on promotion than the agencies that target particular groups. The potential application of market segmentation data in a park context is however much broader than simply promotion. An understanding of visitor segments can assist in many facets of park management, including the design of appropriate trails and accommodation, the development of tailored communication products (e.g., environmental interpretation, risk management strategies, advertising campaigns) and the development of attractive volunteer opportunities.

There are a variety of ways market segments can be developed. Typically primary research is used to collect information on a limited number of attributes relevant to the intended use. In park studies, this has often comprised data on activities or demographics. Increasingly data mining is being employed as a method to form segments and reveal a variety of perhaps unexpected relationships. While application of this method is absent in park studies, it has been used effectively in other industry sectors (e.g., financial services [Rud, 2001]). Data mining uses numerous variables to form segments. This type of research or model building can be atheoretical (i.e., relying on intuition), and therefore often excludes a validation step. Ideally it should capitalize on extant knowledge and important theoretical concepts when industry objectives such as realization of market potential are sought (Verhoef & Donkers, 2001; Rud, 2001), following the most advanced scientific methodology in the process.

In terms of the broader leisure and tourism fields, research has acknowledged that consumers vary according to their characteristics, needs, wants, and preferences (Holden, 2000; Konu, Laukkanen, & Komppula, 2011). According to Hanlan, Fuller, and Wilde (2006), the grouping of consumers into homogeneous segments based on benefits sought has emerged as the preferred approach to segmentation in these fields, as evidenced by its application in several studies (Frochot, 2005; Huang & Sarigöllü, 2007; Jang, Morrison, & O'Leary, 2004; Koh, Yoo, & Boger, 2010; Moscardo, Pearce, & Morrison, 2001; Naylor & Kleiser, 2002; Sarigöllü & Huang, 2005). Segmentation on the basis of benefits has also proven a popular method in park studies (e.g., Backlund & Stewart, 2012; Bichis-Lupas & Moisey, 2001; Coupal, Bastian, May, & Taylor, 2001; Floyd & Gramann, 1997). First introduced by Haley (1968) and classified as a form of behav-

ioral segmentation (Tynan & Drayton, 1987), this process divides the market on the basis of the desired consequences consumers seek from product or service use (Frochot & Morrison, 2001).

Benefit segmentation is primarily concerned with *why* customers buy a product or service, and not, for example, *who* buys it, as demographic segmentation techniques highlight (Hanlan et al., 2006). Since the 1960s, there has been a move from the "activity approach" to a "behavioral approach." The behavioral approach is based on expectancy theory, which suggests outdoor recreation behavior is based on the need to fulfill motivations and achieve benefits. Motivations and benefits are considered more stable and reliable traits when compared to activities or demographic variables (Manning, 2011). When first described in the seminal work by Haley (1968), no precise definition of the concept of benefits was given. Researchers have interpreted benefits sought by consumers in a variety of ways including price, motivations and destination attributes (Frochot & Morrison, 2001; Hanlan et al., 2006; McCabe, 2009). This problem has also been apparent in the park literature prompting Driver (2008) to define benefits as either an improved change in a condition, maintenance of a desired condition and/or prevention or reduction of an undesired condition, and realization of a satisfying recreation experience.

A key advantage of using benefits sought to segment leisure consumers is its ability to create relevant and meaningful segments and better predict consumer behavior through the causal nature of the data. Despite these advantages, some limitations of this approach to market segmentation have been noted. Dolnicar and Leisch (2005), in particular, suggest that the statistical analysis involved in data-driven segmentation, as opposed to intuitive segmentation has limited its adoption within some organizations. Additionally, the lack of expertise in the area of data analysis within some park organizations can lead to poorly formed segments, which are consequently of limited or no use. While noting these challenges, benefit segmentation has clear advantages (Haley, 1968; Hanlan et al., 2006; Tkaczynski, Rundle-Thiele, & Beaumont, 2009) compared to more traditional "common-sense" or *a priori* sociodemographic and geographic approaches. Holding great potential for advancing benefit segmentation in park studies is an innovative approach that combines benefits data with other important theoretical concepts and relevant demographic variables, sourced from data mining. Inclusion of demographic information in the segmentation process can provide additional market insights (Verhoef & Donkers, 2001), which may be valuable for an agency-wide typology that needs to be effective at both strategic and operational levels.

Benefit Segmentation of Park Visitors

In contemplating benefits as a basis for segmentation in park studies, it must be acknowledged that the benefits park visitors seek and accrue are diverse. They include psycho-physiological benefits such as increased fitness, reduced tension and stress, and improved recovery and attention (De Kort, Meijinders, Sponselee, & Ijsselsteijn, 2006; Maller, Townsend, Pryor, Brown, & St. Leger, 2006; Staats & Hartig, 2004); psychological benefits such as personal development and growth (Pohl, Borrie, & Patterson, 2000) and mental health and maintenance (Kuo & Faber Taylor, 2004; WonSop & HongKuen, 1996); as well as social/cultural benefits (Kuo, 2003; Kweon, Sullivan, & Wiley, 1998) and environmental and economic benefits (Moore & Driver, 2005).

An established means of assessing benefits associated with the park experience are the Recreation Experience Preference (REP) scales. Researchers have developed REP scales over a number of years (e.g., Driver & Bassett, 1977; Driver & Knopf, 1977; Driver & Tocher, 1970; Manfredo, Driver, & Brown, 1983), with at least 50 empirical studies conducted to confirm their validity and reliability (Driver, Tinsley, & Manfredo, 1991). Using the REP scales, benefits have been found to be a stable trait across ROS remoteness classes and between urban and regional

park types (Anderson, Nickerson, Stein, & Lee, 2000; Weber & Anderson, 2010) and have been shown to be strong predictors of visit satisfaction (Crilley, Weber, & Taplin, 2012). The REP scales have been applied unmodified or modified to form factors that create discernible benefit visitor segments in numerous park studies, mainly in the United States (Backlund & Stewart, 2012; Bichis-Lupas & Moisey, 2001; Coupal et al., 2001; Fix & Taylor, 2011; Hendricks, Schneider, & Budruk, 2004; Légaré & Haider, 2008; Marin, Newman, Manning, Vaske, & Stack, 2011; McCool & Reilly, 1993; Floyd & Gramann, 1997). Most of these studies combined benefit segmentation with a post hoc examination of other demographic variables (Bichis-Lupas & Moisey, 2001; Coupal et al., 2001; Hendricks et al., 2004; Légaré & Haider, 2008; McCool & Reilly, 1993; Floyd & Gramann, 1997). Analysis of the demographic variables allowed the authors to provide further insights to assist management applicability; however, essentially it was the motivation for a particular experience that was the key discriminator of visitor segments in the above-mentioned studies. Despite the prominence afforded REP scales in the literature, they are not the only approach used in park segmentation studies.

Several park visitation studies have employed other variables to form and analyze visitor segments. Farnum and Hall's (2007) study used loyalty factors to divide 453 whitewater rafters in Idaho and Colorado into three visitor segments. They then employed Importance Performance Analysis (IPA) to assess the customer loyalty of the high and low groups to local whitewater rafting operators. Kil, Holland, and Stein (2010) used place attachment measures to identify three segments: high, moderate and low-attached visitors to the Ocala National Forest in Florida. In a study of the Chattahoochee National Forest in Georgia, Kyle, Absher, and Chancellor (2005) used forest agency commitment items to segment fee paying visitors into three visitor segments: Indifferents, Moderates, and Loyalists. Studying a Kenyan National Park, Kibicho (2006) used items from Dunlap and Liere's (1978) New Environmental Paradigm (NEP) scale to identify three visitor segments, ranging from Environmentalists, concerned with the untouched nature of the park, to Want-it-all Tourists more concerned with the activities and facilities the park offered, and Independent Tourists who were interested in exploring the park independently and enjoying peaceful relaxation in the process.

Limitations of Previous Approaches to Constructing an Agency-Wide Visitor Typology

The park segmentation literature, while substantial, offering various insights into why homogenous visitor groups are attracted to parks, has for the most part used relatively simple approaches to constructing visitor segments. Most appear to use a single construct, albeit with many items, to segment so as not to confound the formulation of visitor segments. Importantly, the end use of these studies has been very specific (e.g., the importance of customer loyalty [Farnum & Hall, 2007] or marketing [Bichis-Lupas & Moisey, 2001]). Only a limited number have used multiple constructs in their segment formation, which enables a small number of visitor segments to be generated based on a more complex set of variables. Examples of this more robust approach include Oh and Ditton's (2006) study of 522 anglers in Texas that used two behavioral, three skill, and three commitment items with confirmatory factor analysis and K-means clustering to construct three specialization visitor segments (Casual, Intermediate, and Advanced). Oh, Ditton, Anderson, Scott, and Stoll (2005) used similar variables in an earlier study of 430 anglers at a reservoir in Texas and subsequently examined the economic net value (i.e., willingness-to-pay) of these segments. Kemperman and Timmermans's (2006a) study also used multiple constructs, including park type, park features, distance from the participants' residence to the park, the activities conducted in the park and some factual variables such as sociodemographics

in their study of urban park use patterns in the Netherlands, focusing was on recreation behavior patterns for aging visitors.

