

The Adoption of Social Carrying Capacity for the Management of Theme Park Settings

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Abstract: In order to manage the quality of visitor experience, social carrying capacity has been prevalently applied to the planning of contemporary parks and natural environments. The common underlying logic of the applications is that carrying capacity can be determined through the identification of management objectives and associated indicators and standards of quality. Indicators can be monitored over time and carrying capacity is reached once standards have been reached. In this study, visitors' "reported queuing time" for using their favorite facilities in theme parks was adopted as the indicator. Accordingly, visitors' crowding norms, the queuing-norm-crowding relationship, and the applicability of social carrying capacity to the management of theme park settings were analyzed and discussed respectively.

Introduction

As applied to outdoor recreation from wild-life management, carrying capacity has evolved from a primary emphasis on ecological impacts to a dual focus which includes social considerations. The ecological aspect of concern refers to the integrity of the resource base which implies some threshold or tolerance level after which further exploitation or use may cause permanent damage to the natural ecosystem. From the social point of view, as more people visit a particular natural area, not only the environmental resources of the area are affected, but also the quality of the visitor experience. Accordingly, social carrying capacity has been prevalently applied to the planning of contemporary parks and to natural environments in the US. The common underlying logic of the applications is that carrying capacity can be determined through the identification of management objectives and associated indicators and standards of quality. Indicator variables can be monitored over time and once standards have been reached, carrying capacity has been reached as well. In order to manage the quality of visitor experience in a particular natural area, visitor's perceived crowding is usually used to represent

the magnitude of deterioration caused by the increasing number of visitors. As a result, the notion of social carrying capacity has become closely associated with the concept of crowding (Stankey & McCool 1989).

Crowding can be defined as a negative evaluation of a certain density level in a given area (Fleishman, Feitelson & Salomon 2004, Gramman 1982, Lee & Graefe 2003, Vaske, Shelby, Graefe & Heberlein 1986). The term "perceived crowding" is often used to emphasize the subjective or evaluative nature of the concept. Perceived crowding combines descriptive information (i.e. the density experienced by the individual) with evaluative information (i.e. the individual's evaluation of that density) (Vaske & Donnelly 2002). In this context, the density experienced by the visitors in a natural environment is represented by the indicator variable "reported encounter" and crowding is a negative evaluation of those encounters. In other words, visitors' perceived crowding involves a value judgment that the number of encounters they had exceeds their definition of an acceptable standard.

Norms are the standards that individuals use for evaluating the conditions they experienced as good or bad, better or worse (Vaske et al. 1986).

While social norms are those norms which are perceived by the individual to be shared by collective members in a society, personal norms arise from within the individual as feelings of moral obligation (Roggenbuck, Williams, Bange & Dean 1991). Since social norms are assessed by aggregating the personal norms, researchers (Donnelly, Vaske, Whittaker & Shelby 2000, Roggenbuck et al. 1991) have been interested in some characteristics of social norms, such as norm prevalence and crystallization of norms, derived from data at the individual level. In this context, norm prevalence refers to the percent of respondents giving a norm, and crystallization of norms refers to the level of collective consensus or agreement. In addition, researchers (Vaske & Donnelly 2002) have also been interested in the theoretical relationship between encounters, norm, and perceived crowding—when encounters exceed a visitor's norm for seeing others, perceived crowding will increase.

This study attempts to apply social carrying capacity to the management of theme parks—recreation settings that built in forms of artificial environments. Most early crowding studies focused primarily on wilderness areas (Manning 1999), recently, researchers have become interested in crowding issues within frontcountry settings (e.g. Kuentzel & Heberlein 2003; Manning, Lime, Freimund & Pitt 1996, Roggenbuck et al. 1991, Tarrant & English 1996, Vaske, Donnelly & Petruzzi 1996). While concepts derived from management of social carrying capacity have repeatedly been shown to be important for backcountry visitors, research that explores the types of norms and impact indicators appropriate for frontcountry settings would facilitate this understanding (Vaske & Donnelly 2002; Vaske, Donnelly & Whittaker 2000). Furthermore, Westover and Collins (1987) claim that the extension of crowding studies to urban settings has both theoretical and pragmatic significance. However, since the reported encounter is less useful in high density than in low density environments (Heywood 1993, Shelby & Vaske 1991), visitors' "reported queuing time" for using their favorite facilities in theme park settings was adopted as "impact indicator" to represent the magnitude of their experienced density. This study attempts not only to analyze prevalence and crystallization

