

EXPLORING THE CROWDING-SATISFACTION RELATIONSHIP BETWEEN DAY AND OVERNIGHT USERS IN THE LOWER COLORADO RIVER BASIN, TEXAS

Yung-Ping Tseng
Department of Recreation, Park and Tourism Sciences
Texas A&M University
College Station, TX 77841

Gerard T. Kyle
Texas A&M University

C. Scott Shafer
Texas A&M University

Alan R. Graefe
The Pennsylvania State University

Timothy A. Bradle
Lower Colorado River Authority

Abstract.—As the boating population and number of boats in use have grown in the United States, boaters' perceptions of density at recreation sites and the associated impacts on their experience (e.g., satisfaction) are becoming increasingly important. This paper explores a recreational boating crowding-satisfaction model derived from previous work using safety and enjoyment as mediating variables. We also tested our crowding-satisfaction model among day and overnight users at three lakes in the Highland Lakes region within the lower Colorado River basin. Our analysis revealed no significant difference between day and overnight users for any of the relationships tested. The final model indicated that as respondents' expectations for seeing people increased along with their feelings of being crowded, they were more inclined to consider conditions on the lake unsafe. They were also more inclined to indicate that the number of people they had seen on the lake detracted from their boating experience. Respondents' satisfaction was tied to their perceptions

of crowding. Mediating variables illustrated that the relationship was conditioned by perceptions of safety and enjoyment.

1.0 INTRODUCTION

Boating is a rapidly growing outdoor activity in the United States. Recreational boating participation increased by an estimated 2.3 million participants from 2004 to 2005, reaching a level of 71.3 million boaters. In 2005, Texas ranked as the third largest state in total expenditures for new powerboats, motors, trailers, and accessories (Natl. Marine Manufacturers Assoc. 2005). Due to the limited boating opportunities for Americans residing away from the coast, lakes and other interior waterways are undergoing some of the strongest growth in use. Consequently, issues related to boaters' perceptions of setting density and the associated impacts on their experience (e.g., satisfaction) are becoming increasingly important.

Beyond the increasing boating population, much of the growth in use is also represented by day users. For example, in 1983, day users were about 43 percent of all users at Bureau of Land Management sites, 62 percent of users at National Park Service sites, and 83 percent of users at Fish and Wildlife Service sites (Manning 2007a, p. 227). At U.S. National Park Service (NPS) areas, the average percentage of day use has remained around 60 percent from 1983 to 2004 (Manning 2007a, p. 227). Last, in a survey of 87 NPS wilderness managers (Abbe and Manning 2007), most managers believed that day users held different perceptions of and values about wilderness compared to overnight users. They suggested that day users had substantial impacts on the resources and social conditions of wilderness areas. Little research has been directed explicitly at this type of use, however. Understanding the differences in perceptions of

crowding, enjoyment, and satisfaction between day users and overnight users would provide more accurate assessments and evaluations for managing day use in recreation settings.

2.0 LITERATURE REVIEW

2.1 Crowding and Satisfaction in Outdoor Recreation

According to normative theory (Stokols 1972), use level is defined as a physical concept relating the number of people per unit of space. Crowding, on the other hand, is the negative and subjective evaluation of use level with psychological meaning (Manning et al. 2000). An inconsistent relationship between use level and crowding has been observed in past work (Absher and Lee 1981). Furthermore, the relationship between crowding and satisfaction was found to be generally weak or nonexistent (Manning 1999).

Previous studies have suggested that visitor perceptions of crowding are affected by many variables that interact with their perceptions of the number of people at the recreation setting (Ditton et al. 1983). Social interference theory suggests that crowding occurs when the number of other people present interferes with one's goals or desired activities (Manning 1999). Shelby (1976), Schreyer and Roggenbuck (1978), and Heberlein et al. (1979) all noted that the standards people use to evaluate a setting are influenced by their expectation for the experience. For example, Ditton et al.'s (1983) study of recreationists on the Buffalo National River in Arkansas found that floaters who felt crowded were more likely to report having seen more people and experienced more contacts than expected. This antecedent variable of crowding—expectations—was often measured by asking respondents “the number of visitors encountered” or “the type of experience sought” (Heberlein et al. 1979) as compared to what was expected.