Almost all studies in parks recreation have used abstract variables (i.e., benefits or place attachment) to produce visitor segments for marketing purposes. It may be argued that the Oh et al's. (2005) study is the only exception as they used factual variables (e.g., fishing trip frequency), to examine willingness-to-pay; variables that are factual, such as gender and age, rather than abstract variables, such as satisfaction or service quality. There have been academic studies in other industries such as automobiles (Chan, 2008) and insurance where factual sociodemographic variables have been used to create market segments to predict potential customer value (Verhoef & Donkers, 2001).

Furthermore, there is a dearth of park studies applicable to multiple uses, for example, strategic and operational planning, which is the type of visitor segmentation that would be required by a park agency. Multiple purposes are sometimes explicitly suggested or implied by the preponderance of post hoc analyses on secondary variables such as demographics. The segmentations based on single or few abstract conceptual dimensions produce diverse visitor segment solutions, but these segments cannot be easily combined to form a multi-purpose segmentation for a park agency to holistically use.

In surveying the body of park segmentation studies, universally they have employed very few, usually one, survey location in one park and usually focus on one specific recreational activity (e.g., Bichis-Lupas & Moisey, 2001; Fix & Taylor, 2011; Kyle et al., 2005). Multisite studies, while exceptions, are also limited generally to one specific type of park (i.e., national parks, state or national forests, urban parks, rivers), or only one section within the community (i.e., aged people [e.g., Farnum & Hall, 2007; Kemperman & Timmermans, 2006a; McCool & Reilly, 1993]). There is a paucity of studies that gather samples at multiple sites, at multiple parks and park types, for diverse recreational activities, despite the fact that this is the management reality for many park agencies. Consequently, there are very few large sample segmentation studies. It appears Backlund and Stewart's (2012) useable sample of 1,400 of mail back survey respondents that applied for a permit to camp in the Grand Canyon National Park is the largest number of cases employed to date in segmenting park visits.

Finally, there have been no segmentation studies in the park recreation literature that have used the method of correlation resemblance measures to construct or validate visitor segments with actual respondents' data. All studies appear to use Euclidean distance resemblance measures to construct segments. This is surprising given Beaman and Vaske's (1995, p. 182) point made almost 20 years ago: "The use of r_p as a resemblance measure is not new or unique (Cattell, 1949; Cohen, 1969; Holley & Guilford, 1964), but its application to recreation research has not been found."

Overall, it appears the scope and complexity of visitor segmentation studies in park management has been limited. This limited scope has resulted from simple approaches that do not do justice to the potential of segmentation as an effective data compression tool. The number of constructs used in the segmentation process, and the samples analyzed would need to be considerably larger to develop relevant visitor segments across an entire park agency. Selecting appropriate variables upon which to segment and validate requires considerable care and analysis. While benefits are an important variable, the inclusion of additional spatial variables like ROS remoteness class and demographic variables can allow for the improved applicability of resulting visitor segments.

Most park agencies operate diverse parks in multiple locations and provide opportunities for a wide range of activities within those parks. They also manage many visitor-related processes

(e.g., facilities, construction and maintenance, accommodation, marketing, planning, etc.). To produce meaningful comparisons across a managed estate requires large samples with visitors sampled at many locations on the basis of multiple variables. The current article addresses the limitations of the extant literature in detailing the findings of a large-scale study of more than 11,000 participants who visited one of 33 diverse parks across one park agency. The data were collected over a four-year period to comprehensively examine and distinguish between visitors using a combination of sociodemographic and benefit-driven descriptors. The intention of the process was to develop a concise visitor typology applicable across a range of different parks managed by a park agency, which would support different park functions.

Methods

Study Design

The aim of market segmentation is not simply to describe heterogeneous visitor segments using distance measures but to find distinctive visitor segments that have meaningful and different relationships between important variables. This need is amplified when considering a general segmentation where multiple purposes are required. This study employed a hybrid analysis similar to Kemperman and Timmermans' (2006a) study, using multiple variables that were considered relevant to park visits *a priori*. These variables were both abstract and factual. Although this gives the appearance of data mining, this step in segmentation construction was necessary to maximize separation on all relevant variables, a key advantage of clustering, in producing distinctive segments across a broad spectrum of variables and data.

This paper presents the part findings of a larger study that defined and examined a number of integrated visitor segments and subsegments as part of the whole of agency visitor segmentation approach. It is beyond the scope of one paper to present these findings in full. Future papers will detail these subsegments and their related higher-order visitor segments. The subsegments are only mentioned here for completeness because their inclusion in the study design necessitated the large sample size of over 11,000 respondents in order to do a myriad of post hoc analyses and avoid Type II errors in the process.

Study Site and Sample Representativeness

The scope of this study included 33 diverse parks managed by Parks Victoria in the Australian State of Victoria. Parks Victoria is one of the youngest and arguably most progressive park agencies in Australia. Formed in 1996 by the amalgamation of the 100-year-old Victorian National Park Service and Melbourne Parks & Waterways, Parks Victoria has over 4 million hectares under management including 45 national parks, 25 state parks, 24 marine reserves, 3 wilderness areas, 30 metropolitan parks, and 60 other reserves. The agency attracts 86 million visits a year, including 46.4 million visits to parks (Parks Victoria, 2012, p. 7), strongly aligning itself with the health benefits of parks via its "Healthy Parks, Healthy People" program (Crompton, 2008).

The agency maintained a comprehensive database on park visitation across park units and ROS remoteness classes. This was used to construct a sampling plan. Table 1 shows the frequency of survey participants relative to actual park visitation figures according to the three ROS remoteness classes sampled (see Sample Collection). A comparison is presented relative to all Parks Victoria parks. As Table 1 suggests, visitation to the sampled parks represented 80% of all park visits across the State based on available comparative data and, therefore the sample represents the most heavily visited parks in Victoria. The last two columns of Table 1 also suggest

that the sample's ROS remoteness class profile is reflective of the representative breakdown of all Parks Victoria parks. Differences between the sample and the total populations of park and visits were within a range of 10% on average.

As expected, the majority of the returned sample was Victorian (82%), with smaller cohorts of interstate (10%) and overseas visitors (8%). For the Victorians, demographic characteristics were compared with Australian census data (see Table 2), and while there were slight under representations, e.g., 18 and 19 year olds; these were consistent with research on recreation and park usage in Australia (Australian Bureau of Statistics (ABS), 2002; ABS, 2010) and in North America (Zanon, Doucouliagos, Hall, & Lockstone-Binney, 2013). It was therefore determined that the sample was a good representation of the Victorian community based on its demographic profile.

Table 1

Representativeness of Survey Sample across ROS Remoteness Class

	Percentages (%) of			
Park ROS Remoteness Class[1]	Survey Participants n=11,387	Total PV Visits[2] 28.3 million	Survey Parks n=33	Total PV Parks[2] n=135
Roaded Natural/ Semi-remote Motorized (class 3)	44.2	54.9	43.9	34.1
Semi-developed/ Natural (class 4)	17.6	21.6	25.7	18.7
Developed (class 5)	38.2	23.5	30.4	47.3

Note. Individual park data obtained upon request from Parks Victoria (PV).
1. Park ROS Remoteness Class as per Worboys, Lockwood & De Lacy (2005, pp. 436-437).
2. Only parks with both visits estimates and ROS remoteness class were included in these totals. Sample park visitation was 22.6 million or 80% for the total PV comparative data.

Table 2

Representativeness of Survey Sample with Victorian Population

		Percentages (%) of	
Demographic Variable	Group	Victorian Sample n=9,088	Victorian Adult Population[1] n=3,780,057
Age (years)	18-19	2.5	3.5
	20-29	19.7	17.5
	30-39	30.3	19.3
	40-49	25.0	19.1
	50-59	13.9	16.5
	60-69	6.4	11.2
	70+	2.1	12.9
Gender	Male	53.7	48.4
	Female	46.3	51.6
Highest Education	Primary or primary with some secondary	8.4	17.5
	Completed secondary	30.3	37.9
	Tertiary	61.3	44.6

Note:
1. Data for 18 years or more from Victorian Census 2006 (Australian Bureau of Statistics, 2006).