of visitors' crowding norms and the queuing-norm-crowding relationship but also to discuss the applicability of the normative approach extending from natural to artificial environments and the marketing implications of the results of this study. Accordingly, the following six research questions were developed:

1. What is the respondents' prevalence of crowding norms for acceptable queuing time in theme park settings?
2. What is the respondents' level and crystallization of crowding norms in theme park settings?
3. Will respondents' perceived crowding increase when reported queuing time exceeds their norms for queuing? In other words, is the perceived crowding of respondents who reported that queuing time (T) exceeded their crowding norms (N) different from those who reported that T did not exceed their N?
4. Is there a significant linear correlation between respondents' reported queuing time (T), crowding norms (N), and perceived crowding?
5. Are there differences or similarities in the corresponding findings derived from natural and artificial environments?

Methods

The target population for this study was visitors to the five leading theme parks in Taiwan (i.e. Jenfusan, Lefoo, Yamay, Formosan Aboriginal Culture Village, and Window on China). A quota sampling technique was employed to select elements of the research sample from the sampling population based on the official report (Tourism Bureau 2004) on annual attendance to domestic theme parks in Taiwan in 2003. The field survey for data collection was conducted between April and June of 2004. Junior students from a local university were trained as interviewers for data collection. Interviewers stationed near the exit gates of the five parks invited departing visitors to participate in this study. All subjects were selected based on their willingness to volunteer their personal information on site. For all analyses, a significance level of $p < 0.05$ was used.

1	2	3	4	5	6	7	8	9
Not at all Crowded		Slightly Crowded			Moderately Crowded		Extremely Crowded	

Figure 1: Standardized measure of perceived crowding.

In order to contrast the results of this study with the results obtained from the natural environments, the single-item scale (shown in Figure 1) developed by Heberlein and Vaske (1977) was adopted in this study. Since findings using this measure of crowding have been compiled from 35 studies addressing 59 different natural areas and more than 17,000 visitors, this diversity of applications suggests that investigators have found this single item measure of crowding to be universally useful (Shelby, Vaske, & Heberlein 1989). In this single-item scale (ranging from 1 to 9), the first two points label the situation as uncrowded, and the remaining seven points label it as crowded to some degree.

In this study, there is also a question for measuring crowding norms that asks respondents to give the longest queuing time they would tolerate for their favorite facilities, with a response of “makes no difference to me.” Some researchers (Hall & Shelby 1996; Hall, Shelby & Rolloff 1996; Manning et al. 1996; Roggenbuck et al. 1991) have included a third response category “makes a difference but can’t give a number.” Although the three-choice option provides respondents with a more exhaustive set of response categories, this study did not include the third response category because the derived findings may have less managerial relevance (Donnelly et al. 2000).

Results

By using quota sampling technique, a research sample consisting of 1,440 respondents was obtained from visitors to the five leading theme parks. The result shows that the distribution patterns of the respondents’ demographics were consistent with the practical observation of theme park visitors’ characteristics in the real world.

Donnelly et al. (2000) reviewed 30 different crowding studies, representing 56 norm evaluation contexts in natural environments (26 in backcountry and 30 in frontcountry settings) from 20 years of research. The results of their analysis showed

that the average norm prevalence was 70%, the median was 71%, and the standard deviation was 18%. In detail, norm prevalence in backcountry (mean = 81.2%, SD = 15.9) was significantly higher than in frontcountry (mean = 60.7%, SD = 13.8) evaluation contexts in terms of reported encounters. The result of this study shows that 63.4% of the respondents in theme park settings specified their crowding norms in terms of queuing time for using their favorite facilities. By comparison, prevalence of theme park visitors’ crowding norms was lower than the mean of all crowding studies conducted in natural environments as a whole, but higher than the average norm prevalence in frontcountry evaluation contexts specifically.

