AN EXPLORATION OF RECREATIONAL CROWDING ON TEXAS INLAND WATERWAYS

A Dissertation

by

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ABSTRACT

Perceived crowding is an important issue influencing recreationists' satisfaction with their nature-based leisure experiences. Past work, however, has consistently revealed that crowding accounts for a conspicuously low level of variation in satisfaction. Central to the concerns are intervening factors between perceived crowding and satisfaction, the mechanisms by which recreationists employ to cope with perceived crowding, and other drivers of the crowding- satisfaction relationship.

Given this, I explored two questions related to recreationists' perceptions of crowding within the context of boating in central Texas. First, what are some additional crowding-related factors that contribute to recreationists' satisfaction with their experiences? My findings revealed that expectations of encounters with other boaters contributed a large portion to the variance in satisfaction. Second, how does recreationists' attachment to the resource influence their choice of coping strategy in response to perceived crowding? In an effort to answer this question, I investigated the moderating role of place attachment in recreationists' selection of coping mechanisms in response to perceived crowding. I found that for respondents who had a higher level of place attachment, the likelihood of adopting temporal substitution, direct action, or activity substitution was higher than for respondents who have lower place attachment.

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1. INTRODUCTION

Recreational boating is a popular outdoor activity in the United States (U.S.) and an important contributor to the U.S. economy. In 2013, 36.6% of adults living in the U.S. participated in recreational boating and new boat and engine retail sales totaled $9.9 billion with operating costs (fuel, repair/services, storage, insurance, taxes, and interest payments) of $9.8 billion (National Marine Manufacturers Association, 2014). Texas is no exception in boating demand being the sixth largest state in recreational vessel registration (NMMA, 2014). It ranked second only to Florida in total new powerboat, motor, trailer, and accessory sales in 2012 (NMMA, 2014).

Along with the growth in boating activities, the issue of crowding has received increased attention from the public and managing agencies. In central Texas in particular, the population growth of the Hill Country and surrounding areas continues to bring recreational uses on the lakes in the region. Increased demand not only stresses physical resources, but can also create social conflicts among user groups and lead to the deterioration of recreational experience quality. The management agency of these lake resources, the Lower Colorado River Authority (LCRA), is charged to "use leadership role and environmental authority to ensure the protection and constructive use of the area's natural resources" (LCRA, 2014). LCRA is responsible for offering quality boating experiences despite the large demand. It needs more knowledge in terms of how to maintain boaters' enjoyment and satisfaction when the lakes are crowded and how to deal with associated issues such as safety concerns and conflicts among boaters.

Numerous research findings on the issue of crowding in outdoor recreation have accumulated for almost half a century. It is acknowledged that the relationships among use level, crowding, and the quality of recreational experience are complex. The answer to the central question, "How does use level influence the quality of recreational experiences?", is far from conclusive and begs additional inquiry. My dissertation is aimed at furthering the understanding of recreational crowding and its potential management through addressing two questions: 1) What factors mediate and/or moderate the relationship between crowding and satisfaction?; and 2) How do recreationists cope with crowding and what role does place attachment, one of the most significant personal characteristics, play in the crowding and coping relationship?

1.1. Inland Waterways

Inland waterways in the United States comprise all inland and intracoastal waterways including inland, coastal, and lakewise domestic traffic (Stern, 2013). Inland waterways not only serve as a significant part of the nation's transportation system but also provide various types of recreational opportunities to residents and visitors. In the U.S., most recreational boating activities are afforded by inland waterways (Tseng et al., 2009). Such closed or spatially restricted water bodies as rivers, lakes, reservoirs, and inland bays have been the focus of recreational boating studies (Sidman & Fik, 2005).

In Texas, the lower Colorado River and the highland lakes (Lake Buchanan, Inks Lake, Lake LBJ, Lake Marble Falls, Lake Travis) down the river managed by LCRA are among the most popular boating areas. Lake Austin and Lake Travis were the sampling

sites of my dissertation research. Lake Austin is located in an urban recreational environment (i.e., within the Austin city limits), while Lake Travis represents a "wildland-urban interface where major tracts of natural open space are being subdivided and developed to accommodate residential growth" (Kyle, Shafer, Schuett, & Tseng, 2009, p. 12). However, the recreational use on both lakes is affected by the population growth of the Austin-Round Rock Metropolitan Statistical Area. Much of the development associated with the population growth continues to pressure Lake Austin and is moving westward toward Lake Travis and the Hill Country in general (City of Austin, 2007).

Safety concerns are a major crowding-related issue when people are boating in inland waterways. The social interference theory (Brehm, 1966; Proshansky, Ittelson, & Rivlin, 1970) suggests that crowding is not determined solely by physical density but occurs when the number of people present in the setting interferes with one's goals or desired activities. Applied to recreational contexts, this theory suggests that "goal interference attributed to another's behavior" (p. 369) (i.e., recreation conflict) affects crowding perception as well as recreational experience (Jacob & Schreyer, 1980). Recreation conflicts can arise from different user groups sharing one common setting. For example, motorboaters and canoeists are constantly reported to be conflicted groups (e.g., Adelman, Heberlein, & Bonnicksen, 1982; Heatwole & West, 1982; Ivy, Stewart & Lue, 1992). Additionally, boaters report more intense conflicts when personal watercraft traffic increases on the waterway (Heatwole & West, 1982; Roe & Benson, 2001). Recreational conflict may also be provoked by other boaters' behaviors, including

noise, yelling, and loud behavior; littering and polluting; and noncompliance with rules (West, 1982). Studies have indicated that conflicted use and inconsiderate behaviors of those encountered are often more important to recreationists than the sheer number of visitors in crowding perceptions (e.g., Bultena, Field, Womble, & Albrecht, 1979; Gramman & Burdge, 1981; Gramann, 1982; Titre & Mills, 1982; West, 1982; Womble & Studebaker, 1981), leading to decreased satisfaction (Adelman et al., 1982). The issue of safety perception has been examined only to a limited extent (Tseng et al., 2009; Yoon, Kyle, Hsu, & Absher, 2013) in recreational boating research.

1.2. Carrying Capacity

The rubric of carrying capacity is used to address "the tragedy of the commons" (Hardin, 1968). Hardin predicted that with increasing population, all common resources would eventually be overexploited and degraded (Hardin, 1968). Hardin's prediction works under several assumptions: 1) The world and its resources are finite; 2) The human population will continue to grow; and 3) Individual welfare will be maximized through an increasing use of common property resources (Hardin, 1968). The tragedy of the commons is based on the assumption that common property resources, such as parks and protected areas, have environmental limits to sustain population and economic growth and that their capability of supporting a sufficiently high standard of living will be undermined if they are overexploited. Hardin's concerns focused people's attention on the relationship between individual behavior and resource sustainability (Hardin &

Baden, 1977). His solution was to have government controls or to privatize common resources, and, above all, to limit population, even via coercion (Hardin, 1968).

The concept of carrying capacity was first applied in the fields of rangeland and wildlife management and ecology and then adapted to the context of humans. It has been associated with various social and institutional issues beyond its traditional focus on population (i.e., Manning & Lime, 1996; Seidl & Tisdell, 1999; Wagar, 1964). For example, Seidl and Tisdell (1999) suggest that rather than the maximum population size, it is the ecological and social impacts of population growth and related economic development that define the acceptable level of growth, and that the acceptable level of growth is a manifestation of human values and related choices of living standards. In this sense, (human) carrying capacity is equated with social carrying capacity (Seidl & Tisdell, 1999). In the area of park and outdoor recreation management, researchers (e.g., Wagar, 1964) have adapted the concept of carrying capacity to assess the social aspects of visitor experience beyond its original environmental/ecological concerns in wildlife and range management (Dasmann, 1964). In other words, human carrying capacity must consider natural constraints in the context of human values and related choices. Within this framework, carrying capacity has been expanded to a three-dimensional concept, i.e., environmental resources, the quality of the recreation experience, and the extent and type of management actions (illustrated in Figure 1) as applied to parks and protected areas (Manning & Lime, 1996).

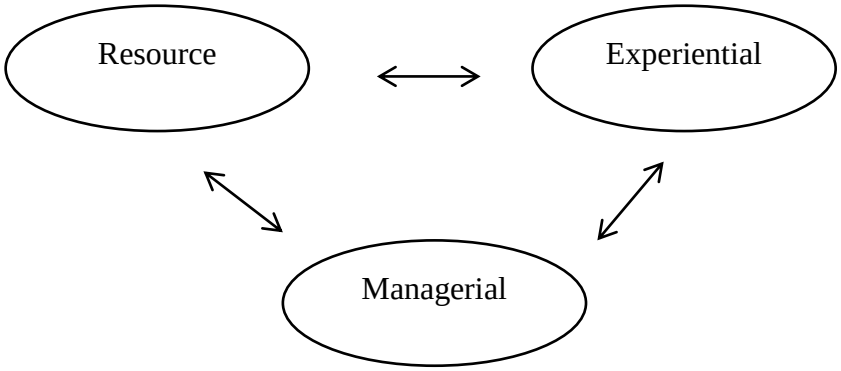

Figure 1. Three dimensions of carrying capacity of parks and related areas
Source: Manning and Lime, 1996

The three-dimensional framework of carrying capacity in the setting of parks and protected areas has been named in varied manners. For example, Heberlein (1977) labeled the three dimensions of carrying capacity as ecological, social, and facilities. In the current study, "social carrying capacity" is deliberately used to refer to the experiential dimension of the carrying capacity framework (i.e., the quality of the recreation experience) as opposed to other possible terms such as carrying capacity, recreation capacity, experiential capacity, etc., while carrying capacity is used to include all three dimensions.

The essential question of social carrying capacity is the "limits of acceptable change" (Frissel & Stankey, 1972; Stankey et al., 1985) in the quality of recreational experiences. Among indicators documenting the impacts of increasing visitor use on the quality of the recreational experiences, crowding is often viewed as the most direct

social impact of outdoor recreation activities (Manning, 2011; Manning & Lime, 2000). By incorporating crowding into social carrying capacity models, one can frame the central question of social carrying capacity in a more explicit manner as: What level of visitor use can be appropriately accommodated within a park or a similar outdoor recreation area so that crowding does not jeopardize the quality of recreation experience? Empirical tests attempting to address this question have not produced strong support of the central hypothesis of social carrying capacity (i.e., experiential quality goes down with increased use by others). Many studies found that there was little or no effect of actual encounters on people's satisfaction with their recreational experience (e.g., Lucas, 1980; Manning & Ciali, 1980; Shelby, 1980). Further, these studies suggested that other variables such as expectation and preference of crowding play a more important role in influencing people's satisfaction with their experiences (e.g., Budruk, Schneider, Andereck, & Virden, 2002; Graefe, Vaske, & Kuss, 1984; Manning, Valliere, Minteer, Wang, & Jacobi, 2002).

1.3. Satisfaction Model

Adopting the concept of social carrying capacity, research on crowding issues in outdoor recreation is centered on the relationships among setting density, crowding, and user satisfaction. Early satisfaction models (Heberlein & Shelby, 1977) assumed that there was some level of visitor density beyond which the quality of the recreation experience diminishes to an unacceptable level (e.g., Lucas, 1964, 1980; Stankey, 1973). Yet, the relationships among use level, crowding, and satisfaction have been shown to be

generally weak (Manning, 2011). Crowding explains zero (Lee, 1977) or a low variation in satisfaction (Shelby, 1980). Similarly, the relationship between use level and satisfaction appeared to be weak while the association between use level and crowding is "moderate at best" (Manning, 2011, p. 105).

Manning (2011) suggested several reasons for the weak relationship between visitor use and satisfaction including: 1) Setting density is not considered crowding and will not decrease satisfaction until it is negatively evaluated to disrupt one's objectives (Stokols, 1972a); 2) A multitude of mediating variables, including personal characteristics (e.g., preferences, and expectations), characteristics of others (type and size of group and behavior), and coping mechanisms (Milgram, 1970) to crowding adopted by people mitigate the influence of crowding on the ultimate satisfaction; and 3) Methodological issues, especially the measurement of density and satisfaction can affect the relationships among density, crowding and satisfaction. The next two sections of my dissertation aimed at addressing two specific questions among the issues summarized by Manning (2011).

1.4. Purpose of This Research

My dissertation research had two major purposes. The first was to identify some additional significant crowding-related factors contributing to recreationists' satisfaction with their experiences in the context of recreational boating. The second purpose was to better understand how boaters cope with crowding. Addressing these two questions can

deepen the knowledge of crowding and aid resource management agencies to accomplish their mission better.

1.5. Study Objectives

In order to carry out the research purposes, the following objectives were developed:

1. Examine determinants of boaters' perceptions of crowding.
2. Examine the mediating effects of boaters' perceptions of safety and enjoyment between crowding and their satisfaction with their experiences.
3. Examine the group difference between regular and infrequent boaters on the relationships among crowding-related concepts and satisfaction.
4. Examine how boaters' perceptions of crowding influence their selection of coping strategies.
5. Examine the moderating effects of place attachment on the crowding-coping relationship.