As noted, the lack of empirical evidence supporting the hypothesized relationship between crowding and satisfaction was evidenced in the low variation explained in Lee's (1977) and Shelby's (1980)

research. However, Manning (1999, p. 116) and Cole (2000, p. 14) suggested that the absence of a relationship may be due to mediating variables, given the multitude of variables reported to be associated with satisfaction. In the context of boating activities, perceptions of crowding not only occur when use density increases, but may also occur when other people interfere with an individual's activities, intentions, or goals (Ruddell 1989). Heatwole and West (1982) indicated that the likelihood for conflict between recreational boating and other human uses of the waterway also increases as traffic increases, particularly near large metropolitan areas. For example, some recurring on-water conflicts were reported by boaters with the increased use of jet skis and other small personal watercraft. Boaters perceived that their encounters with these vessels were putting them at risk (Department of Water Resources 2004). This conflict resulted in a negative evaluation of setting density that also led to the detracting of satisfaction (Adelman et al. 1982). Reckless operation, use of alcohol or drugs, and issues of safety associated with jet skis were reported as the most common at-risk behavior in boating (Responsive Management 2000). However, the safety issue has received little attention in recreational boating research.

Last, in a study of campground users at the Katmai National Park in Alaska, Womble and Studebaker (1981) found that as the number of recreationists increases, visitors will begin to feel crowded and consequently their enjoyment will diminish. However, Mowen and others (2003) indicated that at certain developed recreational sites where larger numbers of people are expected, crowding can be a positive factor. Eroglu and Harrel (2003) coined the term “functional density” to refer to a good version of crowding where additional numbers of people increase visitors' enjoyment. In addition, visitors' subjective evaluation of overall enjoyment was a component of satisfaction measurement in Graefe and Fedler's (1986) recreational fishing research. Irrespective of the nature of the sites, managers need to address the question, “At what point does use level affect perceived crowding, visitor enjoyment and, ultimately, visitor satisfaction?”

2.2 Day and Overnight Users

Evidence suggests that the manner in which some user groups interpret encounters with others in natural recreation settings differs. In the context of this investigation, we focus on day and overnight users. Roggenbuck et al. (1994) observed that day users may create more crowding problems than overnight users. For example, early work by Lucas (1980) found that day users visit recreation sites more often in family groups, are less concerned about solitude, are more interested in scenic beauty, and are more satisfied with their trip than overnight users. At the same time, visits to parks and wilderness areas are becoming shorter, in part because of dwindling leisure time and the growing number of two-income households. Day use warrants more management attention given the likelihood that the proportion of facility/amenity use by this user group is likely to increase. However, the magnitude of differences in perceptions, preferences, and values between the two types of users has received little attention. In other work, Roggenbuck et al. (1979) found that day users were sometimes less likely to consider litter and crowding to be problems. Hall (1996) also indicated that day users noticed fewer environmental impacts than overnight users in her Mount Jefferson and Three Sisters Wildernesses (Oregon) research. In research at Zion National Park in Utah, Manning (2007b) found that overnight wilderness visitors were slightly less tolerant of large groups than were day visitors, but the former had a stronger norm intensity than the latter. An understanding of the crowding perceptions and management preferences of day users is essential for gaining insight into effective management of popular day-use areas.

3.0 METHODS

We collected data from visitors at three lakes in the Highland Lakes region of the lower Colorado River basin in Texas: Lake Austin, Lake Travis, and Lake Lyndon B. Johnson (LBJ).

3.1 Sampling

Six sampling days were selected to conduct exit interviews of boaters across the three lakes. Sampling

occurred at both public and private boat ramps between Memorial Day weekend (May 28) and the end of June 2007. We approached 469 boaters for the survey; participants completed 291 questionnaires, for a response rate of 62 percent.

3.2 Measures

In recent research, recreation satisfaction has been conceptualized and measured as a function of the multiple satisfactions derived from a spectrum of specific and separate experience elements (Graefe and Fedler 1986). It has become almost a maxim in satisfaction research that, holding all else constant, the more items in self-report measures of psychological constructs, the better. However, Manning (1999, p. 117) pointed out that “when satisfaction measures were intermixed with questions evaluating specific aspects of the trip, average satisfaction scores were lower than when the satisfaction measures were presented alone.” From a practical perspective, the use of single-item measures during the onsite data collection for the present study lowered our respondent burden and likely minimized respondent refusal (Bergkvist and Rossiter 2007). The use of single-item measures of satisfaction also has a lengthy history in the literature (Cronin and Taylor 1992, Howat et al. 1999). In this study, boaters’ overall satisfaction was measured using a 10-point Likert-type scale (Matlock et al. 1991).