Questionnaire

The data underpinning the segmentation design was drawn from Parks Victoria's Visitor Satisfaction Monitor (VSM). The items within the VSM were similar to those used by Hornback and Eagles (1999) and Horneman, Beeton, and Hockings (2002). The VSM questionnaire was developed in consultation with the Centre for Environment and Recreation Management at the University of South Australia (Gary Crilley, 2000, *pers. comm*.). The VSM is a 69-item instrument comprising four sections: visitor characteristics (e.g., demographic variables), visit characteristics (e.g., first or repeat visit), visitor perceptions about the park and perceptions regarding the visit. Variables from the VSM instrument used in the segmentation are shown in Tables 3 and 4. Items from the instrument that required conversion are detailed in Table 4 (see Data Selection and Conversion below).

The abstract variables items shown (in italics) in Table 4 included nine *service quality* factors (Rodger, Moore, & Taplin, 2012; Tian-Cole, Crompton, & Willson, 2002), generated from factor analysis of the VSM's 18 matched *service quality expectation* and *performance* measures shown in Table 3 (i.e., 36 battery items in total) to represent visitor park perceptions. Visitor perceptions regarding visit were drawn from five converted benefit variables (Hanlan et al., 2006). With limited testing of the REP scales in Australia (Crilley et al., 2012; Weber & Anderson, 2010; Weber, Senior, Zanon, & Anderson, 2008), an open-ended approach was used to assess benefits based on the following question, "What was the main reason for visiting the park?" Participants could list multiple benefits and these were coded according to the primary benefit and secondary benefits. Secondary benefits were excluded from the segmentation process (see Data Selection and Conversion below). Three *desirable outcomes* or "loyalty" variables in the form of *visit satisfaction*, *agency satisfaction* and *recommendation level* were also used to assess visitor perceptions regarding visit (Moore, Rodger, & Taplin, 2013). One abstract variable representing the *ROS remoteness classes* (Manning, 2011) was incorporated in the assessment of visit characteristics. The remaining factual items in Table 4 were also used in the segmentation. They included five visitor characteristics or demographic variables; five visit descriptor items and four tallies of visitor suggestions.

Finally, the VSM contained a series of open-ended questions that allowed participants to provide additional information about what aspects of their park visit were enjoyable and/or what problems they encountered during their visit but these were excluded from the segmentation process as discussed below.

Sample Collection

The data were collected by way of 11,387 face-to-face interviews, undertaken by a large international, accredited market research contractor. Using a convenience sampling approach, on-site interviews were conducted annually during peak visitation weekends during spring (November), summer (December and January) and winter (July) at 68 visitor sites in 33 major parks over a four-year period. Participants were approached in car park areas as they went to depart. In the case of groups, only a single member 18+ years of age was surveyed and the group member with the closest birthday at the time of surveying was selected. A quota of 70 completed questionnaires per survey period for any one visitor site was set throughout the study. The collection was spread over two or more weekends at each survey site in an effort to reach this quota; additional weekends were worked if quotas weren't met. It should be noted that due to low visitation numbers and/or unexpected conditions (e.g., heavy rain, fire or floods) it was not always possible to obtain the quota at each park, every year. It should also be noted that the sampling did not occur within remote or semi-remote *ROS remoteness classes*. This is acknowledged as a

Table 3

First Stage Factorization—18 x Expectation and Performance Battery Item Loadings

	Expectation Factors and Rotated Components Correlation Matrix					Performance Factors and Rotated Components Correlation Matrix			
SERVICE OR FACILITY ITEMS Matched but separate ratings for Expectations and Performance	PEEF	RMEF	GMEF	RFEF	IIEEF	PEPF	RMPF	GMRFPF	IIEPF
PARK ENTRY									
Car parking adequate, safe & secure	0.57					0.71			
Tracks & paths well maintained	0.65					0.77			
Directional signage clear & helpful	0.72					0.70			
Pre-visit information timely & helpful	0.70					0.42			
RANGER MANAGEMENT									
Rangers available to assist		0.84					0.87		
Rangers avail. to supervise visitors		0.84					0.87		
Rangers avail. to provide information		0.79					0.82		
GENERAL MANAGEMENT									
Sufficient & accessible toilets			0.69					0.65	
Toilets clean			0.77					0.57	
Services to minimize litter			0.63					0.43	
Safe access to all facilities			0.76					0.36	
RECREATIONAL FACILITIES									
Sufficient cooking & picnic				0.81				0.77	
Sufficient shelter				0.81				0.75	
Sufficient drinking water				0.63				0.70	
INFORMATION, INTERPRETATION & EDUCATION									
Info. on potential risks & dangers					0.80				0.79
Info. on regulations					0.80				0.79
Info. on natural or cultural features					0.76				0.78
Visitor information center					0.46				0.57
Cronbach's Alpha	0.77	0.87	0.79	0.80	0.77	0.72	0.93	0.82	0.83

Note: Likert coded response values for items were: 1=Disagree; 2=Neither agree nor disagree; 3=Slightly agree; 4=Agree; 5=Strongly agree; 6=Very strongly agree.

limitation; however, data from nearly 500 back-country users (e.g., long distance and overnight walkers, campers and cross country skiers, see Table 5) were captured during the survey period because they exited via the sites selected.

Data Selection and Conversion

The integrity of the four years of data were examined and some items were excluded because they had been modified or omitted over time or were systematically omitted at particular parks aligned to a *ROS remoteness class*. For example, the *service quality* item "wilderness camping facilities" was not used with the other *Recreation Facilities* items in *ROS remoteness class* 5, Developed parks. Some categorical coded and open-ended questions that had a multitude of responses (e.g., *What aspects of their park visit did you find enjoyable? How did you find out about the park?*), and the *survey location name* were excluded from the segmentation process. All variables excluded were used in post segmentation analyses, not shown. Three categorical questionnaire items were considered important and required conversion to be included. These related to *benefits*, *visitor suggestions* and *home location*.

Table 4

Stage Two Factorization Variables

Variable Grouping		Variable	Coded Response Values	Required Conversion
Visitor Characteristics	Descriptive demographics	Gender	0=male; 1=female	×
		Age group	1=18-19; 2=20-24; 3=25-29; 4=30-34; 5=35-39; 6=40-44; 7=45-49; 8=50-54; 9=55-59; 10=60-64; 11=65-69; 12=70+ years	×
		Highest level of education	1=primary/some secondary; 2=completed secondary; 3=tertiary	×
		Life stage	1=young single; 2=young couple/no children; 3=young family; 4=middle family; 5=mature family; 6=older couple/no children at home; 7=mature single	×
		Home location	1=metropolitan; 2=regional; 3=interstate; 4=overseas	✓
Visit Characteristics	*Park descriptor*	*ROS Remoteness Class*	*3=Roaded Natural /Semi-remote Motorized; 4=Semi-developed/ Natural; 5=Developed.*	×
	Visit descriptors	Visits per year		×
		Number of people in your party	Numeric integer.	×
		Time of stay in hours (days x 24)		×
		First time visit to this park	0=yes; 1=no.	×
		Trip type	1=Day trip from home; 2=from holiday accommodation; 3=a stay in park.	×
Visitor perceptions about the park	*Service or facility expectation factors (Stage 1)*	*Park Entry - PEEF*	*Numeric real.*	✓
		Ranger Management - RMEF		✓
		General Management - GMEF		✓
		Recreation Facilities - RFEF		✓
		Interpretation, Information & Education - IIEEF		✓
	Service or facility performance factors (Stage 1)	*Park Entry - PEPF*	*Numeric real.*	✓
		Ranger Management - RMPF		✓
		General Management & Recreation Facilities - GMRFPF		✓
		Interpretation, Information & Education - IIEPF		✓
	Visitor suggestions (tallies):	Park Accessibility	Numeric integer.	✓
		Management Services		✓
		Recreation Facilities		✓
		Other (includes IIE, environment, safety, negative and miscellaneous comments)		✓
Visitor perceptions regarding the visit	*Benefits (dichotomous variables)*	*Relationships with Nature*	0=false; 1=true.	✓
		Exercise Physical Fitness: trail based		✓
		Exercise Physical Fitness: non-trail based		✓
		Family Togetherness & Being with People		✓
		Physical Rest; Escape Pers.-Soc. Press; or Phys. Press. & Other		✓
	Desirable outcomes ("loyalty variables")	*Visit Satisfaction*	*1=completely dissatisfied; 2=very dissatisfied; 3=dissatisfied; 4=satisfied; 5=very satisfied; 6=fully satisfied.*	×
		Agency Satisfaction		×
		Recommendation level to others	*1=would strongly not recommend; 2=would not recommend; 3=would recommend; 4=would strongly recommend.*	×

Note: Abstract conceptual variables are in *italics*

Main reason for visiting responses were coded according to relevant benefits as the REP items were not directly included in the VSM instrument. Regrettably, there were no motivational battery items included in the VSM as in other park studies (e.g., Backlund & Stewart [2012]; Bichis-Lupas & Moisey [2001]; Coupal et al. [2001]). There was a follow-up multiresponse question designed to elicit secondary benefits, but it was modified over time and the change in wording meant that the data was inconsistent and couldn't be used in the segmentation.