It was hypothesized that:

H1a: Respondents' perceptions of crowding will increase as setting density increases.

H1b: Respondents' satisfaction with their boating experience will decrease as perceived crowding increases.

H1c: Respondents' perceived crowding will increase if the number of boaters seen on the lake exceeds their expectations.

H1d: Respondents will be less likely to be satisfied if the number of boaters seen on the lake exceeds their expectations.

H1e: The more crowded respondents feel, the less likely they will feel safe on the lake.

H1f: The safer respondents feel, the more satisfied they will be with their boating experience.

H1g: The more crowded respondents feel, the less likely it is that they will enjoy the boating experience.

H1h: The more respondents enjoy their boating experience, the greater their satisfaction.

H1i: The safer respondents feel when they boat on the lake, the greater their enjoyment of the boating experience.

H1j: If the number of boaters seen on the lake exceeds respondents' expectation, their safety concern will increase.

H1k: If the number of boaters seen on the lake exceeds respondents' expectation, their enjoyment will decline.

H1l: EUH moderates the effect of setting density on perceived crowding and the relationships among perceived crowding, perceptions of safety, enjoyment and satisfaction with the experience (H1a, H1b, H1e, H1f, H1g, H1h, H1i), such that with

more prior experience, the weaker the relationships hypothesized in H1, H2, H5, H6, H7, H8, and H9.

H1m: EUH moderates the effects of expectations of encounters on perceived crowding, perceptions of safety, enjoyment and satisfaction with the experience (H1c, H1d, H1j, H1k), such that with more experience, the stronger the relationships hypothesized in H1c, H1d, H1j, and H1k.

H2a: As perceived crowding increases, use of coping strategies increases.

H2b. As perceived crowding increases, its effect on the use of behavioral coping mechanisms (temporal substitution, activity substitution, resource substitution, absolute displacement, direct action) will be stronger.

H2c. Place attachment moderates the effect of perceived crowding on the use of coping mechanisms. For respondents who have a higher level of place attachment, the likelihood of adopting cognitive coping mechanisms would be higher than respondents who have lower place attachment.

The following sections (Section 2 through Section 3) were written to stand alone based on the grouping of the hypotheses. Each of the sections develops the theoretical foundations of the hypotheses, the methods used to collect and analyze data, results of hypotheses testing and conclusions. Both sections target specific journals in the field and contain a separate introduction, literature review, methods and conclusions pertinent to the particular group of hypotheses and suitable for the specific journal targeted.

Specifically, Section 2 deals with identifying crowding-related factors contributing to recreationists' satisfaction with their experiences. Variables measuring the approximate amount of boating traffic, expectations of setting density as well as safety perceptions and enjoyment were analyzed and their relationships with crowding and satisfaction were examined. Additionally, whether there is a significant difference between regular and infrequent boaters on those relationships was explored. In Section 3, data were analyzed to determine if perceived crowding has a positive influence on the use of coping mechanisms and how place attachment affects the relationship between crowding and each individual coping option.

1.6. Contribution of the Dissertation

The study presented in Section 2 is among the very few studies that have examined the associations among setting density, crowding, and satisfaction. The study suggests a way to improve understanding of both direct and indirect effects of setting density and crowding on satisfaction. I investigated perceptions of safety and enjoyment as mediators between crowding and satisfaction. Perceptions of safety and enjoyment have been recognized as important in practice but have not been sufficiently analyzed empirically. The results showed that perceptions of safety accounted for a high degree of variance in satisfaction. Overall, adding variables of setting density, expectations of encounters, perceptions of safety and enjoyment in the crowding-satisfaction relationship significantly increased the variance explained in satisfaction. The study presented in Section 3 applied the social judgment theory in examining the effects of

place attachment on coping mechanism selection in response to perceived crowding. It demonstrated that the social judgment theory was useful in understanding how place attachment influences people's perceptions of setting conditions and behaviors. In addition, this study suggested a structure of coping that is different from what was originally conceptualized.

2. AN EXPANDED CROWDING-SATISFACTION MODEL IN THE CONTEXT OF RECREATIONAL CROWDING

2.1. Overview

Previous research on the crowding – satisfaction relationship implies that the association is more complex than originally conceived. Drawing from the work of several authors, we hypothesized and tested an expanded model of the crowding – satisfaction relationship that incorporated setting density, expectations of encounters, perceptions of safety and enjoyment. The final model indicates that the more traffic there was on the lake, the more crowded respondents felt. When the number of people seen on the lake exceeded respondents' expectations, their perceptions of safety and enjoyment both declined, resulting in lower satisfaction. Overall, respondents' satisfaction was negatively influenced by their perceptions of crowding. Analysis of the indirect effects illustrates that expectations of encounters and perceptions of safety had significant indirect effects on satisfaction.

2.2. Introduction

The issue of recreational crowding has received intensive attention over the past 40 years because of its potential influence on the quality of recreational experiences. The framework of social carrying capacity suggests that increased visitor use generates negative evaluations of setting density (i.e., perceived crowding), resulting in deterioration in recreational experiences (e.g., Heberlein & Shelby, 1977; Lucas, 1964, 1980). However, accumulated empirical evidence suggests that the relationships among density, crowding, and the quality of recreation experiences are more complicated than originally conceived.

Despite the progress in crowding research, the variance explained in studies examining the influence of perceived crowding on satisfaction is conspicuously low; i.e., often less than 10%. In Manning's (2011) review of the crowding literature, he suggests that the weak relationship between perceived crowding and satisfaction might be due to the mediating or indirect effects of several factors. Specifically, most of the studies testing the relationships among setting density, perceived crowding, and satisfaction with recreational experiences have been limited to examining the effect of setting density or perceived crowding on satisfaction, but not both. Using only setting density or perceived crowding to explain satisfaction diminishes the variance explained in satisfaction. Only a few studies (Bultena, Albrecht, & Womble, 1981; Ditton, Fedler, & Graefe, 1982; Vaske, Donnelly, Heberlein, & Shelby, 1982) have examined the associations among the three constructs. The study represented in this paper included setting density, perceived crowding, and satisfaction with recreational experiences in the

analysis and investigated both direct and indirect effects of setting density and perceived crowding on satisfaction.

Previous studies have also omitted a number of other influences noted by Manning (2011) to have potential to both mediate and moderate the crowding – satisfaction relationship; e.g., perceptions of safety, enjoyment, and experience use history (Ditton, Fedler, & Graefe, 1983; Mowen, Vogelsong , Graefe, 2003; Thapa & Graefe, 2004; Tseng et al., 2009). Safety concerns generated by high densities have been shown to heighten perceptions of crowding and lower recreationists' satisfaction (e.g., Bultena et al., 1981; Heatwole & West, 1982; Heberlein et al., 1982; Manning, 2011; Womble & Studebaker, 1981). Additionally, heightened perceptions of crowding have been shown to decrease recreationists' overall enjoyment (Mowen et al., 2003; Womble & Studebaker, 1981). Accounting for the effects of these mediators could potentially improve the variance explained in satisfaction. In addition, more experienced recreationists tend to report higher levels of perceived crowding (Arnberger & Brandenburg, 2007; Arnberger & Haider, 2007). Their level of satisfaction with the same experiences may be different from that of less experienced users.

With this literature in mind, we tested an expanded model of the crowding - satisfaction relationship. The model included indicators of setting density, perceived crowding, expectations of encounters, perceptions of safety, enjoyment, and satisfaction. We also tested this model among regular and infrequent users of two lakes in central Texas.

2.3. Literature Review

2.3.1. Setting Density, Perceived Crowding, and Satisfaction with Recreational Experiences

Theoretical explorations of how visitor use levels affect recreationists' satisfaction with their experiences originated from the concept of social carrying capacity. The application of carrying capacity in wildlife and range management is concerned about the ecological impacts of grazing growth (Dasmann, 1964). Researchers in the field of park and outdoor recreation (e.g., Wager, 1964) adapted the concept of carrying capacity to study the influence of increasing visitor use on the quality of visitor experiences. Manning and Lime (1996) proposes three components of the carrying capacity framework: environmental resources, the quality of the recreation experiences, and the extent and type of management action. The essential question in social carrying capacity research is, "How much impact or change in the visitor experience is acceptable?" Similar to the fundamental concerns raised by early carrying capacity scholars (e.g., Hardin, 1968; Price, 1999; Pearl & Reed, 1920; Seidl & Tisdell, 1999), there is a negative connotation on the relationship between visitor use and quality of recreation experience that implies increasing visitor use will ultimately deteriorate the quality of recreation experience.

Early satisfaction models (e.g., Heberlein & Shelby, 1977; Lucas, 1964, 1980; Stankey, 1973) testing the relationships between use level and satisfaction in crowding research assumed that there was some level of visitor density beyond which the quality of the recreational experiences diminished to an unacceptable level. In other words,

setting density has a negative impact on the quality of recreation experiences. However, scholars have also shown that the relationship between setting density and satisfaction with recreational experiences is weak to nonexistent, while the association between setting density and crowding perceptions is moderate at best (Manning, 2011).

One reason that setting density does not necessarily spoil the quality of recreation experiences is that setting density is not always evaluated negatively. It is not until the recreationists feels "crowded" that it can potentially disrupt one's objectives and influence satisfaction (Stokols, 1972b). Setting density is an objective assessment of the number of people per unit of space; perceived crowding, on the other hand, is the negative assessment of the density level (Stokols, 1972a). More importantly, Stokols (1972a) stated that "density is a necessary but not sufficient condition for the feeling of being crowded" (Altman, 1975, p.150); and other social psychological factors may have an even stronger influence on crowding perceptions than setting density alone (Shelby & Heberlein, 1986). For instance, recreationists' expectations of encounters have been shown to exert a stronger effect on crowding than setting density (e.g., Bultena et al., 1981; Budruk et al., 2002; Tseng et al., 2009; Womble & Studebaker, 1981).

The conceptualization and measurement of setting density may also influence the relationship between setting density and perceived crowding. Visitor use level and contact level have previously been used as proxies for setting density (e.g., Broom & Hall, 2009; Nielson, Shelby, & Haas, 1977; Shelby, 1980; Shelby & Colvin, 1982; Manning & Ciali, 1980). However, they represent distinct concepts. Visitor use level is defined as the number of people per unit of space (Stokols, 1972, a, b), whereas contact

level is comparable to "perceived setting density", referring to the subjective estimate of the number of people, the space available, and the organization of the space (Rapoport, 1975). Visitor use level is an objective measure, while perceived setting density is subjective. Several studies have reported that at high use levels, respondents tended to underestimate number of contacts while self-reported contacts were more accurate at lower use levels (Cole, Hammond, & McCool, 1997; Shelby & Colvin, 1982). Therefore, an objective measure of setting density is more appropriate for urban recreational settings with relatively higher use levels such as the lakes in our study. The current study used a proxy measure (i.e., the number of cars in the parking lots nearby lakes at different times of a day) to provide an objective account of setting density.

In response to the aforementioned literature, two hypotheses were formulated to examine the relationships among setting density, perceived crowding, and satisfaction with recreational experiences:

H1: Respondents' perceptions of crowding will increase as setting density increases.

H2: Respondents' satisfaction with their boating experience will decrease as perceived crowding increases.

2.3.2. Expectations of Encounters

Recreationists' expectations of encounters may help shape their perceptions of crowding and have an indirect effect on their satisfaction with the experiences. Expectation also acts as a direct antecedent of satisfaction (Szymanski & Henard, 2001).

These relations are explained by expectancy disconfirmation theory of satisfaction. Expectancy disconfirmation theory suggests that (dis)satisfaction in recreation due to crowding is a function of the discrepancy between the number of people one expects to encounter and the number one actually encounters. In crowding research, expectations of encounters are usually operationalized as a discrepancy between the *actual* number of people a recreationist saw in the setting and the number of people he/she *expected* to see (e.g., Ditton et al., 1983; Lee & Graefe, 2003; Shelby, 1980), i.e., disconfirmed expectation of encounters. Informed by the contrast effect of disconfirmation, expectations of encounters have a negative influence on satisfaction with recreational experiences.

In crowding studies, most effort has been devoted to investigating the effect of expectations of encounters on perceived crowding. Expectations of encounters have been shown to significantly predict perceived crowding (e.g., Ditton et al., 1983; Shelby, 1980). Adding it as a predictor in the setting density-satisfaction relationship increases the variance explained in perceived crowding of different recreational settings (e.g., Lee & Graefe, 2003; Shelby et al., 1983). In boating studies, Ditton et al. (1983) reported that among river floaters on the Buffalo National River, Arkansas, 22% of them classified the setting as crowded (i.e., reporting reduced enjoyment) and about the same number (27%) reported the people they saw increased their enjoyment. Those who felt crowded were more likely to report to have seen more people; they were also more likely to report having seen more people than expected. In another study of river floaters conducted by Shelby (1980) on the Colorado River, Grand Canyon National Park, Arizona, three

significant use level/interaction measures explained only 4% of variance in perceived crowding. However, much higher variance in perceived crowding was found to be explained by expectations for contacts together with an encounter preference measure (total R^2 = .29, and correlation coefficients with the significant measure of encounter expectation and preference were -.39 and -.40, respectively). A study of attendees at an arts festival found that adding expectations of setting density to estimated density increased the amount of explained variance in perceived crowding by almost 10% (Lee & Graefe, 2003). Similarly, expectations of contacts together with preferences for crowding levels accounted for 5% to 19% more explained variance in perceived crowding across six areas offering various recreation opportunities, including canoeing and white water rafting (Shelby et al., 1983).