Perceived crowding was measured using a 9-point Likert-type scale developed by Heberlein and Vaske (1977). Respondents were asked, “*How would you describe the overall boating conditions?*” The single-item crowding measure has been widely used in outdoor recreation research (Shelby et al. 1989). The expectation, safety, and enjoyment items were modified from Graefe and Fedler (1986) and Hall and McArthur (1994). Expectation was measured using a 5-point Likert-type scale.

4.0 RESULTS

4.1 Model testing

We tested our hypothesized model across day and overnight visitors using manifest-variable regression in

LISREL 8.70 (Jöreskog and Sörbom 2004). Selected goodness-of-fit indices were used in reporting the results. All subsequent analyses were performed using manifest-variable regression and tests of invariance. The results of path model testing are shown in Table 1. These findings indicate that our hypothesized model fit the data well for both day users ($\chi^2 = 3.571$, $p = .168$) and overnight users ($\chi^2 = 1.987$, $p = .370$). Invariance testing was then used to examine whether the hypothesized relations varied by different user groups. In essence, this procedure tested whether the beta weights were significantly different between user groups. In the invariant regression coefficient model, beta coefficients were constrained to be invariant (i.e., equal) across the two user groups. Results indicated that the imposition of these constraints did not significantly affect model fit. Given that the invariance testing revealed no significant difference between the two groups with regard to our hypothesized model, our discussion of findings is based on the analysis of the pooled data.

4.2 Summary of Effects

Table 2 depicts the statistically significant direct effects among the five manifest variables. The

discussion that follows describes the nature of these relationships:

1. Predictors of crowding: Crowding was positively influenced by expectation ($\beta = .38$, $t\text{-value} = 6.93$). This finding suggests that respondents' perceptions of crowding were influenced by the number of people they expected to see on the lake. Expectation accounted for 14.2 percent of the explained variance in crowding.
2. Predictors of safety: Safety was negatively influenced by crowding ($\beta = -.21$, $t\text{-value} = -3.40$) and expectation ($\beta = -.18$, $t\text{-value} = -3.03$). That is, as respondents' expectations for seeing people increased along with their feelings of being crowded, they were more inclined to consider the conditions on the lake unsafe. Crowding and expectation accounted for 10.3 percent of the variance in safety.
3. Predictors of enjoyment: Enjoyment was positively influenced by safety ($\beta = .14$, $t\text{-value} = 2.41$) and negatively influenced by crowding ($\beta = -.15$, $t\text{-value} = -2.41$) and expectation ($\beta = -.21$, $t\text{-value} = -3.46$). These findings suggest that as respondents' expectations for seeing

Table 1.—Goodness-of-fit indexes for day users and overnight users path models

Model	χ^2	df	$\Delta\chi^2$	Δdf	RMSEA	NNFI	CFI
Path Model	0.535 (P=0.765)	2			0.000	1.040	1.000
Baseline							
Day Users	3.571 (P=0.168)	2			0.063	0.951	0.990
Overnight Users	1.987 (P=0.370)	2			0.000	1.003	1.000
Invariant Regression Coefficients	15.946 (P=0.194)	12	10.388	8	0.043	0.964	0.979

Table 2.—Regression coefficients for pooled sample

Path	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>R</i> ²
Expectation → Crowding	.633	.091	.377	6.928***	.142
Crowding → Safety	-.090	.026	-.205	-3.409***	.103
Expectation → Safety	-.134	.044	-.182	-3.028**	
Crowding → Enjoyment	-.078	.032	-.145	-2.412*	.132
Expectation → Enjoyment	-.188	.054	-.208	-3.462***	
Safety → Enjoyment	.171	.071	.139	2.412*	
Safety → Satisfaction	.476	.122	.222	3.896***	.112
Enjoyment → Satisfaction	.355	.099	.204	3.576***	

* $p < .05$, ** $p < .01$, *** $p < .001$

people increased along with their feelings of being crowded, they were more inclined to indicate that the number of people they had seen on the lake detracted from their boating experience.

4. Predictors of satisfaction: Recreational satisfaction was positively influenced by safety ($\beta = .22$, t -value = 3.90) and enjoyment ($\beta = .20$, t -value = 3.58). These relationships indicate that respondents' overall satisfaction with their experience on the lake was positively associated with their perceptions of safety and their enjoyment. Safety and enjoyment accounted for 11.2 percent of the variance in recreation satisfaction.