Table 5

Main Reason for Visiting the Park Grouped into Benefits

Benefits[1] (n = 13,384)									
I: Enjoy Nature; H: Learning		M: Physical Fitness (trail based)		M: Physical Fitness (non-trail based)		E: Family Togetherness, F: Similar People		N: Physical Rest, O: Escape Personal-Social Pressures,: P: Escape Physical Pressures & Miscellaneous	
Reason	n	Reason	n	Reason	n	Reason	n	Reason	n
Sightseeing	2,128	Short walk (up to 1 hour)	814	Surfing	270	Attending a special/ major event or party with family or work	1,188	Other (NFI[2])	399
Environment/ atmosphere	496	Skiing (cross country)	293	Swimming	182	Picnicking or barbecue	779	Relaxing/ resting	389
On holiday / on break/ weekend trip	354	Long walk or day walk (4+ hours)/ bushwalk / hiking	178	Exercising/ fitness	162	Socializing with/ meeting with friends/ family	585	Location/ nearby/ central	89
Appreciation or study of historical or cultural features	253	Walking the dog	171	Snow activities/ tobogganing/ playing in snow	103	Outdoor activity with or for children	342	Sunbathing/ sitting around	76
Apprec. / watch/ study of plants/ birds or animals	253	Cycling	170	Fishing	59	Meal or refreshment in a cafe or restaurant/ meal	198	Painting or drawing/ photography	48
Travelling or passing through, e.g. place to place	236	Jogging/ running	96	Informal social sport	58	Supervising children's play in a play area	82	The facilities (NFI[2])	29
Camping (NFI[2])	175	Medium walk or half day walk	81	Rock climbing or abseiling	48	To show kids snow/ teaching kids to ski	28	Recreation (NFI[2])	22
Scenic driving	161	Overnight hike	17	Yachting or sailing	30	Watching sports	21	Volunteer work or research project	25
Commercial or guided tour	56	Mountain biking	16	Formal competitive sport inc. training	20	Music or concert/ slide shows	12	Reading	18
Four wheel driving	15	Roller or inline skating/ scooter /skateboarding	11	Canoeing	19	Courting or romance	8	Kite flying	7
Camping (formed campsite)	15	Horse riding	8	Sailboarding	13	Flower/ garden show or market	8	Visitor Information/ V.I. Centre	4
Educational project or school activities	14			Rowing	11			Hobby: model boats/cars/ planes	1
Accommodation in cabins or lodge	5			Snorkeling or scuba diving	6				
Camping (other site in park)	5			White water kayaking or rafting	4				
Motorcycle touring/ trail biking	4			Fossicking for gold or gems	3				
Ride/ waiting for transit system/ ferry	4			Yoga, Tai Chi	3				
Motor boating	1			Caving	2				
				Hang gliding	2				
				Orienteering	1				

Note.
1. Derived from recreational motivational domains from Manning (1999, pp. 168-170).
2. NFI is no further information.

Five dichotomous variables were created using a three-stage process to represent the benefits outlined in Manning (2011), based on Driver et al.' s (1991) earlier work. The first two stages were blind so as not to unduly influence the grouping of responses. A Parks Victoria researcher accomplished the first stage with the 70 different coded reasons (see Table 5) sorted into similar categories with the aim of minimizing the number of categories so as not to unduly influence the segmentation analysis. The researcher determined the most common responses (e.g., short

walk) and sorted intuitively less common responses (e.g., walking the dog) into one of the major groups. A miscellaneous group was also created to capture reasons for visiting that were not cited frequently (e.g., reading, painting, drawing, other) but were distinct from the more common responses. The second stage of the process involved a review of the categories by six independent Parks Victoria staff involved in park visitor management. Minor and major changes were suggested and refinements made to the categories as part of this process. In the final stage, the main reasons for visiting were grouped according to the dominant benefits (Driver et al., 1991; Manning, 2011) using Hendricks et al.'s (2004, p. 6) loading table as a prototype to group activities into benefits. The final benefit items are presented as Table 5. The benefit groups also appear as dichotomous items in Table 4.

The second converted variable coded for inclusion in the segmentation process was *suggestions to be fully satisfied,* "Can you offer any suggestions for the park itself that would make you fully satisfied with your visit?" This open-ended question was tallied into four precoded categories: *Access, Management Services, Recreation Facilities,* and *Other* and shown as *visitor suggestions* in Table 4. Finally, the third converted variable was the visitor's *home location*, which was a specific place name or Australian postcode; which was categorized into an ordinal variable comprising Metropolitan Melbourne (70% of Victorians live in the capital city of Melbourne), Regional Victoria (other intrastate), interstate and international visitors.

Analyses

Similar to the Kemperman and Timmermans' (2006a) study, this study employed a large number of constructs to form visitor segments. Both studies used a hybrid approach factoring continuous, dichotomous and ordinal variables in two stages. In the current study, the number of *service quality* variables was first reduced from the 36 detailed battery items (18 identical *expectation* and *performance* items) using SPSS version 13.0 software. Principal Components Analysis with eigenvalues greater than one and Varimax rotation generated five *expectation* and four *performance* factors in the initial stage accounting for 68.4% of variance explained (Table 3). Each of the nine factors was shown to have strong consistency, with all Cronbach alpha scores over 0.7 indicating scale reliability (de Vaus, 1985).

Secondly, a final stage factorization was undertaken using the same process to reduce all selected and converted VSM items. Explicitly, all the items shown in Table 4 were used to form the visitor segments. The second stage was necessary to include and compress the large number of variables, remove covariances between the variables, prevent the dichotomous (binary) variables from being used directly in K-means clustering (IBM, 2012a), standardize scales for disparately measured items (i.e., means of zero and standard deviations of one) and to include the numerous cases with one or more variable responses missing, achieved by using the mean substitution option in SPSS for missing data (IBM, 2012b). The second stage factor-item loading table is not shown for brevity sake and also because the intention was not to produce conceptual factors at the second stage. As discussed earlier, the use of abstract conceptual variables to form visitor segments has dominated park segmentation studies. While conceptual variables certainly assist in framing and forming visitor segments that work toward a specific theoretical objective and also help to convey meaning, they are not mandatory in forming conceptual segments (Rud, 2001).

Based on the 32 selected and converted VSM items included in the second stage factorization, 12 factors were produced that accounted for 60% of the variance explained. A cluster analysis followed in order to produce the visitor segments. This approach is consistent with the typical segmentation stages described by Beaman and Vaske (1995), however, unlike most park

studies that determine inclusion or exclusion of near cases by examining dimensional differences (Backlund & Stewart, 2012; Bichis-Lupas & Moisey, 2001; Hendricks et al., 2004), variable correlation patterns were examined in this study as Beaman and Vaske (1995) argue it is the superior approach (see Validation below).

Simple hierarchical clustering using Ward's agglomerative method, followed by K-means clustering was conducted using the final 12 factors identified. The cluster variances were minimized based on Euclidean distances squared (Malhotra, Hall, Shaw, & Oppenheim, 2006). Cluster membership dispersion was examined for two to 12 K-cluster solutions and a relatively good reduction occurred on the two, five, and seven cluster solutions. The remaining solutions either failed to converge or had inferior membership dispersion. The seven-cluster solution was selected as the best solution as it had the lowest dispersion and good differentiation between clusters and produced two additional important visitor segments of interest.

All VSM variables were analyzed for differences across the seven visitor segments, whether they were used in segment construction or not. These analyses were undertaken not to validate but to describe the visitor segments. Most differences were found using cross-tabulations between visitor segments and each variable. Continuous variables were compared using *t*-tests and chi-square tests were used to compare the remaining variables. The large sample allowed over 40 contingency tables to be examined for individual cell differences, that is, clusters versus questionnaire items. The items analyzed included variables that were used in the factor analyses and the questionnaire items excluded. The tables were examined using adjusted standardized residuals (ASR), as suggested in Haberman (1978). Because of the large number of tests, a critical ASR score of ±3.89 (two-tailed) was used with a *p*-value of 0.0001 to reduce the likelihood of Type II errors. These analyses focused on individual cell frequencies because of the issues regarding Euclidean distance resemblance measures to be discussed in the following section on Validation.