Informed by the expectancy disconfirmation theory and past empirical evidence, we hypothesized the following:

H3: Respondents' perceived crowding will increase if the number of boaters seen on the lake exceeds their expectations.

H4: Respondents will be less likely to be satisfied if the number of boaters seen on the lake exceeds their expectations.

2.3.3. Perceptions of Safety

Perceptions of safety and security are prerequisites for a satisfying experience (Sonmez & Graefe, 1988; Yüksel & Yüksel, 2007). In recreational boating, reckless operation, use of alcohol or drugs, and issues of safety associated with jet skis have been

reported as the most common at-risk behaviors engendering safety concerns (Responsive Management, 2000). Deaths in recreational boating were reported to be the second most frequent among all the transportation fatalities in 2012, more than those (in decreasing order) in general aviation, rail and bus transportation, large trucks, railroad, and air taxis (National Transportation Statistics, 2012). Addressing safety concerns and improving recreationists' perceptions of safety are among the focal points of managerial responsibility.

From the perspective of recreation conflict, safety concerns can arise from perceptions of crowding; i.e., goal interference attributed to another's behavior (Jacob & Schreyer, 1980; Vaske, Carothers, Donnelly, & Baird, 2000). In crowded circumstances, boaters have to share the space with a large number of fellow recreationists. Some boaters and personal watercraft users drive their vessels at high speeds. Speed combined with large numbers of recreationists can lead to potentially dangerous situations and generate safety concerns (Finley, 1990). This type of safety concern is essentially a "density crowding effect" mainly caused by the number and/or proximity of other people (Gramann, 1982, p.112). However, perceived crowding is not determined solely by physical density; it also occurs when the number of people present in the setting interferes with one's goals or desired activities (Altman, 1975; Stokols, 1976; Schmidt & Keating, 1979). In other words, crowding perceptions could result from the incompatibility among setting density, other people's behavior, and psychological goals or expectations (Gramann, 1982). For example, alcohol use is the leading known contributing factor in fatal boating accidents (U.S. Department of Homeland Security &

U.S. Coast Guard, 2014). Safety concerns due to the interference of other people's objectionable behaviors are likely to interrupt recreationists' particular goals in partaking in the activity. Thus, such safety concerns can be categorized as "behavioral crowding effects" (Gramann, 1982, p.112). In sum, safety concerns represent recreational conflicts arising from competition for space and others' behaviors, both of which are sources of perceived crowding.

Few studies have examined perceptions of safety or safety concerns as a result of perceived crowding. However, studies have reported recreation conflicts among different user groups sharing one common setting in high density and associated safety concerns. One classic example is the conflict between motorized versus non-motorized recreation activities. In recreational boating specifically, motorboaters and canoeists are often reported to be conflicted groups (e.g., Adelman et al., 1982; Heatwole & West, 1982; Ivy, Stewart & Lue, 1992). All types of boaters have reported more intense conflict when personal watercraft traffic increases (Heatwole & West, 1982; Roe & Benson, 2001) and greater sense of risk when encountering personal watercrafts (Department of Water Resources, 2004). According to the existing literature, this conflict of use leads to decreased satisfaction (Adelman et al., 1982).

Few studies have included perceptions of safety or safety concerns in examining the relationship between perceived crowding and satisfaction (Thapa & Graefe, 2004; Tseng et al., 2009; Yoon et al., 2013; Vaske et al., 2000). Vaske et al. (2000) examined both ingroup and outgroup recreation conflict between skiers and snowboarders in Colorado using four determinants of recreation conflict (activity style, resource

specificity, mode of experience, lifestyle tolerance) and safety concerns. Their results showed that safety concerns predicted skiers' perceptions of conflict with snowboarders. In studying the recreation conflict and tolerance between skiers and snowboarders in northern Colorado, Thapa and Graefe (2004) found that enjoyment for skiers and snowboarders tended to increase when their respective ingroups were present or encountered. However, the presence and behavior of one group had negative impacts on the other group's enjoyment level. They also measured safety concerns (e.g., skiers and/or snowboarders being out of control, passing too closely, behaving in a discourteous manner, failing to beware of others around them) among skiers and snowboarders as an index of recreational conflict. Their conclusion was that safety perceptions resulted from both ingroup and outgroup encounters, and both of the groups indicated that those encounters decreased the enjoyment of the experience. Lastly, Tseng et al. (2009) and Yoon et al. (2013) examined the mediating role of safety perceptions between perceived crowding and satisfaction among recreational boaters. They found that the safer boaters felt, the more enjoyable and satisfactory they felt the boating experiences were.

Based on this literature, the following relationships among perceived crowding, perceptions of safety, enjoyment and satisfaction were hypothesized:

H5: The more crowded respondents feel, the less likely they will feel safe on the lake.

H6: The safer respondents feel, the more satisfied they will be with their boating experience.

2.3.4. Enjoyment

As one of the most heavily studied constructs in psychology and consumer science, satisfaction is most often considered the product of the (dis)confirmation process based on a pre-consumption comparison standard (i.e., expectations) (Wirtz, Mattila, & Tan, 2000). Scholars propose that the construct comprises both cognitive and affective components (e.g., Jun, Hyun, Gentry, & Song, 2001; Rodríguez del Bosque, San Martín, & Collado, 2006; van Dolen, De Ruyter & Lemmink, 2004; Wirtz et al., 2000). This perspective maintains that satisfaction is formed by cognitive evaluations such as expectations and disconfirmation and the affective feelings including positive and negative emotions (Oliver, 1997; Wirtz et al., 2000). Given the experiential and interactive nature of service encounters (Oliver, 1997), the inclusion of affect into the conceptualization of satisfaction is especially meaningful in reflecting the experiential nature of certain services such as tourism and leisure. Adding affect into satisfaction is also likely to augment the disconfirmation model, because service production is not merely a cumulative evaluation of multiple concrete service attributes (e.g., Jayanti, 1998). It is generally accepted that satisfaction is both a cognitive and affective reaction to products and services (Oliver, 1997).

Crowding studies in recreation research indicate that enjoyment is not clearly distinguished as an affective antecedent of satisfaction. For example, Womble and Studebaker (1981) aimed to investigate how perceptions of crowding of campground users at Katmai National Park affected their overall enjoyment with the visit. They asked campers to rate their visit to Katmai on a scale from 1 ("poor) to 5 ("perfect") to measure

trip satisfaction and found a negative correlation between this satisfaction measure and a crowding perception index. Their operationalization of enjoyment is in fact the overall satisfaction measure in consumer behavior studies. Alternatively, the scale of enjoyment is often phrased in relation to crowding (e.g., Ditton et al., 1983; Mowen et al., 2003; Vaske et al., 2000). A typical example is Mowen et al.'s (2003) examination of crowding effects in park and recreation events. Two items in this study were used to measure crowding: 1) a 5-point scale asking respondents if the entire festival would have been more enjoyable with fewer or more people (ranging from 1, "the event would have been more enjoyable with fewer people", to 5, "the event would have been more enjoyable with many more people"), and 2) a 5-point scale asking respondents how the number of people at the festival affected their overall enjoyment (ranging from 1, "detracted from my experience", to 5, "added to my experience"). Mowen and his colleagues reported that the number of people at the festival added to their experience (percentage of respondents: 30%) or had a neutral effect (percentage of respondents: 65%), indicating that most attendees of park and recreation events tended to view crowding favorably. However, they did not further test the relationship between this enjoyment measure and satisfaction. Another way of measuring enjoyment in outdoor recreation is to treat it as a component of satisfaction. For example, Schomaker and Knopf (1982) and Whisman and Hollenhorst's (1998) used enjoyment (agreement on "I thoroughly enjoyed the trip" ranging from 1, strongly disagree to 5, strongly disagree) as one of the 5 indicators of overall satisfaction, representing the affective component of satisfaction. This approach to satisfaction measurement has been adopted by a series of

studies in recreation (e.g., Dorfman, 1979; Hawes, 1978; Peterson, 1974).

The current study adopted the conceptualization that affect is an important antecedent of satisfaction and used enjoyment as a proxy of affect. Although perceived crowding may be viewed positively by recreationists (e.g., Mowen et al., 2003), most studies in outdoor recreation contexts reveal that perceived crowding decreases the quality of recreational experiences. Therefore, it was hypothesized that perceived crowding would negatively affect people's enjoyment with their recreational experience.

H7: The more crowded respondents feel, the less likely it is that they will enjoy the boating experience.

Studies reviewed previously also suggested a positive correlation between enjoyment and satisfaction, although they did not specify enjoyment as a measure of positive affect. Two additional studies (Graefe & Fedler, 1986; Tseng et al., 2009) were more illustrative in testing the relationship between enjoyment and satisfaction. Graefe and Fedler (1986) examined situational and subjective determinants of satisfaction in marine recreational fishing and asked respondents to rate their enjoyment with the challenge and sport of fishing. The authors found that enjoyment positively influenced fishers' overall satisfaction with their experiences. Tseng et al. (2009) also reported that enjoyment positively predicted satisfaction among recreational boaters. Therefore, a positively relationship was hypothesized between enjoyment and satisfaction.

H8: The more respondents enjoy their boating experience, the greater their satisfaction.

Feelings of safety generally contribute to positive affect. This relationship has been suggested in studies reviewed in the section of perceptions of safety (Thapa and Graefe, 2004; Tseng et al., 2009; Yoon et al., 2013; Vaske et al., 2000). A hypothesis on the relationship between perceptions of safety and enjoyment is stated below:

H9: The safer respondents feel when they boat on the lake, the greater their enjoyment of the boating experience.

Lastly, it was hypothesized that expectations with respect to encounters of others negatively influenced perceptions of safety and enjoyment in a similar way that expectations of encounters influences people's satisfaction with recreational experiences because of the contrast effect. People usually take part in recreational activities with the anticipation of particular rewards such as excitement, solitude, friendship, status, etc. (Manfredo, Driver, & Tarrant, 1996; Vroom, 1964). It is natural that they carry certain expectations of setting density appropriate for the pursued rewards. These expectations may be derived from their previous experience, their communication with others, or mass media (Lee & Graefe, 2003). Once they are present in the actual setting, their expectations of encounters are either confirmed or disconfirmed. Given the correlations between setting density and safety perceptions and between setting density and enjoyment (e.g., Tseng et al., 2009; Yoon et al., 2013;Vaske et al., 2000), the disconfirmed expectations of encounters (i.e., the actual setting density outnumbers their expectations) are likely to further deteriorate their safety perceptions and enjoyment. Therefore:

H10: If the number of boaters seen on the lake exceeds respondents'

expectation, their safety concern will increase.

H11: If the number of boaters seen on the lake exceeds respondents' expectation, their enjoyment will decline.

2.3.5. Regular and Infrequent Users: The influence of Experience Use History

Experience use history (EUH, Schreyer, Lime, & Williams, 1984), or past experience, is one of the most widely studied personal characteristics that influence people's interpretations of encounters with others in natural recreation settings (Manning, 2011). EUH refers to the type of activities and frequency of participation (Schreyer et al., 1984). It has been used as a way to categorize recreationists and better understand current and future behaviors, intentions, perceptions, and satisfaction (e.g., Hammitt, Backlund, & Bixler, 2004; Petrick, 2002; Schereyer et al., 1984). However, the effect of recreation use history on perceptions of crowding and related outcomes has been conceptualized differently and empirical findings are mixed. Cognitive development theory suggests that as recreationists experience with the setting and/or activity increases, they develop more complex cognitive categories of setting/activity attributes (Watson, Roggenbuck, & Williams, 1991). Therefore, experienced recreationists are able to better distinguish the fine differences in the setting conditions (Watson et al., 1991). Studies have found that more experienced recreationists are more sensitive to setting density, especially in back-country settings where solitude is sought (e.g., Ditton et al., 1983; McFarlane, Boxall, & Watson, 1998; Vaske, Donnelly, & Heberlein, 1980). Experienced recreationists tend to report higher levels of perceived

crowding or express stronger preferences for less-used areas. Experienced recreationists may be similarly sensitive to safety issues. Consequently, they are less likely to experience enjoyment and satisfaction. On the other hand, cognitive theory suggests that the cognitive categories formed by previous experience may carry expectations that shape perceptions of setting conditions from similar categories (Herr, 1986; Manis, Biernat, & Nelson, 1991). Therefore, experienced recreationists are better able to anticipate and psychologically adjust to density for the specific setting and occasion (Shelby et al., 1983). Experienced recreationists may also have more complex cognitive structures regarding both the activity and related setting and be better equipped to alter their use in anticipation of increased density (Hall & Shelby, 2000; Hammitt & Patterson, 1991). In this sense, they are likely to experience higher levels of satisfaction. In order to clarify how experience use history shapes expectations of setting density and its influence on perceptions of crowding and other variables, this study tested the group difference between regular and infrequent boaters on the hypothesized relationships. The effect of experience use history on the hypothesized paths in the path model was posited as:

H12: EUH moderates the effect of setting density on perceived crowding and the relationships among perceived crowding, perceptions of safety, enjoyment and satisfaction with the experience (H1, H2, H5, H6, H7, H8, H9), such that with more prior experience, the weaker the relationships hypothesized in H1, H2, H5, H6, H7, H8, and H9.