The 913 respondents who indicated specific acceptable queuing time for using their favorite facilities in theme park settings demonstrate highly crystallized consensus or shared agreement. Roggenbuck et al. (1991) suggest that crystallization (or dispersion) can be portrayed by both the coefficient of variation and the range of maximum acceptable queuing time between the first and the third quartiles of respondents. Table 1 lists the median, the maximum acceptable queuing time for the first and the third quartile of respondents with the most restrictive norms, mode, mean, standard deviation, the range, and coefficient of variation for the distribution of the 913 respondents’ norms for queuing (i.e. the upper limit of acceptable queuing time). Since this study used different impact indicator (i.e. queuing time) from the indicator (i.e. encounters) widely adopted in other crowding studies, in order to compare results derived from different scales, coefficient of variation becomes the most appropriate measure representing level of norm crystallization. Accordingly, the level of crystallization found in this study (C.V. = 0.6358) is much more significant than the levels found in previous crowding studies (e.g. C.V. ranges from 0.94 to 1.74 in Roggenbuck et al. 1991) which have been conducted in natural environments. In addition, the median (15 minutes) represents the length of queuing time which 50% of the

Table 1: Level and Crystallization of Crowding Norms in Theme Parks.

Median	1 st Quart	Mode	Mean	S.D.	Minimum	Maximum	C.V.
15 mins	10 mins	10 mins	17.9 mins	11.38	0 mins	60 mins	.6358

N = 913

Table 2: Relationship between Reported Queuing Time (T), Norms (N), and Perceived Crowding.

	Mean	S.D.	Pearson's <i>r</i>	Significance
<i>T-N</i> (minutes)	-8.12	12.21	.237	.000
Perceived crowding*	3.81	1.83		

N = 895

respondents would find unacceptable. Since the norms are highly crystallized, 75% of the respondents would find acceptable if the length of queuing time could be lowered slightly to 10 minutes.

A statistical relationship of queuing—norm—crowding was observed that when respondents' reported queuing time exceeded their normative limits of tolerance, their perceived crowding increased significantly. The result shows that 88.2% of the respondents reported shorter queuing time than their norms, while 11.8% reported longer queuing time than their norms. Mean perceived crowding were significantly higher for respondents reporting longer queuing than their norms ($t = 6.397$, $p < 0.000$). When the reported queuing time was shorter than the norm, respondents felt "slightly" crowded with an average score of 3.67. On the contrary, when reported queuing time exceeded the norm, respondents felt "slightly" to "moderately" crowded with an average score of 4.85.

Table 2 shows the correlation between those who reported longer or shorter queuing time than their norm tolerance and perceived crowding across all evaluation contexts. Since a statistical relationship was observed across all theme park evaluation contexts, only the strength (effect size) of the relationship in sum was examined in this study. Across all 5 evaluation contexts, the average correlation was 0.237 with significance at a 0.001 alpha level. According to Malhotra (1999), this result suggests that the strength of the queuing—norm—crowding relationship can be characterized as "small" to "medium."

Discussion and conclusion

Since the relatively importance of encounters decreases in situations where visitors expect numerous others to be present, Donnelly et al. (2000) suggest that researchers should identify which impacts are important to the setting being studied and measure not only encounters but other impact indicators. According to the results of this study, visitors' queuing time for using their favorite facilities seems to be an appropriate impact indicator representing negative impacts of the density in artificial environments such as theme park settings. By adopting the impact indicator, the results of this study consistent with previous findings in Donnelly et al. (2000) that evaluation contexts with norm prevalence scores lower than the median score (71%) of all crowding studies are more often higher density settings.

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