Validation

From a technical perspective, when forming visitor segments, there is an important tautology to avoid: using Euclidean distance resemblance measures (i.e., variance in ANOVA) to validate visitor segments on variables that produced visitor segments in the first instance using Euclidean distance resemblance measures (i.e., variance in K-means clustering). A common practice is, therefore, to reserve independent variables to validate the visitor segments and to examine segment relationships with other variables of interest using post hoc tests. For example, Jun, Kyle, and Mowen (2009) used K-means clustering to produce REP-based segments of people who subscribed to a park publication and then applied ANOVAs to examine the independent variables of constraints to using metropolitan parks. Caution regarding this more moderate approach should also be noted, however. This practice still uses Euclidean distance resemblance measures to validate visitor segments, which are similar to Euclidean distance resemblance measures used during segment formation, albeit with different items. If one of the items used to test the visitor segments is related to a variable used to construct them, this could cause a serious tautological problem. These problems may be compounded when incorporating numerous variables in segment construction and validation as the chance of spurious relationships increases rapidly with the number of variables used (see Formula 5, Type II Error Probability below). These weaknesses increase the probability of Type II errors and cannot be ameliorated by using tighter test confidence limits, as these dangers may be inherent in the data. In a worst-case scenario, the validation step of using Euclidean distance resemblance measures could even be annulled. It is the authors' view that correlation resemblance measures are a superior alternative means of validating visitor segments created by Euclidean distance resemblance

measures, a technique that to the authors' knowledge has not been applied to park segmentation studies previously.

The intention of this study was to develop a visitor typology applicable across a whole range of parks and among different functions of a park. As such, subsequent analysis of each cluster segment and their relationship to the various service and facility items and factors was conducted. For each item and factor in the *service quality* grouping (see Table 3), the correlation with *visit satisfaction* according to the seven visitor segments was examined. Therefore *service quality* and *desirable outcome* variables were used for validation. Specifically the *service* or *facility performance* factors were correlated as inputs, using Pearson's r, with the *visit satisfaction* variable as an output. The results of this analysis are shown in Table 4. Ninety-ninth percentile confidence limits were used as criterion for the correlation resemblance measures (IBM, 2009).

Type II Error Probability

As previously stated, efforts were made to reduce the probability of a Type II error occurring. The following formulas are offered to demonstrate the approach taken. Let $p_e(C_iU_j)$ be the probability of a Type II error occurring between two variables, C_i for construction and U_j for validation, both using Euclidean distance resemblance measures to develop segments. The error may be a spurious covariance between *Ci* and *Uj*. Also let P_e be the total probability of any Type II error occurring and *m* and *n* be the total number of construction and validation variables used respectively.

Then:

$$P_e = p_e(C_1U_1) \vee p_e(C_1U_2) \vee \ldots \vee p_e(C_1U_n) \vee p_e(C_2U_1) \vee \ldots \vee p_e(C_mU_n) \quad (1)$$

If $(1 - P_e)$ is the probability of any $p_e(C_iU_j)$ not occurring then:

$$P_e = 1 - (1 - p_e(C_1U_1)) \cdot \left(1 - p_e(C_1U_2)\right) \cdot \ldots \cdot \left(1 - p_e(C_1U_n)\right) \cdot \left(1 - p_e(C_2U_1)\right) \cdot \ldots \cdot \left(1 - p_e(C_mU_n)\right) \quad (2)$$

For example if m = 2 and n = 2 the equation (2) fully becomes:

$$P_e = 1 - (1 - p_e(C_1U_1)) \cdot \left(1 - p_e(C_1U_2)\right) \cdot \left(1 - p_e(C_2U_1)\right) \cdot \left(1 - p_e(C_2U_2)\right) \quad (3)$$

If $p_e(C_iU_j)$ is a very small probability then any second or higher order terms such as $p_e(C_2U_1) \cdot p_e(C_1U_2)$ can be removed and equation (3) can be reduced to:

$$P_e \cong p_e(C_1U_1) + p_e(C_1U_2) + p_e(C_2U_1) + p_e(C_2U_2) \quad (4)$$

Further, the probability $p_e(C_iU_j)$ will be generally unknown and if we let $\hat{p}$ be the average probability of all $p_e(C_iU_j)$ then general equation (2) can be reduced to become:

$$P_e \cong \hat{p} \times m \times n \quad (5)$$

Results

As a result of this analytical procedure, it was concluded that there were seven visitor segments robustly determined by the study. This supported the aim to have a manageable number of segments that agency staff were likely to be able to recall and use. The names assigned to the seven visitor segments, the proportion of visitors associated with each and the relative distribution across ROS remoteness classes is shown in Table 6. The largest visitor segments were Nature Admirers and Urban Socials, both comprising 26% of the visitors surveyed. The smallest visitor segment, Vacation Campers, accounted for 8% of visitors.

Table 6

Park ROS Remotness Class by Visitor Segment

Park's ROS Remoteness Class*	Statistic	Visitor Segment							
		Nature Admirers	Urban Socials	Trail Users	Passive & Other Users	Activity Centrics	Access Made Easy	Vacation Campers	Total
Roaded Natural / Semi-remote Motorized (class 3)	Frequency	2,139↑	130↓	640↓	492	316↓	462↑	853↑	5,032
	% in ROS	42.5	2.6	12.7	9.8	6.3	9.2	17.0	100
	% in Segment	71.9	4.4	39.0	45.8	32.5	50.4	99.5	44.2
	ASR	35.4	-50.6	-4.5	1.1	-7.6	3.9	33.9	
Semi-developed/ Natural (class 4)	Frequency	584	411↓	227↓	211	373↑	192	3↓	2,001
	% in ROS	29.2	20.5	11.3	10.5	18.6	9.6	0.1	100
	% in Segment	19.6	13.9	13.8	19.6	38.4	20.9	0.4	17.6
	ASR	3.4	-6.1	-4.3	1.9	17.8	2.8	-13.8	
Developed (class 5)	Frequency	251↓	2,413↑	772↑	372	282↓	263↓	1↓	4,354
	% in ROS	5.8	55.4	17.7	8.5	6.5	6.0	0.0	100
	% in Segment	8.4	81.7	47.1	34.6	29.0	28.7	0.1	38.2
	ASR	-38.9	56.5	8.0	-2.6	-6.2	-6.2	-23.9	
Total	Frequency	2,974	2,954	1,639	1,075	971	917	857	11,387
	% Total	26.1	25.9	14.4	9.4	8.5	8.1	7.5	100
	% of Segment	100	100	100	100	100	100	100	100

Note.
1. Pearson Chi-Square = 5,209.4 with df = 12, Asymp. Significance (2-sided) < 0.001.
2. ↑/↓ significantly higher/lower observed frequencies than expected using Adjusted Standardized Residual (ASR) critical value=±3.9, two tailed at p < 0.0001 (Haberman, 1978).
3. Park ROS Remoteness Class as per Worboys, Lockwood & De Lacy (2005, pp. 436-437).

Post segmentation analysis of the clusters provided a profile of the visitor characteristics of each segment. The variables most influential in forming segments are also summarized in Table 7. A brief description of each segment is detailed as follows:

Nature Admirers visit for a novel but short (median 2 hours) visual experience of nature with the park scenery acting as the primary motivation for the visit. Nearly all Nature Admirers are visiting parks for reasons including sightseeing or touring, often with a nearby stay overnight during a holiday. This visitor segment is most likely to come from interstate or overseas in small groups and is most likely to comprise *first-time* visitors. They are very likely to be visiting a national park located in a regional/country area and typically visiting a mid-level *ROS remoteness class* (Roaded Natural/ Semi-remote Motorized). They had the highest level of *desirable outcomes* of any visitor segment. There were, however, no strong associations between *desirable outcomes* and *service quality* variables for this visitor segment, and they made fewer *visitor suggestions*.

Urban Socials typically visit parks for a large social gathering with the setting serving as a suitably large and recreationally serviced venue. Nature is simply serving as the backdrop for the social occasion. Nearly the whole segment visit for social interaction, for example, work or

Table 7

Visitor Segment Means on Key Variables and Tukey HSD for Homogeneous Subsets

	Visitor Segment Means							
Variable	Nature Admirers	Urban Socials	Trail Users	Passive & Other Users	Activity Centrics	Access Made Easy	Vacation Campers	Harmonic Mean Sample Size
Relationships with Nature	0.98[1]	0.04	0.01	0.00	0.02	0.50[1]	0.76[1]	1272.179
Exercise Physical Fitness: trail based	0.00	0.00	0.98[1]	0.00	0.00	0.17[1]	0.09[1]	1272.179
Exercise Physical Fitness: non-trail based	0.00	0.00	0.00	0.00	0.96[1]	*0.03*[2]	*0.04*[2]	1272.179
Family Togetherness & Being with People	0.02	0.96[1]	0.01	0.00	0.01	0.30[1]	0.08[1]	1272.179
Physical Rest; Escape Pers.-Soc. Press; or Phys. Press. & Other	0.00	0.00	0.00	1.00[1]	0.00	0.01	0.03[1]	1272.179
Park Accessibility (tally of visitor suggestions)	0.04	0.05	0.10	0.14	0.14	1.04[1]	0.12	1272.179
ROS Remoteness class	3.37[1]	4.77[1]	4.08[1]	3.89	3.96	*3.78*[2]	3.01[1]	1272.179
First visit to this Park	0.41[1]	0.75	0.82	0.66	0.85	0.62	0.72	1272.179
Trip Type	1.76	1.04[1]	1.45	1.71	1.40	1.59[1]	2.98[1]	1272.179
Time of stay in hours	8.03	3.78	10.80	30.07[1]	9.37	10.90	170.68[1]	1270.918
Home location	2.19[1]	1.13[1]	1.39	1.51	1.35	1.59	1.51	1245.528