H13: EUH moderates the effects of expectations of encounters on perceived crowding, perceptions of safety, enjoyment and satisfaction with the experience (H3, H4, H10, H11), such that with more experience, the stronger the relationships hypothesized in H3, H4, H10 and H11.

The hypothesized relationships among setting density, expectations of encounters, perceived crowding, perceptions of safety, enjoyment, and satisfaction with recreational experiences are depicted in figure 2.

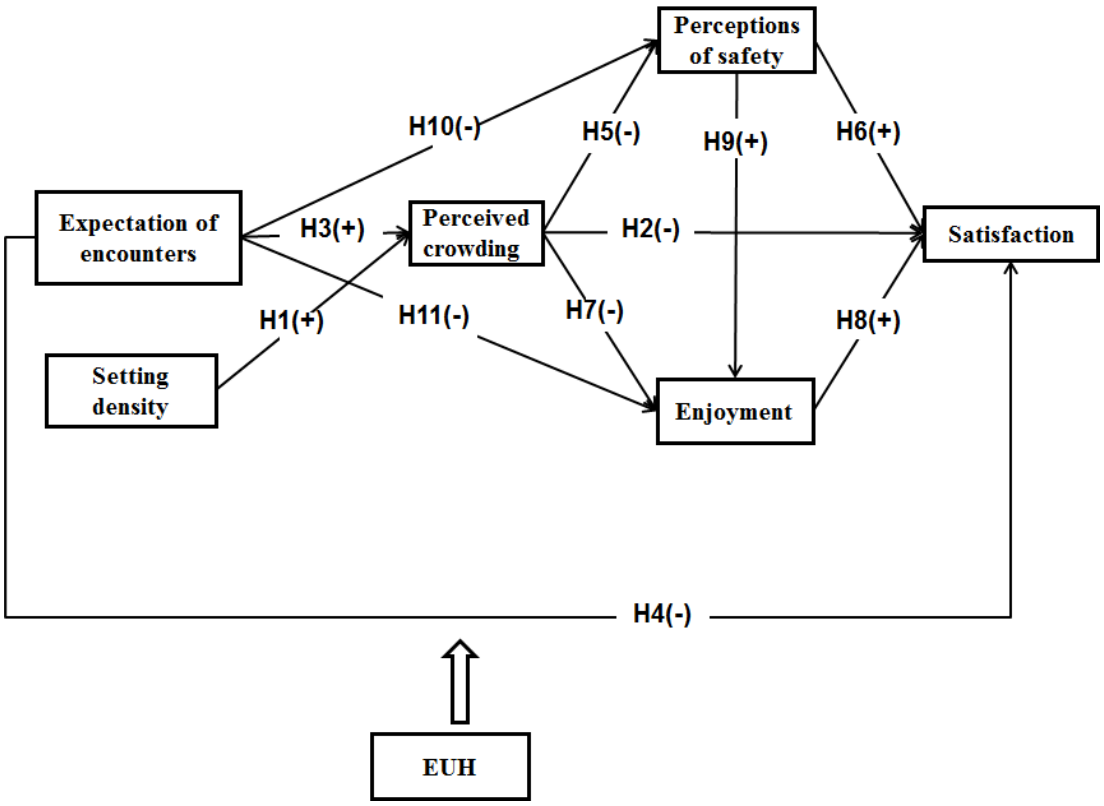

Figure 2. Hypothesized crowding-satisfaction model

2.4. Data Collection

2.4.1 Settings

Lake Austin and Lake Travis are two of the highland lakes formed by dams on the Lower Colorado River in the Austin Metropolitan area, Central Texas. Boating and other water-related activities (e.g., jet skiing, fishing) are the primary recreational opportunities offered by the lakes. Lake Austin is about 21 miles long and is used for flood control, electrical power generation, and recreation. It is a popular fishing and boating destination because of its accessibility from downtown Austin (lakeaustin.com). Lake Travis was created by the construction of Mansfield Dam. It is 63.75-miles long with the largest storage capacity of the seven highland lakes. Lake Travis is probably the most visited of the highland lakes. Austin Park and Recreation Department and Lower Colorado River Authority (LCRA) manage Lake Austin and Lake Travis, respectively.

2.4.2. Sampling

Data for this study were collected by surveying public boat ramp users of Lake Austin and Lake Travis. A brief on-site interview was administered between the Memorial Day weekend and the Labor Day weekend in 2008 to capture the high use season. The sampling sites included four public boat ramps across Lake Austin and 12 ramps across Lake Travis. Except for some busier sampling sites (e.g., Mansfield Dam on Lake Travis) where two trained interviewers were situated, each site was assigned one interviewer. Surveying occurred between 8:00 AM and 8:00 PM over 28 sampling days. These sampling days were concentrated on weekends, public holidays, and

randomly selected weekdays. Boaters exiting the lakes were approached and requested to participate in the survey. People over the age of 18 with the most recent birthday in the group were requested to participate. The number of completed surveys across the two lakes was 990 (Lake Austin: 399; Lake Travis: 591) with 462 total refusals (Lake Austin: 229; Lake Travis: 233), resulting in an average response rate of 68.2%.

Physical counts were made of vehicles in parking lots surrounding the lakes to obtain a proxy of boating density. On-site interviewers at public boat ramps on each lake conducted parking lot counts every two hours beginning upon their arrival. The counting periods were concurrent with the on-site surveying of public boat ramp users and lasted from 8am to 8pm. Counts focused on the number of: (a) cars with boat trailers, (b) cars alone, and (c) trailers alone (Kyle et al., 2009).

2.4.3. Measures

In the context of current study, setting density is defined as the average number of boats on the lakes. A proxy of the setting density, the number of vehicles in parking lots nearby the lakes at the surveying time was used in the study. The time that the survey was being taken was recorded by interviewers for each case. For each day during the surveying period, the total number of vehicles was summed by hour. The count of vehicles of the closest hour to the surveying time was used to represent the setting density when the survey was taken.

Perceived crowding is measured with a 9-point Likert scale developed by Heberlein and Vaske (1977). This single-item measure of perceived crowding has been

widely used in outdoor recreation research (e.g., Shelby, Vaske, & Heberlein, 1989; Shelby & Vaske, 2007; Vaske & Shelby, 2008). Shelby and his colleagues (1989) compared perceived crowding in multiple locations and found this 9-point Likert scale a useful and reliable measure for perceived crowding. Respondents were asked ‘‘How would you describe the boating conditions at each of the following areas (at the lunch ramp/marina at the start of your trip; out on the lake while boating; along the shoreline areas that you used; at the launch ramp/marina when you stopped boating) during your visit to Lake Austin/ Travis?’’ A response of 1 or 2 indicated not at all crowded, 3–4 indicated slightly crowded, 5–7 indicated moderately crowded, and 8–9 indicated extremely crowded. Scores of perceived crowding at each of the locales across Lake Austin and Lake Travis were averaged to form a composite measure.

Measures of expectations of encounters, enjoyment, and perceptions of safety were modified from Graefe and Fedler (1986) and Hall and McArthur (1994). Expectations of encounters was examined along a 5-point Likert scale that asked boaters ‘‘How did *the number of people you saw* on the lake today compare with what you expected to see?’’ A response of 1 indicated a lot less than expected, 3 indicated about what expected, 5 indicated a lot more than expected, and 6 indicated no expectations. Enjoyment was measured by asking ‘‘How did the amount of use at the lake today affect your overall enjoyment of your visit?’’ A response of 1 indicated detracted a lot from enjoyment, 3 indicated no effect on enjoyment, and 5 indicated added a lot to enjoyment. Lastly, perceptions of safety was measured by asking respondents to rate how safe they felt while boating ‘‘in light of the number of boats you saw on the lake today” and “in

light of the behavior of other boats," respectively. A response of 1 indicated not at all safe, 3 indicated moderately safe, and 5 indicated extremely safe. Responses to these two questions were averaged to produce a measure of perceived safety. The two items measuring perceptions of safety was significantly correlated with each other ($r = .59$, $p < .001$). Moreover, the Cronbach alpha of the two items was .744, above the generally agreed-on lower bound of .70 (Hair, Anderson, Tatham, & Black, 2002), indicating satisfactory reliability for the overall scale of perceptions of safety.

Boaters' overall satisfaction with their experience was measured on a 10-point scale (Matlock et al., 1991). Respondents were asked ''On a scale of one to ten, how would you rate your overall experience at Lake Austin/ Travis, with a rating of 10 being the best possible experience, and a rating of 1 being the worst possible experience you can imagine?'' The use of a single item to measure satisfaction can minimize response refusals by lowering respondent burden and is widely adopted in various service settings (e.g., Cronin & Taylor 1992; Howat, Murray, & Crilley, 1999; Parasuraman, Zeithaml, & Berry, 1988).

Finally, boaters were asked to tell how many times they came to Lake Austin/Travis for recreation in a typical year. This question was used to differentiate regular boaters from infrequent ones.

2.5. Data Analyses

Among those 990 questionnaires collected from the two lakes, 27 were less than 50% completed and were discarded, resulting in 963 usable instruments. The dataset was

then screened for outliers before data analysis. Cases in which the answer to the question of expectation of encounters was "no expectation" were removed (n = 15) due to the conceptual irrelevance of this option to the study purpose. The multiple imputation procedure in LISREL 8.80 (Jöreskog & Sörbom, 2006) was adopted to address missing values (2 cases with all missing values were deleted; percentage of missing values: 3.47%). Thus, a total number of 946 cases were retained for model estimation. Of those, 361 cases (38.1%) were collected on Lake Austin and 585 (61.8%) on Lake Travis.

To test the hypothesized relationships, path models with manifest variables were estimated in LISREL 8.80. First, a path model with the pooled sample (i.e., the sample with both regular and infrequent boaters) was estimated. The four measures of perceived crowding were allowed to co-vary with one another. Second, two user groups, regular and infrequent boaters, were created based on the median of boaters' reported number of visits to the lakes (Median = 10). Regular boaters (Median > 10) and infrequent boaters accounted (Median <= 10) for 47.1% (n = 446) and 52.9% (n = 500) of the sample, respectively. Path models with each of the user groups were fitted to test whether the hypothesized model fit both groups. As a measure of goodness-of-fit of the path models, the absolute fit index, chi-square/degree of freedom ratio value, is reported. We also report the normed fit index (NFI) (Bentler & Bonnett, 1980), non-normed fit index (NNFI) (Bentler & Bonnett, 1980; Tucker & Lewis, 1973), comparative fit index (CFI) (Bentler, 1990), and root mean square error of approximation (RMSEA) (Browne & Cudeck, 1993; Steiger, 2007). Values of CFI, NFI and NNFI greater than .95 are recommended for a good model fit; and an RMSEA value less than .05 indicates a good

fit of the model (Browne & Cudeck, 1993).

Next, invariance testing was used to examine whether the hypothesized relations varied among regular and infrequent boaters. This step involved constraining beta coefficients in the model to be invariant across the two user groups. If the change of chi-square values per degree-of-freedom is significant, the beta weights would be significantly different between the two user groups. Finally, an F-test was conducted on the R-squared change between the path model and the crowding-satisfaction regression to determine the significance of R-squared increase accounted for by setting density, expectations of encounters, perceptions of safety, and enjoyment to the crowding-satisfaction relationship.

2.6. Results

The profile of the sample is presented in Table 1. The average age of boaters that completed the questionnaire was 41. The proportion of females was 15.6%. The majority of individuals had been to either of the lakes before (93.6%). On average, there were 4.33 persons in a boating group. Each group had less than two vehicles (M = 1.43) and approximately one watercraft (M = 1.08). Almost all trips (92.3%) to the lakes were overnight visits. Most boaters (90.6%) indicated that Lake Austin/Travis was their first choice for the boating trip. Less than 15% (14.4%) of them changed their boating plans on the trip because of perceived crowding at the lake.