5.0 DISCUSSION

The primary purpose of this investigation was to explore a recreational boating crowding-satisfaction model derived from previous work using safety and enjoyment as mediating variables. We also tested our hypothesized model among day and overnight users. Our results illustrated that as boaters' expectations for seeing people were exceeded and their feelings of being crowded increased, they were more inclined to consider the conditions on the lake unsafe and less enjoyable. These negative evaluations resulted in lower satisfaction.

One of the important findings of our investigation was that there was no variation between day and overnight users with regard to the relationships tested. Although past work has found that day users are generally more tolerant of encountering others during their leisure experiences and are usually more satisfied than overnight users (Roggenbuck et al. 1979, Lucas 1980), our analysis revealed no significant differences between the two groups. These findings are more congruent with other work illustrating that day users and overnight users are not profoundly different (Cole 2001). In the context of this investigation (referring to sites, sample, and the issue of crowding), these findings suggest that initiatives directed toward the management of crowding would apply equally to both day and overnight users.

One explanation for the similarity between day and overnight users is that most overnight users tend to be nonlocal visitors who have more invested in their visit (e.g., time, transportation costs, accommodations). These investments or "side bets" bind them to a consistent pattern of behavior (Buchanan 1985). A product of these investments is a level of commitment that promotes the rationalization of potentially negative impacts on their experience. Few studies, however, have addressed the process of rationalization and other related coping mechanisms (i.e., displacement, substitution, or product shift) when recreationists are confronted by negative conditions or situations (e.g., crowding). As Manning (1999) has suggested, the weak relationship between crowding and satisfaction may be due to mediating variables such as recreationists' coping mechanisms. These coping mechanisms could act as mediators in reducing cognitive inconsistencies and associated stress. In these contexts, coping negates negative elements, resulting in high satisfaction despite changing use conditions. Further investigation of the crowding-satisfaction relationship should consider the inclusion of various coping mechanisms (e.g., rationalization) to better understand its complexity.

6.0 CITATIONS

- Abbe, D., and Manning, R.E. (2007). **Wilderness day use**. *International Journal of Wilderness*, 13(2), 21-25.
- Absher, J.D., and Lee, R.G. (1981). **Density as an incomplete measure of crowding**. *Leisure Sciences*, 4(3), 231-247.
- Adelman, B.J.E., Heberlein, T.A., and Bonnicksen, T.M. (1982). **Social psychological explanations for the persistence of a conflict between paddling canoeists and motorcraft users in the boundary waters canoe area**. *Leisure Sciences*, 5(1), 45-61.
- Bergkvist, L., and Rossiter, J.R. (2007). **The predictive validity of multiple-item versus single-item measures of the same constructs**. *Journal of Marketing Research*, 44(2), 175-184.

- Buchanan, T. (1985). **Commitment and leisure behavior: A theoretical perspective.** Leisure Sciences, 7(4), 401-420.
- Cole, D. (2000). **Visitor use density and wilderness experiences: A historical review of research.** In: Freimund, Wayne A.; Cole, David N., comps. Visitor use density and wilderness experience conference: proceedings. June 1-3, 2000, Missoula, MT. GTR-RMRS-P-20. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 11-20.
- Cole, D.N. (2001). **Day users in wilderness: How different are they?** Res. Pap. RMRS-RP-31. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 29 p.
- Cronin, J.J., and Taylor, S.A. (1992). **Measuring service quality: A reexamination and extension.** Journal of Marketing, 56(3), 55-68.
- Department of Water Resources. (2004). **Recreation safety assessment final.** California: The Resources Agency, State of California.
- Ditton, R.B., Fedler, A.J., and Graefe, A. (1983). **Factors contributing to perceptions of recreational crowding.** Leisure Sciences, 5(4), 273-288.
- Eroglu, S., and Harrel, G. (2003). **Retailing crowding: Theoretical and strategic implications.** Journal of Retailing, 62(4), 346-364.
- Graefe, A., and Fedler, A.J. (1986). **Situational and subjective determinants of satisfaction in marine recreational fishing.** Leisure Sciences, 8(3), 275-298.
- Hall, C.M., and McArthur, S. (1994). **Commercial white water rafting in Australia.** In D. Mercer (Ed.), New viewpoints in Australian outdoor recreation research planning (pp. 109-118). Australia: Harper Marriot and Associates.
- Hall, T.E. (1996). **Trends in wilderness use and their social and ecological implications.** Unpublished dissertation, Oregon State University, Corvallis, OR.
- Heatwole, C.A., and West, N.C. (1982). **Recreational-boating patterns and water-surface zoning.** Geographical Review, 72(3), 304-314.
- Heberlein, T., Alfano, G., Shelby, B., and Vaske, J. (1979). **Expectations, preferences, and feeling crowded in recreation activities.** Paper presented at the Annual meeting of the Rural Sociology Society, Burlington, Vermont.
- Heberlein, T.A., and Vaske, J.J. (1977). **Crowding and visitor conflict on the Bois Brule River.** Technical Report, WIS WRC 77-04. Madison, WI: University of Wisconsin Water Resources Center. 109 pp.
- Howat, G., Murray, D., and Crilley, G. (1999). **The relationships between service problems and perceptions of service quality, satisfaction, and behavioral intentions of Australia public sports and leisure center customers.** Journal of Park and Recreation Administration, 17(2), 42-64.
- Jöreskog, K.G., and Sörbom, D. (2004). **LISREL 8.7 for Windows.** Lincolnwood, IL: Scientific Software International.
- Lee, R. (1977). **Alone with others: The paradox of privacy in the wilderness.** Leisure Sciences, 1, 3-19.
- Lucas, R.C. (1980). **Use patterns and visitor characteristics, attitudes, and preferences in nine wilderness and other roadless areas.** (Gen. Tech. Rep. INT-253). Ogden UT: USDA, Forest Service, Intermountain Research Station.
- Manning, R. (2007a). **Evaluating the effectiveness of management practices.** In R. Manning (Ed.), Parks and carrying capacity- commons without tragedy (pp. 227). Washington, DC: Island Press.