Note:
1. For each variable: the underlined segment mean form a heterogeneous subset, i.e. a homogeneous subset with segment membership of one with subset for alpha = 0.001 (sig. =1.0); therefore these segments can be classed as heterogeneous.
2. Similarly italicized means split into heterogeneous segments with subset for alpha = 0.01 (sig. =1.0).
3. Other segment means form homogeneous subsets of 2 or more segment members, (sig. =1.0) at both alpha levels.

family picnics, birthday parties, or simply for socializing with friends and family, especially with children. This visitor segment is most likely to be on a short half-day visit (median 4 hours) from their metropolitan home to an urban park (Developed park, *ROS remoteness class* 5). They don't visit frequently (median *visits per year* = 2) but are usually repeat (i.e., not *first time)* visitors. Many come in larger groups with the majority visiting in groups of six to 50+ in number. The visitor segment has slightly lower *desirable outcomes* and several strong associations between *desirable outcomes* and the *general management* and *recreational facilities service quality* items. They are also much more likely to make *visitor suggestions* on *recreational facilities*.

Trail Users visit for a variety of trail activities, mostly walking, with the park providing a suitable track or trail with natural surroundings. The variety of trail-based activities includes a short walk with or without a dog or a companion person, cycling, cross-country skiing, jogging or running. The majority of this visitor segment lives in metropolitan areas and is more likely to be repeat and highly frequent visitors to the park, typically, on a day trip. The visitor segment is more likely to be visiting an urban park. They had no large service gaps and no strong associations between *desirable outcomes* and *service quality* variables except for *ranger management* and *recommendation level*.

Passive and Other Users visit to relax and unwind in a natural setting or for some other activity, which is typically low energy. About half this visitor segment visit for passive activities such as relaxing, resting or sunbathing; the remainder visit for a variety of miscellaneous reasons including visiting because the park is nearby, reading, painting, drawing, photography, volunteer work or visiting the facilities (such as toilets). This visitor segment were not generalists but rather had few distinguishing characteristics other than a high percentage of passive activities undertaken and a longer duration of stay in the park. The longer stay was associated with a particular cohort making up 15% of the visitor segment that were campers who stayed

for one to seven nights for the *first time* at a distant and remote park usually as a consequence of a friend's recommendation. They camped for only one specific purpose (i.e., to rest or relax), unlike Vacation Campers. The visitor segment found peaceful aspects of the visit more enjoyable and, in particular, water features such as lakes, beaches and waterfalls featured strongly. The least positive aspect of their visit was a lack of shade. Only the *interpretation, information, & education service quality* factor had higher associations with *visit satisfaction* and *recommendation level*.

Activity Centrics visit to undertake a specific activity where the park provides a suitable venue for that activity, typically high-energy and/or water-based. The wide variety of physical activities includes surfing, swimming, exercising, tobogganing, informal sport, fishing, rock climbing, and yachting. There are more young singles and more 18- to 19-year-olds in this visitor segment with fewer older visitors (55+ years). Interestingly, the *park entry service factor*, including adequate car parking, track and trail maintenance and directional signage, had the highest impact on *visit* and *agency satisfaction* but the *general management* and *recreation facilities service quality* variables had the strongest influence on this visitor segment's *recommendation level,* including clean toilets, safe access to facilities and mown lawn areas for informal sport (e.g., football).

Unlike other segments, Access Made Easy does not visit for any one specific benefit; they visit for any of three benefits. The main activities undertaken are therefore, in descending order, sightseeing, socializing, and trail use. The key feature of the visit is that they are underwhelmed by it; while generally satisfied, some access problem (e.g., poor track maintenance, lack of parking, and/or poor directional signage or orientation information) negatively impacts their experience. Most visitors in this cohort made park *accessibility visitor suggestions*; in fact, half of all park *accessibility suggestions* came from this relatively small visitor segment. The visitor segment had by far the lowest *visit* and *agency satisfaction* level of any visitor segment, with double the number of problems encountered compared with the average visitor. It also has more mature singles and is dominated by males and tertiary educated people (both 76%). Compared to the other visitor segments, the Access Made Easy grouping has more people who *visit once a year* only and more from interstate. This lower level of familiarity is possibly reflected in the access issues the visitor segment faced. Only the *general management* and *recreation facilities service quality* factor was highly associated with *recommendation level;* there were no high associations with *visit* or *agency satisfaction.* This suggests that some of this visitor segment may have brought their low *satisfaction* with them (i.e., before arrival). This was indeed the case when a particular cohort which made up 10% of this visitor segment was identified; this cohort unlike the rest of the segment, visited often, many visited the park almost every day but counterintuitively had relatively lower *visit* and *agency satisfaction* compared to this and every other segment—usually as a consequence of a recurring problem with the park and despite the visitor having reported it, the problem went unfixed. Interestingly, this small cohort often resonated with many park rangers as serial complainants.

Vacation Campers like to spend a substantial period of their vacation staying in national parks in regional areas; typically camping. The visitor segment generally stays overnight in the park; most stay more than four nights. Like Nature Admirers, many visitors in this segment undertake touring and sightseeing activities, however, unlike Nature Admirers they plan and undertake many additional activities during their visit and thus seek a multitude of benefits. They have average *visit* and *agency satisfaction*, with many in the visitor segment encountering problems that affect their *satisfaction* levels, particularly in relation to track and path maintenance and sufficient and clean toilets and/or showers. *Park entry* and *ranger management service quality* factors highly influenced *agency satisfaction*.

Examining the visitor segments collectively across park *ROS remoteness class* (see Table 6), it appears that the findings contradict Kemperman and Timmermans' (2006b) finding that each visitor segment prefers a different type of park. While there are clear preferences, for example, the largest visitor segment, Nature Admirers, is most likely to use areas that are Roaded Natural/ Semi-remote Motorized on the *ROS remoteness class*, compared to Urban Socials and Trail Users, who are more likely to use developed sections of parks, it is clear that the sites with medium levels of development are used primarily by the majority of visitor segments. These collective findings are supportive of the first research aim of the study, namely, "Can market segmentation be used to obtain a manageable number of visitor segments that are relevant to multiple parks and ROS remoteness classes?".

Caution should be exercised in the interpretation of these findings. While it does at the segment level suggest medium levels of development are most popular with visitors, this should not be misconstrued to assume that less developed areas are undervalued. By virtue of the study design, as surveying did not occur in Remote or Semi-remote areas, ROS class 1 and 2, inferences cannot be drawn as to the importance of those ROS remoteness classes. A particular example to illustrate this limitation is the Activity Centrics' high representation in Semi-developed/Natural parks shown in Table 6. This observation was primarily due to one recreation type, surfers, with large numbers living in urban Melbourne and using surfing beaches at a nearby national park. This activity pattern would not be representative of Semi-developed/ Natural parks at other non-coastal locations.

The results of the cluster analysis do, however, indicate that each visitor segment seeks different benefits from their park visits. For example, Nature Admirers obtain their primary benefit from enjoyment of nature, while Urban Socials derive benefits from a sense of togetherness accruing from park visits with family and friends. Table 8 shows the Euclidean distances between each visitor segment centroid and between the pooled data centroid (0.0_{F1}, 0.0_{F2}, 0.0_{F3} …0.0_{F12}). All distances between visitor segment centroids are over two standard deviations, suggesting the visitor segments are very distinct and significantly different from one another, detailed analyses follow. The distance from the pooled data centroid is also useful in evaluating the contribution of the factors that are most influential in forming the visitor segments, this analysis is not shown here for brevity sake.

Table 8

Euclidean Distance between Centroids

	Visitor Segment Centroid						
Euclidean distance to centroid of:	Nature Admirers	Urban Socials	Trail Users	Passive & Other Users	Activity Centrics	Access Made Easy	Vacation Campers
Pooled data (i.e. 0_{F1},0_{F2},0_{F3}…0_{F12})	1.31	1.42	2.05	2.92	2.70	2.17	2.50
Nature Admirers		2.23	2.71	3.55	3.14	2.64	2.86
Urban Socials			2.81	3.48	3.31	2.73	3.15
Trail Users				3.73	3.62	3.10	3.41
Passive & Other Users					**4.21**	3.94	**4.02**
Activity Centrics						3.57	3.86
Access Made Easy							3.43

Note: Measurements are in standard deviations (SDs=1). Underscored cells are less than 2 SDs; bolded cells are above 4 SDs.