Table 1. Descriptive summary of participants

Variable	*n*	%
Socio-demographic and - economic		
Age(n = 756, M = 41.00 years, SD = 11.72)		
Gender(n = 819)		
Male	691	84.4
Female	128	15.6
Boating behavior		
Have you ever been to Lake Austin/Travis before? (n = 920)		
Yes	861	93.6
No	59	6.4
How many people are in your group? (n = 939, M = 4.33 people, SD = 4.37)		
How many vehicles did your group have with you at the lake today? (n = 940, M = 1.43 vehicles, SD = 1.49)		
How may watercraft does your group have with you at the lake today? (n = 931, M = 1.08 watercrafts, SD = .39)		
Was your trip a day trip or on overnight visit today? (n = 943)		
Day trip	73	7.7
Overnight trip	870	92.3
Was this lake your first choice of a lake for this boating trip? (n = 932)		
Yes	844	90.6
No	88	9.4
Did you change your boating plans on this trip because of perceived crowding at the lake? (n = 909)		
Yes	131	14.4
No	778	85.6

Table 2 summarizes the descriptive statistics of the variables in the model. The mean number of vehicles at the parking lot on each day during the surveying period was 97.59 with a standard deviation of 135.03. The number of people boaters expected to see on the lake was a bit less than they actually saw (M = 2.59). The mean value of perceived crowding was 3.57, indicating that boaters felt the lake a little crowded. Among the four locales in which perceived crowding was examined (at the launch ramp/marina at the start of the trip, while boating on the lake, along the shoreline areas, and at the launch ramp/marina when boating ended), boaters felt most crowded out on

the lake while boating (M = 3.98) and at the launch ramp/marina when boating ended (M = 3.94). They felt least crowded at the launch ramp/marina at the start of the trip (M = 2.80). In general, boaters felt safe while boating on the lake (M = 4.16), and the crowding situation did not have much effect on their enjoyment of the boating experience (M = 3.28). The high mean satisfaction score (M = 8.50) also indicated that boaters viewed their experience on the lake close to their ideal.

Table 2. Descriptive summary of variables in the path model (n = 946)

Variables	***Range***	***M***	***SD***
Setting density	(0,+∞)	97.59	135.03
Expectations of encounters	(1, 5)	2.59	1.06
Perceived crowding	(1, 9)	3.57	1.76
At the launch ramp/marina at the start of the trip		2.80	2.12
Out on the lake while boating		3.98	2.15
Along the used shoreline areas		3.55	2.19
At the launch ramp/marina when stopped boating		3.94	2.44
Perceptions of safety	(1,5)	4.16	.80
In light of the number of the boats		4.22	.85
In light of the behavior of other boaters		4.09	.94
Enjoyment[a]	(1, 5)	3.28	1.02
Satisfaction with recreational experiences	(1, 10)	8.50	1.60

[a] Reverse coded

Table 3 displays the results of the path model testing. Findings indicate that the hypothesized model fit the data well for both types of boaters (infrequent boaters: χ^2 = 2.885, df = 4, P = .557, RMSEA = .000, CFI = 1.000, NFI = .988, NNFI = 1.019; regular boaters: χ^2 = 6.5549, df = 4, P = .162, RMSEA = .035, CFI = .992, NFI = .979, NNFI = .968). The results of invariance testing suggest that the imposition of the beta coefficient

constraint did not significantly affect model fit ($\Delta\chi^2 = 12.932$, $\Delta df = 11$, $P > .05$). Given that no significant difference exists between the two groups, the following discussion on direct and indirect effects among variables is based on the analysis of the pooled data.

Table 3. Goodness-of-fit indices: path models for pooled sample, infrequent and regular Boaters

Model	**χ^2**	**df**	**$\Delta\chi^2$**	**Δdf**	**NNFI**	**CFI**	**RMSEA**	**NFI**
Pooled sample	2.872 (P = .579)	4			1.008	1.000	.000	.995
Baseline model	9.434 (P = .311)	8			.990	.997	.019	.983
Infrequent boaters	2.885 (P = .557)	4			1.019	1.000	.000	.988
Regular boaters	6.549 (P = .162)	4			.968	.992	.035	.979
Invariant regression	22.366 (P = .266)	19	12.932	11	.990	.994	.019	.960

Note. Infrequent boaters: average annual visits to the lakes no more than 10 times.
Regular boaters: average annual visits more than 10 times.

Figure 3 depicts the direct effects among setting density, expectations of encounters, perceived crowding, perceptions of safety, enjoyment, and satisfaction. All the hypothesized paths were significant, so H1~H11 were supported. Specifically, perceived crowding was positively influenced by setting density ($\beta = .108$, $t = 3.473$) and expectations of encounters ($\beta = .271$, $t = 8.719$). This finding indicates that the respondents' perceptions of crowding increased as setting density increased and their expectations for seeing people were exceeded. Setting density and expectations of encounters accounted for 8.5% of the variance in perceived crowding. Perceptions of safety were negatively influenced by expectations of encounters ($\beta = -.082$, $t = -2.612$)

and perceived crowding (β = -.345, t = -10.998). That is, as respondents' expectations for seeing people were exceeded, they were more likely to feel crowded and consider the lake condition to be unsafe. Expectations of encounters and perceived crowding accounted for 14.1% of the variance in perceptions of safety. Enjoyment was negatively influenced by expectations of encounters (β = -.175, t = -5.237) and perceived crowding (β = -.087, t = -2.513) but positively influenced by perceptions of safety (β = .078, t = 2.286). Over six percent of the variance in enjoyment was explained by these three variables. This indicates that as respondents' expectations for encountering people were exceeded and their perceptions of crowding increased, they tended to indicate that the number of people they had seen on the lake detracted from their boating experiences. Alternately, their feelings of being safe while boating added to their enjoyment of the experiences. Finally, satisfaction with boating experiences was to some extent negatively influenced by expectations of encounters (β = -.080, t = -2.517) and perceived crowding (β = -.075, t = -2.236) but positively influenced by perceptions of safety (β = .283, t = 8.665) and enjoyment (β = .096, t = 3.081). Over 14% of the variance in satisfaction was explained by these four variables. The relationships indicate that respondents' overall satisfaction with their boating experiences declined as their expectations of encountering people were exceeded and their feelings of crowding increased. On the other hand, their satisfaction increased if perceptions of safety and enjoyment increased.

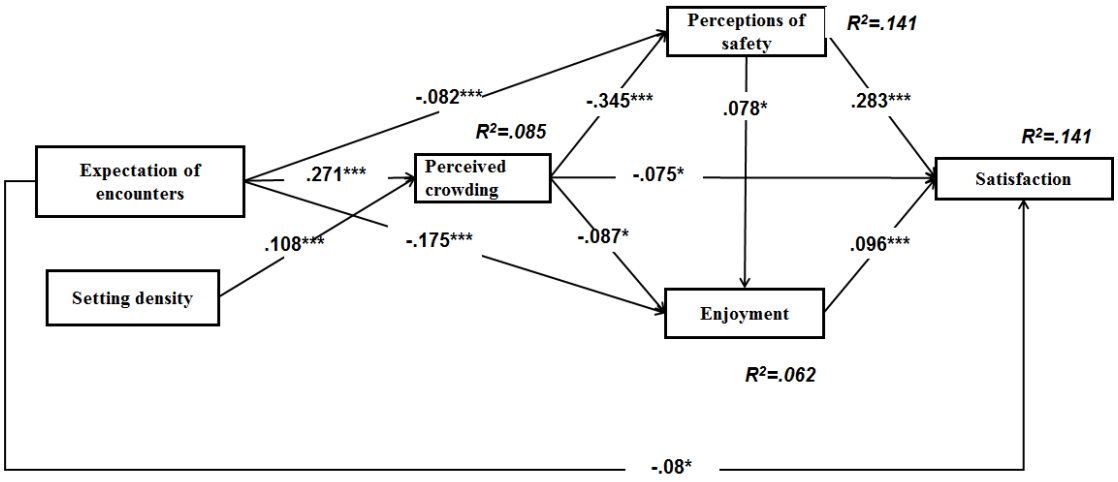

Figure 3. Results of crowding-satisfaction model
$\chi^2_{(4)} = 2.872$, $p = .579$; RMSEA = .000, NFI =.995; NNFI = 1.008; CFI = 1.000
*$p < .05$; **$p < .01$;*** $p < .001$

Because lake managers are only able to influence boaters' perceptions of crowding through manipulating their expectations of setting density and perceptions of safety, we chose to report the statistically significant indirect path related to expectations of setting density and perceptions of safety. Table 4 illustrates that beyond direct effects, expectation of encounters and perceptions of safety also had indirect effects on satisfaction. The significant indirect effect of expectations of encounters on perceptions of safety (β = -.082, t = -2.612) indicates that the relationship between the two was partially mediated by perceived crowding. This means that respondents' unsafe feelings of boating conditions could be partially attributed to their negative evaluation of setting density in addition to their expectations of seeing people being exceeded. Perceived crowding and perceptions of safety mediated the expectation of encounters to enjoyment relationship (β = -.175, t = -5.327). That is, the number of people on the lake reduced

boaters' enjoyment if setting density increased their perceptions of crowding and/or triggered safety concerns. The relationship between expectations of encounters and satisfaction was partially mediated by the indirect effects of perceived crowding, perceptions of safety, and enjoyment (β = -.080, t = -2.517). When the number of people seen on the lake exceeded respondents' expectations, their perceived crowding increased and feelings of unsafety and overall enjoyment declined, resulting in lower satisfaction with their experiences. Finally, perceptions of safety was found to have indirectly influenced satisfaction (β = .283, t = 8.665). It indicates that, in addition to the direct effect, the impact of perceptions of safety on satisfaction was conditioned by respondents' enjoyment level.

Table 4. Summary of selected indirect effects for pooled sample

Path	**β (SE)**
Expectations of encounters → Perceptions of safety	-.082 ** (.024)
Expectations of encounters → Enjoyment	-.175*** (.031)
Expectations of encounters → Satisfaction	-.080 * (.048)
Perceptions of safety → Satisfaction	.283*** (.065)

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

The R-squared change after adding setting density, expectations of encounters, perceptions of safety and enjoyment to the crowding-satisfaction relationship was .095 (F = 25.99, p < .001). The four additional variables in the crowding-satisfaction relationship brought significant increase in the variance explained in satisfaction.

2.7. Discussion

The primary purpose of this research was to investigate factors influencing the crowding-satisfaction relationship in recreational boating. We also explored whether the hypothesized model differed among regular and infrequent boaters. The results illustrated that as setting density increased and boaters' expectations of seeing people were exceeded, their feelings of being crowded increased; they were more likely to consider the boating conditions on the lake to be unsafe and less enjoyable. As a result, boaters' satisfaction level with their experiences declined. Adding the variables of setting density, expectations of encounters, perceptions of safety and enjoyment to the crowding-satisfaction relationship significantly improved the variance explained in satisfaction.

This investigation revealed no significant difference between infrequent and regular boaters regarding the relationships tested. This finding is in contrast to most of the previous work that reported higher perceptions of crowding for more experienced users during leisure activities (Berry, Hals, Schrievir, & Auchley, 1993; Graefe & Moore, 1992; Arnberger & Brandenburg, 2007; Arnberger & Haider, 2007). One explanation of the similarity between infrequent and regular boaters maybe be that most of the respondents (93.6%) are repeat users of the lake resources, and about 70% of them reside in nearby cities. It is highly likely that their earlier exposure to the setting, whether it is more or less frequent, has equipped boaters with sufficient knowledge to better anticipate the situation and cope with the negative impacts of setting density on their experiences. As Manning (2011) points out, the adoption of coping mechanisms is

an important reason that perceived crowding does not result in lower satisfaction. These coping mechanisms mediate the relationship between crowding and satisfaction by relieving stress associated with negative situations (e.g., crowding). In our study setting, boaters might be familiar enough with the setting to shift their use patterns (e.g., boating in non-peak season or weekdays) or adjust their perceptions of the conditions (rationalization), leading to high satisfaction despite the crowded situation. No studies, however, have addressed the effect of related coping mechanisms (e.g., substitutions, rationalization, and product shift) on satisfaction when recreationists are confronted by negative conditions. The inclusion of various coping mechanisms in the crowding-satisfaction relationship is one direction of further investigation.

This study is one of the few that simultaneously test the effects of setting density and perceived crowding on satisfaction. By using vehicle counts in the parking lot around the lake at the time of survey - taking as a proxy of boating traffic, we found significant, direct relationships among setting density, perceived crowding, and satisfaction. This finding corroborates the major hypotheses of the social carrying capacity framework and is congruent with numerous studies illustrating the positive correlation between setting density and perceived crowding and the negative impact of perceived crowding on satisfaction (e.g., Ditton et al., 1982; Tarrant, Cordell, & Kibler, 1997; Tseng et al., 2009). More importantly, we also identified a negative indirect effect of setting density on satisfaction. Although the effect is not strong ($\beta = -.037$) compared with to the effect of expectations of encounters on satisfaction (total effect: -.211), this finding illustrates that recreationists' overall satisfaction with their experiences only

diminishes when the increased density triggers their negative evaluation of setting conditions.

Regarding antecedents of the crowding-satisfaction relationship, expectations of encounters was found to be a stronger predictor of perceived crowding than was setting density. Consistent with past crowding research across various recreational activities in different settings (e.g., Lee & Graefe, 2003; Shelby et al., 1983), the addition of expectations of encounters to setting density explained a much larger amount of variance in perceived crowding. Given expectations of encounters is conceptualized as a disconfirmation process, this finding suggests that similar to customers' satisfaction in a service setting, satisfaction with recreational experiences is essentially the gap between expectations of setting density and the actual encounters. Expectation is one of the most important personal characteristics influencing people's evaluation of setting density and their experiential qualities. Since our sample is mainly composed of repeat visitors with fairly accurate expectations of setting density (M = 2.67, suggesting that the number of people they saw on the lake was roughly the same with what they expected to see), a possible improvement in capturing the disconfirmation process may be achieved by measuring respondents' preferences for setting density. Several studies have shown that preferences of setting density have stronger correlations with perceived crowding than expectations of encounters (Andereck & Becker, 1993; Bultena et al., 1981; Womble & Studebaker, 1981; Watson, 1995). Future studies with similar potential sample profiles (i.e., repeat visitors with relatively high experience levels) may use preferences for setting density as opposed to expectations of encounters to identify influential factors

contributing to quality experiences.