- Manning, R. (2007b). **Wilderness management at Zion national park.** In R. Manning (Ed.), *Parks and carrying capacity- commons without tragedy* (pp. 167-180). Washington, DC: Island Press.
- Manning, R., Valliere, W.A., Minter, B., Wang, B., and Jacobi, C. (2000). **Crowding in parks and outdoor recreation: A theoretical, empirical, and managerial analysis.** *Journal of Park and Recreation Administration*, 18(4), 57-72.
- Manning, R.E. (1999). **Studies in outdoor recreation: Search and research for satisfaction (2nd ed.).** Corvallis, OR: Oregon State University Press.
- Matlock, G.C., Osburn, H.R., Riechers, R., and Ditton, R.B. (1991). **Comparison of response scales for measuring angler satisfaction.** *American Fisheries Society Symposium*, 12, 413-422.
- Mowen, A.J., Vogelsong, H.G., and Graefe, A.R. (2003). **Perceived crowding and its relationship to crowd management practices at park and recreation events.** *Event Management*, 8(2), 63-72.
- NMMA. (2005). **2005 recreational boating statistical abstract.** Chicago, Illinois: National Marine Manufacturers Association.
- Responsive Management. (2000). **Factors related to recreational boating participation in the United States- a review of the literature.** Harrisonburg, VA: Responsive Management National Office.
- Roggenbuck, J., Joseph, W., Timm, W.N., and Watson, A.E. (1979). **Visitor perception of the recreational carrying capacity of three wilderness areas in North Carolina.** Unpublished Report. U.S. Department of Agriculture, Forest Service, Aldo Leopold Wilderness Research Institute.
- Roggenbuck, J., Marion, J., and Manning, R. (1994). **Day users of the backcountry: The neglected national park visitor.** *Trends*, 31(3), 19-24.
- Ruddell, E.J. (1989). **A goal/norm-interference model of recreation conflict.** Unpublished Ph.D. Dissertation, Texas A&M University, United States, Texas.
- Schreyer, R., and Roggenbuck, J. (1978). **The influence of experience expectations on crowding perceptions and social-psychological carrying capacities.** *Leisure Sciences*, 1, 373-394.
- Shelby, B. (1976). **Social psychological effects of crowding in wilderness: The case of river trips in the Grand Canyon.** Unpublished Dissertation. University of Colorado.
- Shelby, B. (1980). **Crowding models for backcountry recreation.** *Land Economics*, 56, 43-55.
- Shelby, B., Vaske, J.J., and Heberlein, T. (1989). **Comparative analysis of crowding in multiple locations: Results from fifteen years of research.** *Leisure Sciences*, 11, 269-291.
- Stokols, D. (1972). **On the distinction between density and crowding: Some implications for future research.** *Psychological Review*, 79, 275-277.
- Womble, P., and Studebaker, S. (1981). **Crowding in a national park campground.** *Environment and Behavior*, 13(5), 557-573.