As expected, post hoc ANOVA results confirmed that K-means clustering separated the visitor segments well on all variables in Table 4, with the means on each of the 32 contributing variables being significantly different (F values ranged from 9.6 to 1,322 with a median of 120.8, $p < 0.0001$, $df = 6$). Although these results are highly significant; they should not be used to validate the visitor segments as the same variables were used in the K-means clustering; this also applies to the Tukey HSD analyses which follow. Table 7 highlights the individual visitor segment means for variables that load highest on the factors that are most distinctive in forming the visitor segments. These variables are therefore key to segment differentiation as they contribute most to forming individual visitor segments; the means are all shown with Tukey HSD analyses of homogeneous subsets; heterogeneous subsets are shown as underlined, i.e., where the subset membership is one. As with the ANOVA findings, the visitor segments show significant ($p < 0.001$) differentiation on all the key distinctive variables.

As an example of the differences highlighted in Table 7 and for descriptive purposes only: Nature Admirers are differentiated by high *relationships with nature* as a *benefit*; they have a lower *ROS remoteness class* meaning a more remote park preference; a lower *first visit to park* score indicating they are more likely to be *first-time* visitors and finally a higher *home location* score indicating more non-Victorian visitors. Interestingly, the data suggests *benefits* rather than *ROS remoteness class* are more powerful in distinguishing visitor segments as all seven visitor segments are differentiated by *benefits* but only four visitor segments are differentiated by *ROS remoteness class* (i.e., Passive and Other Users, Activity Centrics, and Access Made Easy are not differentiated by *ROS remoteness class*). The one visitor and three visit descriptor variables, *first visit, trip type, time of stay* and *home location*, that are at the bottom of Table 7; are of interest as these also contribute substantially to differentiating all visitor segments except for Activity Centrics. Finally, a high tally of *park accessibility visitor suggestions* and a high *trip type* (i.e., not a *daytrip from home*) also contribute substantially to differentiating the Access Made Easy segment.

Validation Results

Detailed in the brief descriptions of the seven core visitor segments above is reference to their *desirable outcomes* with various *service quality* items and factors. It is beyond the scope of the current article to present the findings of all relationships between the visitor segments and the 18 *service quality* items assessed in the VSM; however, one aim of this study was to develop a visitor typology applicable to different functions of a park organization. To highlight the results, the validating analysis is provided as an illustrative example of the correlation analysis conducted on the *desirable outcome* variables (*visit satisfaction, agency satisfaction,* and *recommendation level*). Importantly, these findings, detailed in Figure 1, highlight the correlations coefficient patterns with corresponding ninety-ninth percentile confidence intervals (IBM, 2009) between *service quality* factors and visit satisfaction that vary between visitor segments and the pooled data.

Several significant observations can be made from Figure 1. First, all visitor segments have at least one correlation coefficient outside of the pooled data confidence intervals (significant at $p < 0.01$). For example, Trail Users have a higher correlation coefficient than pooled for *park entry* and *ranger management* but lower for *interpretation, information, and education*; Vacation Campers have a higher correlation coefficient only for *ranger management*. It may be noted that the pooled data includes each visitor segment's data and therefore the comparison samples are not independent; however, this makes the correlation resemblance test more conservative, i.e., it increases the chance of Type I errors and reduces the chance of Type II errors (Malhotra et al., 2006); it is therefore, acceptable in this case. Further, some visitor segment's confidence intervals

are completely outside that of the pooled data, e.g., Urban Socials correlation coefficient on the *general management and recreational facilities* indicating significance at $p < 0.0001$.

Second, most visitor segments have significant positive correlation coefficients between the *service quality* factors and *visit satisfaction* (Pearson's r correlation, $p < 0.01$). This was also the case with the other two *desirable outcome* variables. Only a few correlation coefficients, where their confidence interval straddles the 0.0 horizontal line, were not significant. Third, the *park entry* factor correlates highest with *visit satisfaction*; while *ranger management* has the lowest correlates. Finally, visitor segments differ with other visitor segments (e.g., for the *park entry* factor, Activity Centrics correlation coefficient is higher than Nature Admirers, Urban Socials, Trail Users, Passive and Other Users, and Access Made Easy; Vacation Campers correlation coefficient is higher than Nature Admirers, Urban Socials, Trail Users, and Access Made Easy) (all significant at $p < 0.01$). Similarly, for the *ranger management* factor, Access Made Easy's correlation coefficient is higher than Urban Socials and Activity Centrics. Visitor segment correlation coefficient differences can be found on all four *service quality* factors with respect to *visit satisfaction* and also with *agency satisfaction* and *recommendation level*, not shown for brevity sake.

This evidence supports the validation of distinctive visitor segments. Additionally, the correlational coefficients support the function of segmentation by finding numerous significant but differing relations for visitor segments on the variables of interest. Lastly, this is achieved using a method that is more robust and free of Euclidean distance resemblance measures such as ANOVA, supporting the third aim of this study.

Discussion and Conclusions

The study detailed in this article offers several contributions to the park visitation literature in the development of a whole of agency approach to market or visitor segmentation. Methodologically, it moves the literature beyond the dominance of a single site, single park or park type studies, involving small samples and a limited number of explanatory variables to segment visitors into supposedly meaningful, actionable visitor segments. The findings of the four-year study of 11,000 visitors to a total of 33 diverse parks located in the State of Victoria, Australia, applied robust statistical analysis to reveal seven distinct visitor segments to form a whole of park agency visitor typology. The theoretical and applied contributions of this typology will be discussed in turn.

In finding that seven high-level visitor segments broadly differentiate between visitors to a variety of park types, the study addresses the first research aim postulated. This number of visitor segments is within the range managers are likely to recall (Miller, 1956) and hence be more likely to engage with. Benefits sought were found to be the primary distinguishing factor among the visitor segments. While this appears contrary to assertions made by Anderson et al. (2000) and Weber and Anderson (2010) that there is a core group of benefits that most visitors seek, it does support the contention that the antecedent conditions for benefits comprise more than just setting and activity variables (Pierskalla, Lee, Stein, Anderson, & Nickerson, 2004; Weber, Senior, Zanon, & Anderson, 2008). The activities people participated in were certainly important, whether it be sightseeing for Nature Admirers, socializing for Urban Socials, or undertaking trail-based activities in the case of the Trail Users segment. Access Made Easy and Vacation Campers were the exceptions, as they did not have one strong purpose-specific rationale motivating their visits. Interestingly, the results reveal that ROS remoteness class or setting is a less potent factor for distinguishing between visitor type than activities or benefits, with a number of visitor segments sharing preferences for similar types of park, for example, Trail Users and

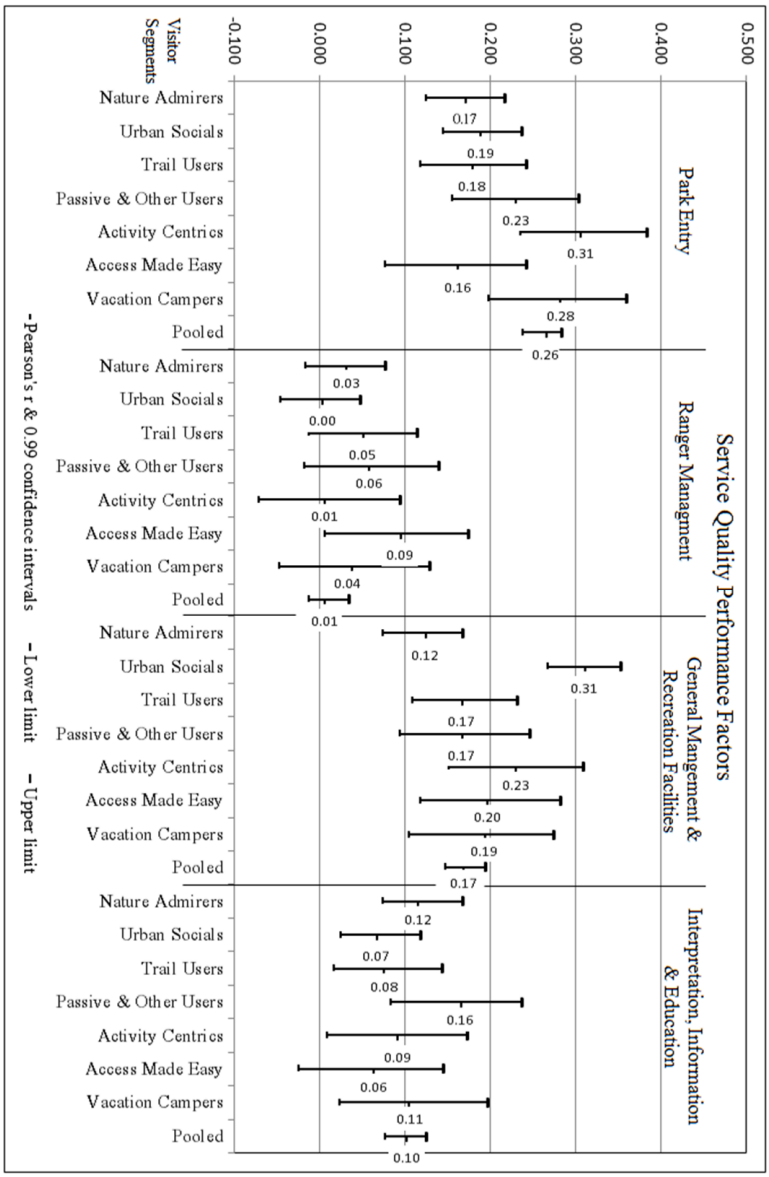

Figure 1. Visit Satisfaction correlations with Service Quality Performance Factor for Visitor Segments

Urban Socials favoring urban parks (ROS remoteness class 5, Developed park). Further research is required to determine whether these findings result from the limitations noted in the research design or are in fact indicative of setting preferences as operationalized via ROS remoteness classes playing a lesser role than benefits in distinguishing between visitors across an entire park agency.