With respect to mediators, we observed that perceptions of safety and enjoyment mediated the relationship between perceived crowding and satisfaction. When boaters perceived the lakes to be crowded, they were inclined to feel unsafe and experienced less enjoyment. This finding corroborates earlier work that identified the relationships among satisfaction and feelings of safety (Vaske et al., 2000) and, enjoyment (Thapa & Graefe, 2004; Tseng et al., 2009). In our study context, perceptions of safety are likely the result of both "density crowding effect" and "behavioral crowding effects" (Gramann, 1982, p.112). Respondents' perceptions of safety are influenced by the number of different types of water craft (e.g., canoes or kayaks, cabin cruisers, jetskis) sharing the lakes and other user's depreciative behaviors during various activities. Past research has illustrated that recreational conflict is asymmetrical among different user groups. For example, in water-based activities, non-motorized users (e.g., canoeists, fishermen) often perceive motorized users' (e.g., motor boaters, jet skiers) behaviors to be problematic while the latter group does not feel as strongly toward the former group. Perceptions of safety might be compromised to a greater degree for specific lake use groups such as swimmers, fishermen, and cabin cruisers, who might see themselves as more vulnerable to the behavior of others than those using a jet ski or pulling tubers. Therefore, future research in lake use safety needs to investigate the potential of safety perception based on others' behaviors rather than density.

Findings of this study inform lake managers that boaters' expectations of encounters and perceptions of safety are key to their enjoyable and satisfying experience.

Management policies should focus on these two elements to establish reasonable expectations of encounters and minimize unsafe feelings. It is critical to communicate lake use level with recreationalists using all possible tools prior to their arrival. Austin Park and Recreation Department and LCRA could publish historical data of the lake use level on its website and brochures. Public radio, community newspapers, and social media can be used to update the most recent trend on density. In terms of interfering with boaters' perceptions of safety, LCRA may consider giving advice such as safety zones, safety time periods (e.g., times during the day, days of the week or periods during the year), and directions of travel (e.g., counter-clockwise direction) based on lake use data. Promoting participation in safety education program can also help reduce the number of accidents occurrence and enhance safety perceptions. Lastly, resource managers can suggest several substitution options when updating the lake use information with boaters in order to assist their decision-making. The application of these coping strategies reduce recreationists' negative evaluations related to safety and enjoyment and will ultimately increase their level of satisfaction.

2.8. Limitation and Future Research

Several limitations exist in this study. First, the measure of setting density was imperfect in that it was approximated from the total number of vehicles in the parking lots surrounding the lakes close to the time of survey-taking. Given the significant impact of setting density on other variables found in this study, it is recommended that future research continue exploring feasible methods to obtain a relatively objective

measure of setting density. Aerial counts can be an effective tool but can also be expensive and subject to weather conditions. This is more important in high-use areas given recreationists' tendency of underestimating setting density (Cole et al., 1997; Shelby & Colvin, 1982). An extension of the investigation of boating density may be to identify the level of lake use under which quality recreational experiences can be achieved. Visual methods (e.g., Manning et al., 2000) in which participants are presented with images suggesting various levels of use and asked to indicate the acceptability of each level have been recommended for this line of research.

Second, the measure of perceived crowding in this study was the mean score of the same item regarding four locales on the lakes. Since the quality of experience was a global measure, the average score of crowding perceptions in reference to four areas that capture the general crowding perceptions across the lakes was considered consistent with the satisfaction at the level of measurement. Hence, using the mean score of perceived crowding was preferred over entering all the four items into the model. However, there is a concern that the associations between crowding perceptions regarding different areas of the lakes and satisfaction may vary. Previous research indicates that situational variables including locations within an area affect people's perceptions of crowding. For instance, several studies have found that visitors are more sensitive to encounters at campsites than along trails (Stankey, 1973, 1980). In a boating setting, Graefe and Drogin (1989) found that respondents were more sensitive to crowding on the lake than at access points. Future studies on crowding-related issues on waterways may consider examining how crowding-satisfaction relationship varies at different spatial points

within a recreational setting. In the context of the current study, for example, some parts of the lakes are connected by long and narrow channels while others have relatively broad basin-like settings. People's perceptions of crowding in waterway areas might differ and their relationships with satisfaction and other variables could result in deviations from the current results. Depending on the concern and needs of management agencies, future research is recommended to examine the crowding-satisfaction relationship regarding particular spatial areas on the lakes.

Similarly, further studies may inquire how the crowding-satisfaction relationship varies at different temporal points. The data collection period of this study covered public holidays, non-holiday weekends and weekdays. Our data show that setting density was significantly different among the three types of days. However, the type of days did not have a significant effect on the crowding-satisfaction relationship, which might have been ameliorated by expectations of encounters. A closer examination of the crowding-satisfaction relationship among weekdays, weekends and holidays may expand the current knowledge.

Third, the measurement of enjoyment has potential to be improved. This study treated enjoyment as a proxy of positive affect to test whether boaters' feelings increased their satisfaction with experiences. Nevertheless, rather than measuring users' affective state, the wording of the enjoyment item resulted in a measure of a judgment of the effect of contextual factors on the affective state. In addition, replacing "amount of use" with "number of users" would reduce ambiguity. "Amount of use" could refer to the boater's own use of the lake resource, which is misleading. Moreover, alternative

conceptualizations and measurements of affect are available and have been widely used. For example, in retail crowding studies, researchers have identified that affect, whether it is measured by pleasure and arousal or Izard's emotional types (e.g., joy, interest, surprise, anger, disgust and contempt), mediates the relationship between perceived human/spatial crowding and shopping satisfaction (Eroglu, Machleit, & Barr, 2005; Machleit, Eroglu, & Mantel, 2000; Li, Kim, & Lee, 2009). Theoretically, emotion is another vital component in forming satisfaction besides cognition (e.g., expectations of encounters). Adding affect as a mediator between perceived crowding and satisfaction may increase the variance explained in satisfaction. An equally important point is that recreational activities are often self-selected and are thus generally produce a high level of satisfaction regardless of use level. Seeking joy, happiness, and relaxation is a self-evident goal of recreational participation. Examining how perceived crowding influences recreationists' affect may reveal more variance in outcome variables and help better understand recreational experiential outcome. Affective antecedents of satisfaction have been largely ignored in crowding studies in recreational settings, so future examinations of more direct measures of affect in the crowding-satisfaction relationship in recreation studies are warranted.

Fourth, there might be other factors that could assist in understanding the process underlying antecedents and outcomes related to perceived crowding. In addition to preferences for encounters, coping mechanisms, and affect/emotions discussed earlier, the literature indicates that recreationists' attachment to a specific setting might reduce negative feelings toward crowds (Budruk Wilhem Stanis, Schneider, Heisey, 2008; Kyle

, Graefe, Manning, & Bacon, 2004a, b; Wickham & Kerstetter, 2000). Also, perceptions of crowding are activity-and-place specific (e.g., Wickham & Kerstetter, 2000). The relationship between crowding and satisfaction may vary considerably depending on the activities people partake on the water (e.g., swimming, fishing, relaxing, cruising, or water skiing). Future research should carefully select those variables in their models based on the research setting.

Finally, the measure of satisfaction could be improved in the sense of the expectancy-disconfirmation theory. Satisfaction is defined as the "fulfillment response" (Oliver, p.8), a judgment of the degree to which the level of fulfillment is pleasant or unpleasant. The high point of the current scale is "best possible experience" and the low point is "worst possible experience". Such an item measures the quality of experience rather than satisfaction. Further, the use of "experience" in the item is ambiguous. Experience carries various connotations. In some contexts, it refers only to a behavioral element (e.g., work experience) and in others it implies a motivational state (e.g., leisure experience). Nonetheless, the item is clearly not a measure of motivational state or affect. Last but not least, our data revealed that the score of satisfaction was high (M = 8.50 on a range from 1 to 10) and its variation was limited (SD = 1.60). This is consistent with past research that reported the satisfaction level is relatively high despite negative setting conditions (Manning, 2011). It might be helpful to consider delight as an alternative measure of satisfaction (Torres & Kline, 2006) to expand the variation in satisfaction. Delight is a more extreme expression of affect resulting from services exceeding customers' expectations (Kumar, Olshavsky, & King, 2001; Keinningham,

Goddard, Vavra, & Laci, 1999). Using the delight measure may exhibit larger variation in the outcome variable and thus help more clearly illustrate how crowding diminishes satisfaction.

3. THE MODERATING ROLE OF PLACE ATTACHMENT IN THE CROWDING-COPING RELATIONSHIP AMONG RECREATIONAL BOATERS

3.1. Overview

Few studies have examined the selection of coping strategies to respond to different levels of crowding. Even fewer have considered the effects of relevant personal factors (e.g., place attachment) on shaping crowding perceptions and the consequent selection of a coping mechanism. This study began to fill this void by proposing social judgment theory to understand the importance of place attachment in the crowding-coping relationship and providing empirical evidence. The findings illustrated that inconsistent with previous literature, coping was comprised of four dimensions: temporal substitution, cognitive adjustment, direct action, and activity substitution. Respondents' perceptions of crowding had positive effects on all the identified coping mechanisms with an exception of cognitive adjustment. For place-attached respondents, the effects of crowding on temporal substitution, direct action, and activity substitution were significantly stronger than for their less attached counterparts.

3.2. Introduction

Crowding, defined as people's negative evaluation of setting density (Stokols, 1972a, b), is often cited as a stressor in the context of outdoor recreation (Ditton, Fedler, & Graefe, 1983; Manning & Valliere, 2001). Understanding how recreationists respond to crowded settings helps identify the potential range of coping strategies adopted by recreationists in order to maintain satisfactory leisure experiences. Previous examinations have focused on the relationship between particular conditions or situations and the behavioral and cognitive consequences they elicit (e.g., Johnson & Dawson, 2004; Schneider & Hammitt, 1995a, b; Schneider, 2000; Shelby, Bregenzer, & Johnson, 1988). Limited empirical evidence (e.g., Miller & McCool, 2003; Schuster, Hammitt, & Moore, 2006) is available regarding the selection of coping strategies in response to different levels of crowding. Moreover, researchers have noted that the way one evaluates a situation affects the selection of coping strategies (Bouchard, Guillemette, & Landry-Léger, 2004; Miller & McCool, 2003; Schuster, et al., 2003, 2006), but little research attention was taken in exploring relevant factors. For example, as one of the important personal factors in shaping one's perceptions of setting conditions (e.g., Budruk, Wilhem Stanis, Schneider, & Heisey, 2008; Peden & Schuster, 2008), the degree of attachment to a recreational place is expected to offer deeper insight on a recreationist's consideration of coping options. Yet research examining how place attachment affects the selection of coping options has been scant.

In this investigation, we examined the effect of place attachment on the crowding-coping relationship. Coping comprises "thoughts and behaviors that people

use to manage the internal and external demands of situations that are appraised as stressful" (Folkman & Moskowitz, 2004, p. 1). It is an activity taken based on the appraisal of conditions and potential consequences (Lazarus, 1966). Place attachment refers to an individual's bond and affection expressed toward a setting (Altman & Low, 1992; Manzo, 2003). There is evidence illustrating that place attachment influences recreationists' evaluation of stressors including crowding (Peden & Schuster, 2008; Kyle et al., 2004a; Warcheza & Lime, 2001) and their responses to stressors, such as substitution behaviors (Hammitt et al.,; Williams & Roggenbuck, 1989). The concept of place attachment provides an alternative to viewing recreation opportunities as sets of activities and settings that are adaptable to a certain degree (Williams, Patterson, Roggenbuck, & Watson, 1992) by emphasizing the enduring emotional and affective meanings of recreation areas and suggesting that recreational settings are not necessarily interchangeable (Giuliani, 2013).

With this in mind, the purpose of this study was to examine the effect of place attachment on recreationists' selection of coping strategies in response to crowding within the context of recreational boating. Guided by the tenets of social judgment theory (Sherif & Hovland, 1961), we hypothesized that place attachment would moderate the crowding - coping relationship such that boaters who express stronger attachment to the setting will be more likely to adopt cognitive coping mechanisms. Alternately, less attached boaters would be more inclined to employ behavioral coping mechanisms.

3.3. Literature Review

3.3.1. Perceived Crowding and Coping

The relationship between crowding and coping could be understood from a transactional perspective. Through the lens of the transactional theory, stress is conceptualized as "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his/her resources and endangering his/her well-being" (Lazarus & Folkman, 1984, p.19). It is caused by an imbalance between physical, psychological, or social conditions and the capacity of individuals to adjust to such situations (McGrath, 1976; Martens, 1987; Seyle, 1950). This imbalance makes people feel stressed and motivates them to respond in a way to achieve an equilibrium with their physical, psychological, or social conditions. The process of responding to stress through which people manage the imbalance is referred to as coping (Lazarus & Folkman, 1984; Taylor & Schneider, 1989). The transactional process view of stress emphasizes that stress not only is a stimulus that produces stress reactions (i.e., stressor), but also includes the response to the stimulus (i.e., coping), and a stress appraisal mechanism (Lazarus, 1966; Jones & Bright, 2001).

By definition, crowding is the negative evaluation of setting density (Stokols, 1972a, b). It is one of the major sources of stress that recreationists may confront (Ditton et al., 1983; Manning & Valliere, 2001). Perceptions of crowding depend on a variety of factors, including personal characteristics of visitors, characteristics of others encountered, and situational variables (Manning, 2011). Conceptually, the normative interpretation of crowding corresponds to the transactional view of stress in that both

crowding and stress perceptions are highly personal, depending on various individual characteristics. During outdoor recreation experiences, undesirable conditions can produce stress and individual stress-coping processes can influence the outcome of the recreation experience (Schuster et al. 2003), which can be short-term (e.g., satisfaction with the experience) and long-term (e.g., psychological well-being) (Lazarus & Folkman, 1984). In the leisure literature, coping mechanisms have been mostly studied within the context of crowding (Manning & Valliere, 2001).

Crowding does not necessarily lead to decreased quality of recreation experiences partly because of the adoption of coping mechanisms (Manning, 2011; Manning & Valliere, 2001). How recreationists accommodate crowded circumstances has been shown to influence the quality of their experience (Propst, Schuster, Dawson, 2009; Yoon et al., 2013). According to Miller and McCool (2003), coping behaviors in outdoor recreation can be categorized into behavioral changes and cognitive processes. Behavioral changes include different kinds of substitution behavior*: temporal substitution, resource substitution, activity substitution, absolute displacement, and direct action* (Shelby & Vaske, 1991). Substitution is defined as "the interchangeability of recreation experiences such that acceptably equivalent outcomes can be achieved by varying one or more of the following: the timing of the experiences, the means of gaining access to the setting, and the activity" (Brunson & Shelby, 1993, p. 69). *Temporal substitution* occurs when recreationists change the time they visit the site when faced with a stressful situation. Alternately, people could visit a different site and thus opt for *resource substitution*. *Activity substitution* refers to changing the current

activity to another activity to deal with the stress. *Absolute displacement* refers to the choice to never again visit the recreational area due to the stressor encountered there. The last type of behavioral coping is *direct action*. Recreationists can report unpleasant situations directly to the personnel who serve the recreational area, with the expectation that the personnel will then improve the situation (Ziemann & Haas, 1989).

Cognitive processes include *product shift* and *rationalization* (Heberlein & Shelby, 1977; Stankey & McCool, 1984; Schneider & Hammitt, 1995a, b). *Product shift* is defined as a cognitive coping process whereby people change the definition or the expectation of the recreational experience or the meaning of the recreational setting (Shelby et al., 1988). The ultimate goal of engaging in a product shift is to maintain a maximum level of satisfaction while not temporally or physically relocating from the current place (Miller & McCool, 2003). *Rationalization* is the effort to reduce psychological imbalance between expected outcomes and actual situations (Festinger, 1957). Since recreationists usually invest a considerable amount of resources (e.g., time, money, and effort) in their recreation activities, some people tend to rationalize stressful situations in a positive way regardless of the inhibiting conditions (Manning, 2011). The concept of rationalization is rooted in the theory of cognitive dissonance (Festinger, 1957) and suggests that "people tend to order their thoughts in ways that reduce inconsistencies and associated stress" (Manning, 2011, p.114). For example, in Heberlein and Shelby's (1977) research, rafters on the Colorado River in Grand Canyon National Park, Arizona spent a large amount of time effort on their trips, so despite

crowded situations, rafters rationalized the trip as satisfactory as they weighed the negative setting conditions against what they had invested in the trip.

Displacement, rationalization and product shift associated with crowding that outdoor recreationists adopt have been widely documented (Manning, 2011). Displacement, referring to spatial and temporal changes to avoid crowded settings (Anderson & Brown, 1984; Robertson & Regula, 1994), is roughly equivalent to the substitution behaviors in Miller and McCool's (2003) typology of coping. For water-based activities, *temporal substitution*, *resource substitution*, *product shift*, and *rationalization* are pervasive coping strategies dealing with crowding. For example, a study of boaters at Lake Red Rock, Iowa, found that 17 percent of respondents had begun using the lake to avoid crowding elsewhere (i.e., *resource substitution*); an additional 14 percent reported that they had shifted their use of the lake to weekdays to avoid crowding (i.e., *temporal substitution*) (Robertson & Regula, 1994). Another study of the Lower St. Croix and Upper Missouri rivers (Becker, Niemann, & Gates, 1981) identified a small subsample of respondents who had purposively shifted use from one river to the other, at least partially in response to use levels. Two panel studies conducted by Shindler and Shelby (1995) addressed the issue of *product shift* with boaters on the Rogue River, Oregon. In the initial survey, 25 percent of respondents reported that the river provided a "wilderness" experience. However, fourteen years later when the river use had increased 70 percent, only 8 percent of respondents felt the same way in the follow-up survey, suggesting substantial product shift.

The transactional interpretation of coping emphasizes the process of appraising a situation as stressful or not (Jones & Bright, 2001). According to previous work (Ditton et al., 1983; Manning & Valliere, 2001), crowding can be one such type of stressful situation in cases where setting density is negatively evaluated and disrupt one's objectives (Stokols, 1972a, b). Therefore, coping with crowding involves an "unfolding, shifting pattern of cognitive appraisal and reappraisal, coping, and emotional processes" (Lazarus & Folkman, 1984, p. 143). This process is further specified in two types of appraisal: primary and secondary (Lazarus & Folkman, 1984). People first evaluate setting density to consider if there is a disruption to their objectives in primary appraisal (i.e., appraisal of a situation being irrelevant, positive or stressful, Bouchard et al., 2004), and then they evaluate coping options and attempt to find a way to improve experience quality (i.e., examination of coping options and decisions of the best way to react to the situation, Bouchard et al., 2004). Secondly, appraisal is a more complex evaluative process that considers not only which coping options are available, but also the likelihood that the coping option will work as one expects and the possibility that one can employ a specific strategy effectively (Lazarus & Folkman, 1984).

Previous research has found that the use of coping mechanisms increased as a result of the frequency of stressful encounters and/or intensity of stress (e.g., Topf, 1985; Baum & Valins, 1977; McCauley & Taylor, 1976). Some empirical studies (Kuentzel & Heberlein, 1992; Miller & McCool, 2003; Schuster et al., 2006) in the field of recreation also reported consistent results. Miller and McCool (2003) indicated that the number of other people encountered within an area was the most common source of stress

experienced by recreationists in Glacier National Park. Furthermore, they found that recreationists reporting higher levels of stress were more likely to adopt absolute displacement behaviors. For acute stressors, they would take direct action, e.g., talking with park personnel to change the situation. In contrast, those reporting lower stress levels were more likely to choose cognitive adjustments such as rationalization. Moderate stress levels were found to be associated more with substitution behaviors. Schuster et al. (2006) found that seeing too many people at campsites, along the trail, and vehicles near Shining Rock Wilderness were among the major sources of stress experienced by hikers. Their test of relationships among the intensity of stress, the frequency of stress, and coping mechanisms also demonstrated that the intensity of stress was a better predictor of coping behavior than the frequency of stress in outdoor recreational settings. The relationship between perceived level of crowding as a source of stress and coping mechanisms is illustrated in Figure 4.

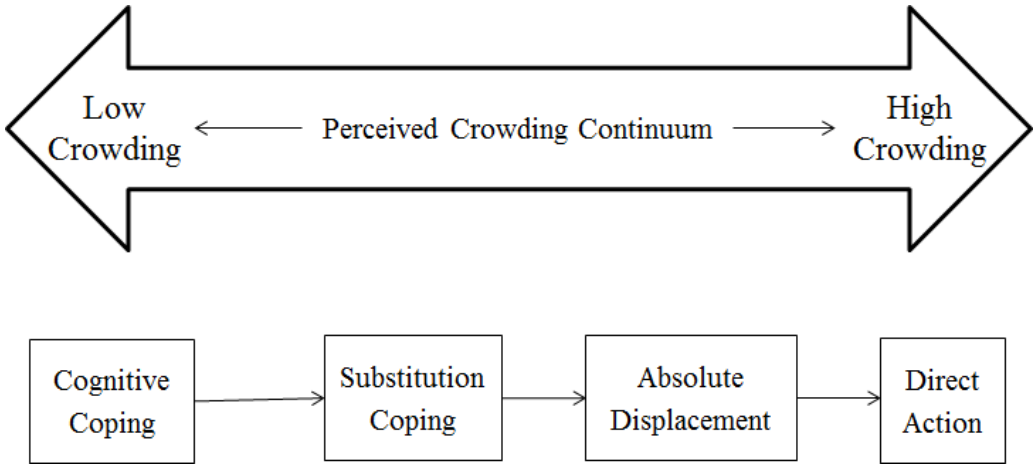

Figure 4. Crowding/Coping as a continuum, adapted from Johnson (2012)

Based on the previous literature review, the current study hypothesized the relationship between crowding and coping as follows:

H1: As perceived crowding increases, use of coping strategies increases.

H2. As perceived crowding increases, its effect on the use of behavioral coping mechanisms (*temporal substitution, activity substitution, resource substitution, absolute displacement, direct action*) will be stronger.

3.3.2. Place Attachment

Altman and Low (1992) suggested that place attachment subsumes or is subsumed by a variety of analogous ideas such as topophilia (Tuan, 1974), place identity (Proshansky, Fabian & Kaminoff, 1983), place dependence (Stokols & Shumaker, 1981), sense of place or rootedness (Chawla, 1992), insideness (Rowles, 1980), genres of place (Hufford, 1992), and community attachment (Hummon, 1992). Place

attachment has been conceptualized to include two components, place identity and place dependence (Kyle et al., 2004b; Moore & Graefe, 1994; Williams & Roggenbuck, 1989). Proshansky (1978) defined place identity in terms of the cognitive connection between the self and the physical environment. According to his definition, place identity comprises ”those dimensions of self that define the individual’s personal identity in relation to the physical environment by means of a complex pattern of conscious and unconscious ideals, beliefs, preferences, feelings, values, goals, and behavioral tendencies and skills relevant to this environment”(p. 155). It is “a substructure of a more global self-identification in the same way that one might consider gender identity and role-identity” (Jorgensen & Stedman, 2001, p.134). Place dependence on the other hand, refers to the functional value of a place (Stokols & Shumaker, 1981). It “concerns how well a setting serves goal achievement given an existing range of alternatives” (Jorgensen & Stedman, 2001, p.234). Williams and Roggenbuck (1989) introduced a measure of place attachment and this measure has been used extensively in the past 35 years (e.g., Moore & Graefe, 1994; Bricker & Kerstetter, 2000; Vaske & Kobrin, 2001; Kyle, Absher, & Graefe, 2003).

The current study embraces Jorgensen and Stedman’s (2001) idea that place attachment reflects an attitudinal construct, which has been applied in several contexts (Halpenny, 2006; Kraus, 1995; Kyle, Graefe, & Manning, 2005). Some researchers examining the relationship between attitudes and behaviors suggest that consistency between cognition (e.g., a belief about an object) and emotion (e.g., a positive or negative feeling toward an object) is associated with high attitude-behavior

correspondence (Kraus, 1995). It is expected that an overarching construct of place attachment incorporating place identity and place dependence would have greater explanatory power in understanding participants' relationship with the place and behaviors (e.g., coping selection). Empirically, studies have demonstrated that place attachment has significant associations with place-specific pro-environmental behavioral intentions (Halpenney, 2006; Stedman, 2002) and participation in recreational activities in the place (e.g., hunting) (Williams et al., 1992). Given the work, we also examined the influence of place attachment on the relationship between crowding and coping.

3.3.3. Social Judgment Theory

Place attachment can be considered an attitudinal construct (Jorgensen & Stedman, 2001) that roughly parallels ego-involvement. Ego-involved attitudes are characterized as being part of one's self-concept and thus "intimately felt and cherished" (Sherif, Sherif, & Nebergall, 1965, p. vi; Sherif & Cantril, 1947). They are activated when a cognitive connection is made between attitude object (e.g., the recreational setting) and self- knowledge. They are enduring in nature (Johnson & Eagly, 1989). Such characteristics can also be found in place attachment. Place attachment, as one's values and feelings associated with a physical setting, represents a part of one's self-identity (Proshansky et al., 1983). For the attached respondents, setting density is likely to be perceived personally relevant or ego-involving, because the setting conditions they encounter has the potential to both inhibit and/or enhance experiential goals. Social judgment theory focuses on how people's ego-involvement influences their encoding of

attitude relevant information against prior attitudes. Thus, social judgment theory is helpful in understanding how place attachment influences recreationists' evaluation of setting density and the resultant selection of coping mechanisms.