The large sample employed in the current study and the use of a wider range of variables than has traditionally been used in park segmentation studies has improved the potential applicability of the visitor segments to various groups within a park agency, addressing the second research aim. Replication of this robust method by other park agencies is recommended and would provide useful insights as to whether there is indeed some type of visitor experience spectrum (parallel to the ROS remoteness class) that is consistent across agencies. Future research could also improve upon the explanatory power of visitor segments with the inclusion of additional variables as inputs in to the segmentation process. Weber and Anderson (2010), for example, suggested place attachment items might supplement the current understanding of the antecedent conditions for benefit acquisition in park studies.

The key implications of this study relate to the greater understanding of park visitors that this typology provides and its application across an entire park agency. The seven visitor segments identified represent the main user groups of the 33 parks studied. Agency planning can be tailored to particular visitor segments that a park within its managed estate provides service to, for example, while Nature Admirers and Urban Socials may appear overall to be the dominant park visitor groups, this dominance does not apply to all parks. Each park location gives a good proxy indication of the dominant market segment(s) to be serviced: urban parks' main markets are Urban Socials and Trail Users; urban fringe parks predominantly attract Nature Admirers and Urban Socials with many Activity Centrics. The main markets for parks in rural areas are Nature Admirers and Vacation Campers, with Trail Users being the third most prevalent visitor group. The Passives & Other Users and Access Made Easy segments appear consistently across a range of park locations. Individual parks, however, can have different mixes or percentages of segments, often with several missing.

The effective and efficient decision support tool that is an agency-wide typology can assist all areas of park management in the administration of resources, assessment of planning decisions, and in general enable an increased range of users to be recognized and catered for in order to avoid user conflicts. Optimal management can only be achieved by tailoring appropriate service and facilities to the needs of the heterogeneous park visitor segments. The illustrative example of the ranger service factor in combination with the visitor segments (see Figure 1) highlights that if the agency wished to reallocate, either add or remove, rangers to parks or sites within parks based on desirable outcomes then the visitor segments visiting those parks can provide insight into that optimal allocation. This is particularly important for agencies as rangers make up a very large proportion of annual staffing costs (Parks Victoria, 2012). Further illustrative examples of the typology's utilization include strategic and operational park management applications that relate to recreation planning, risk management, and tourism strategy formulation. The typology was used by Park Victoria's park planning department strategically with a Geographic Information System overlay (GIS), which spatially located the use patterns and preferences of visitor segments and was used to inform recreational zone planning in Victoria's regional southwest parks (Brown, Weber, Zanon, & de Bie, 2012). Another strategic application was a risk management framework developed for all Victorian parks and visitors using the segments to improve visitor safety (Parks Victoria, 2008), illustrated in Figure 2. An example of an operational application was the development of web-based surfing information in response to an under-representation of younger adults in park visitation (Table 2; ABS, 2002, p. 349) and in sports and physical activi-

ties more generally (ABS, 2002, p. 375; ABS, 2010). Because Parks Victoria were informed that this group was well represented in the Activity Centric segment, they were therefore able to use associated information to develop effective materials and channels likely to engage the target audience, (e.g., Parks Victoria, n.d.).

Type of Visitor (Market Segment)	Recreation Category	Example of potential risk	Level of Risk Tolerance	Control/Action for site LOS rating				
				Very High	High	Mid	Basic	Very Basic
Nature Admirer	- Walking / Sight Seeing	- Insect Bite - Tree limb fall - Trip hazard	Low	AVOID REDUCE Eg. Engineering solutions to 'harden' site.	AVOID REDUCE Eg. Close visitor access to areas of potential risk	AVOID REDUCE Eg. Monitor and treat tree risk.	AVOID REDUCE 	REDUCE 
Urban Social	- Children's Play - Picnicking / Socialising	- Tree limb fall - Trip hazard	Low to Medium	AVOID REDUCE	AVOID REDUCE	REDUCE	REDUCE	REDUCE
Vacation Campers	- Camping / Accommodation - Four Wheel Driving	- Bushfire - Exposure - Tree limb fall (Tree Risk Policy & Guidelines) - Trip hazard - Vehicle rolling	Medium to High	REDUCE 	REDUCE 	ACCEPT RETAIN SHARE	ACCEPT RETAIN SHARE	ACCEPT RETAIN SHARE
Trail Users	- Dog Walking - Cycling / Mountain Bike - Horse / Trail bike - Skating / Rollerblading - Jogging / Running - Snow Sport - Walking / Sight Seeing	- Collision with other park visitors - Collision with infrastructure or trees	Medium to High	AVOID REDUCE 	AVOID REDUCE Eg. Barrier & Hazard signage system, or close track.	ACCEPT RETAIN SHARE Eg. Shared agreements with LTO's	ACCEPT RETAIN SHARE Eg. Appropriate warning signs.	ACCEPT RETAIN SHARE
Activity Centric	- Hang Gliding - Rogaining / Orienteering - Informal / Formal Sport - Rock Climbing / Abseiling - Water: Active Personal Rec - Water: Boating / Fishing - Water: Charter - Water: Rock Fishing - Water: Swimming	- Collision with natural assets - Equipment failure - Trip hazard - Exposure to mine shafts - Falling from height - Injury from jumping or diving into water - Being swept from rocks - Swept from desired location	Medium to High	ACCEPT REDUCE RETAIN 	ACCEPT REDUCE RETAIN 	ACCEPT RETAIN SHARE 	ACCEPT RETAIN SHARE 	ACCEPT RETAIN SHARE Eg. Risk information in Park Notes & info centres.
Guidelines for signage and visitor information implementation				Communicated at strategic locations, on site and in pre-visit information	Communicated at strategic locations, on site and in pre-visit information	Communicated in pre-visit information and on site.	Communicated at site access points and/or on site.	Communicated at strategic access points.

Figure 2. Parks Victoria Visitor Risk Summary Table for Visitor Segments

In summary, the key managerial applications of this study relate to the level and type of service appropriate for different types parks and the subsequent development of visitor service strategies, park management plans and marketing communication strategies. This study may test philosophical beliefs in terms of assessing parks as a commodity; however, at its heart, market segmentation offers great potential to improve visitor experiences. Park studies that focus on the "traditional camper" or "backcountry hiker" maybe ignoring a large percentage of people who use parks regularly for cycling, relaxing and socializing close to home. The fact of the matter is the proverbial "happy camper" may not be a camper at all and may not be happy. Large-scale sampling, over a variety of park types, is the best hope for generating a more complete picture of the diversity of visitor experiences people accrue in park settings. Researchers should be encouraged to explore the use of multiple variables and hierarchically integrated segmentation approaches across entire agencies and in doing so commonalities among agencies in terms of park visitors may be discovered.

Finally, this study used a novel combination of Euclidean distance resemblance measures to construct market segments and correlation resemblance measures to validate those segments. Not applied before in the park recreation, leisure or market segmentation literature, the use of the different validation criteria was risky as it may not have confirmed any distinctive differences between segments differentiated initially by Euclidean distance resemblance measures. The success of correlation resemblance measures for validation purposes illustrated here ensures that the resultant segmentation solution has reduced likelihood of Type II errors and is more robust

given the seven park visitor segments discerned are distinctive on two established and different measurement systems. This method avoids a common danger in market segmentation (i.e., the tautology). By using independent methods to construct and validate segments, this method leaves the researcher free to select any variables of interest while avoiding a tautology. Further, it can be automated into K-means clustering or other Euclidean distance-based clustering algorithms to validate segments created with correlations on preselected variables of interest, thus allowing "ends driven" optimization of the selected solution (i.e., selecting a particular cluster solution that gives the best separation on independent validating criteria, thereby reducing the plurality of potential market segment solutions). This technique over time may also assist in aligning the two main streams of industrial data mining and academic theoretical market segmentation.

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