Social judgment theory suggests that recreationists evaluate emerging stimuli (e.g., setting density) against their prior attitudes or an attitudinal anchor. The attitudinal anchor defines an attitude structure in terms of three latitudes (Sherif et al., 1965): a latitude of acceptance, within which are a situated range of attitudinal positions an individual considers acceptable centered at the attitudinal anchor; a latitude of rejection, within which is the range of positions he or she rejects; and a latitude of non-commitment, within which is the range of positions which a person neither accepts nor rejects. In the context of recreation, the attitudinal anchors against which actual encounters are evaluated could be formed by cognitive categories evoked by prior experience with setting density (Helson, 1964; Webb & Worchel, 1993). From the perspective of social judgment theory (Sherif & Sherif, 1967), recreationists' displacement of actual encounters with others in relation to the latitudes determines their evaluation of setting density. Specifically, when the actual encounters with others fall within the latitude of acceptance or nearby in the latitude of non-commitment, assimilation occurs and the discrepancy between the setting density and the person's own attitude anchor is underestimated. In other words, the stimulus is seen as closer to the person's own attitudinal anchor than it truly is; therefore, one is prone to view setting density as an acceptable condition. On the other hand, if encounters with others fall within the latitude of rejection or just outside this range in the latitude of non-

commitment, contrast occurs and setting density is contrasted away from the person's own attitude. In this instance, setting density tends to be negatively evaluated, hence perceived crowding accumulates.

Furthermore, the strength of the assimilation-contrast effect is proposed to be dependent on ego-involvement (Sherif & Hovland, 1961). Research has found that highly involved subjects are less likely to change their attitudes toward emergent stimuli than little involved ones (Eagly & Chaiken, 1993; Sherif & Sherif, 1967). Highly involved persons experience discomfort when they face information discrepant from positions outside of the latitude of acceptance (Eagly & Chaiken, 1993; Sherif & Sherif, 1967). The reason for this discomfort is that the highly involved person "perceives his stands as parts of what he is and what he claims to be… His personal identity and the stability of his conception of himself depend in no small part on the stability and perpetuation of his stands… " (Sherif & Hovland, 1961, p. 206). Thus, ego-involved persons tend to encode attitudinal information in a highly personalized manner due to the need to maintain and protect the self-concept (Sherif & Hovland, 1961). Ego-involvement strengthens the anchoring effects of prior attitudes so that the magnitude of assimilation - contrast effects amplifies as ego-involvement increases (Sherif & Hovland, 1961; Eagly & Chaiken, 1993; Sherif & Sherif, 1967).

This study posits that respondents' evaluations of setting density are influenced by their degree of place attachment. Attached respondents may tend to possess stronger opinions concerning appropriate conditions for specific settings. Setting conditions that are consistent or approximately close to respondents' attitudinal anchors are likely to be

assimilated whereas setting conditions that are considered distal to the attitudinal anchor will be contrasted. Given the previous hypothesis that the likelihood of adopting behavioral mechanisms increases as perceived crowding increases (H2), it can be further postulated that attached respondents will be more likely to adopt cognitive coping options if they perceive setting conditions to be closer to their attitudinal anchor or on the contrary, they will be more likely to adopt behavioral coping options if they feel setting conditions to be more distal.

Empirical evidence informing the valence of place attachment effect on coping options is minimal in the leisure literature. Korpela and his colleagues (2001) and Low and Altman (1992) indicated that people who have strong ties to a place usually visit their favorite places more frequently, stay there longer, and may be reluctant to leave for other settings. For example, Williams and others (1992) found that for users in four wilderness areas, high attachment to wilderness was associated with a lack of non-wilderness substitutes. These studies suggest that attached people are less likely to view resource substitution as an acceptable choice. Place attachment has also been found to be strongly correlated with setting experience (Moore & Graefe, 1994; Vorkinn & Reise, 2001; Bricker & Kerstetter, 2000; Havitz & Dimanche, 1997). Setting - related experiences afford recreationists with greater knowledge of activity and setting alternatives, but stronger preferences for only a select number of activity and setting alternatives (Havitz & Dimanche, 1997, 1999; Watson et al., 1991). This means that highly attached recreationists are likely to have wider latitude of rejection and be less tolerant of conditions disparate from their attitudinal anchor. Therefore, they tend to be

less inclined to perceive other settings or activities as viable alternatives (Ditton & Sutton, 2004; Hammitt et al., 2004; Halpenny, 2006; Schreyer, Lime, & Williams, 1984), rendering substitutions (i.e., temporal substitution, activity substitution, resource substitution) and absolute displacement less likely to be adopted. Instead, they would prefer employing cognitive coping strategies (i.e. rationalization) to reduce cognitive inconsistencies and associated stress with conditions encountered within the setting (Festinger, 1957; Heberlein & Shelby, 1977).

Informed by social judgment theory and empirical evidence, we hypothesized the effect of place attachment as follows.

H3. Place attachment moderates the effect of perceived crowding on the use of coping mechanisms.

H3a. For respondents who have a higher level of place attachment, the likelihood of adopting cognitive coping mechanisms would be higher than respondents who have lower place attachment.

The conceptual framework of the study is illustrated in Figure 5.

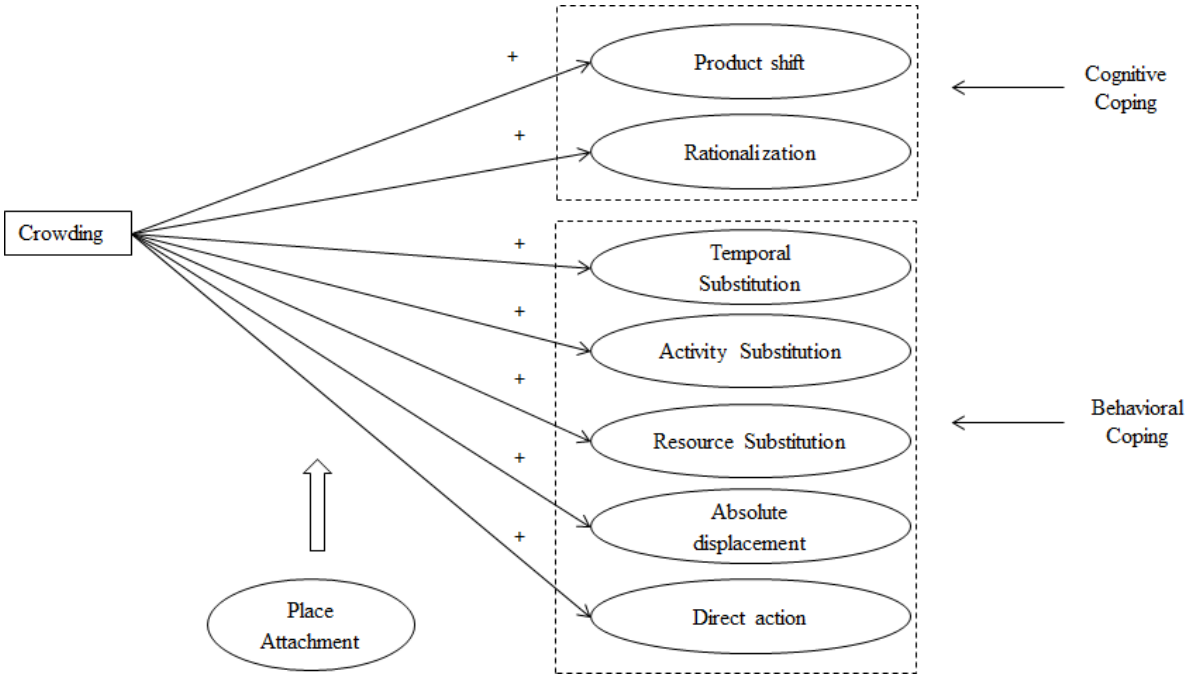

Figure 5. Conceptual framework of the moderating effect of place attachment on the relationship between crowding and coping

3.4. Data Collection

A mail-back/electronic survey was conducted with three different samples of boaters on Lake Austin and Lake Travis beginning from May 2008. The first sample was composed of public boat ramp users who responded to a prior onsite survey (conducted between May 25, 2008 and September 1, 2008) and agreed to participate in the follow-up survey (Lake Austin: 123; Lake Travis: 271). Based on Dillman's (2000) total design method, boaters who provided only an email address were sent a link directing them to a website to complete the questionnaire. Over the following month, five reminder emails were sent to non-respondents. For boaters with only postal addresses, a survey packet was sent. It included a cover letter describing the study, a survey instrument, and a reply

postage paid envelope. Two weeks following the initial mailing a reminder/thank you postcard was sent. A final survey packet was sent to non-respondents in early December 2008. These procedures yielded 220 completed surveys from boat ramp users across the two lakes (Lake Austin: 47; Lake Travis: 173) and 125 non-deliverables (Lake Austin: 57; Lake Travis: 68).

The second sample was composed of lakeshore property owners. Postal addresses of residents residing around each lake were extracted from the 2007 real estate property data (Travis County for Lake Austin, Travis and Burnet counties for Lake Travis). Arc/Info geographic information system (GIS) software was used to identify property parcels that contained single/multiple family dwellings adjacent to the lakes. GIS shape files with attribute tables including property ID, owner names, addresses, city, state, zip code, and state property tax board code were derived from the Central Appraisal District. To ensure that the identified property owners were with lakefront real estate, researchers used a 100'radius of the water boundary for Lake Austin and Lake Travis, respectively, to select lakefront property parcels. Non-single/multiple family dwellings (e.g., vacant lots, commercial, agricultural, etc.) were screened out. The total numbers of dwellings selected in the sampling plan was 978 from Travis County on Lake Austin and 1,500 were randomly selected from Travis and Burnet counties on Lake Travis.

The protocols for the distribution of mail surveys were also adapted from Dillman's (2000) mixed mode survey method. The identified residents were sent an initial letter in October 2008 informing them of the study and the opportunity to

complete the survey online or to have a hard copy sent to them. It was indicated in the letter that if they had not completed the survey online within a week of receiving this letter, a hard copy would be sent to them to be completed and returned in a postage-paid envelope. This initial screening letter also helped identify incorrect addresses (n = 43 for Lake Austin, n = 40 for Lake Travis). Two weeks following the mailing of the initial contact letter, a survey packet including another cover letter, survey instrument, and postage-paid reply envelope was sent to residents who had not completed the questionnaire online. After a month following the initial mailing, a reminder/thank you postcard was sent to all 918 (60 non-deliverables) residents on Lake Austin and 1,445 (55 non-deliverables) residents on Lake Travis. The procedures yielded 1,093 completed surveys (Lake Austin: 407; Lake Travis: 686).

The third sample is comprised of marina tenants. Residents of four marinas on Lake Austin and fourteen marinas on Lake Travis were contacted to participate in the survey. Owing to concerns expressed by some marina managers regarding the privacy of their tenants, several methods were employed to distribute the surveys:

1.A web link to the survey was sent to the marina manager who then forwarded this link to his/her tenants.

2.Hard copies of the survey, cover letter, and postage paid return envelopes were sent to the marina manager to distribute among their tenants.

Two marina managers passed along the tenant mailing list enabling researchers to distribute the survey using the Dillman (2000) protocols. In this instance, the tenants were sent an initial letter informing them of the study and the opportunity to complete

the survey online or to have a hard copy (including cover letter, survey instrument, and postage paid reply envelope) sent to them. We indicated in the letter that if they had not completed the survey online within a week, a hardcopy would be sent. Two weeks following the initial contact letter, a survey packet including another cover letter, survey instrument, and postage paid reply envelope were sent to residents who had not completed the online questionnaire. A month following the initial mailing, a reminder/thank you postcard was sent. A final survey pack was sent to non-respondents in December 2008. The procedures yielded 121 completed surveys for Lake Austin, and 423 for Lake Travis. The total number of completed surveys collected through the three samples was 1,857.

3.5. Measures

Perceived crowding. 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 boating condition out on the lake during your visits to Lake Austin/Travis for the 2008 season?" A response of 1 or 2 indicated not at all crowded, 3-4 slightly crowded, 5-7 moderately crowded, and 8-9 extremely crowded.

Coping. Coping was assessed by using 22 items adapted from Miller and McCool's (2003) scale investigating coping choices of visitors at Glacier National Park. Their coping checklist measured the two forms of coping strategies, behavioral and cognitive coping. Behavioral coping subsumed five categories of behaviors: temporal substitution, activity substitution, resource substitution, absolute displacement, and

direct action. Cognitive coping consisted of product shift and rationalization. Respondents were asked to rate the extent to which each statement described their responses to start, continue or increase their participation in recreational boating on Lake Austin/Travis in response to the obstacles they experienced. The Likert-type scale to measure each statement ranged from 1 (suggesting the statement "does not describe at all") to 5 (suggesting the statement "describes very well").

Place attachment. Five of the items developed by William and Roggenbuck (1999) were adapted to measure place attachment in the current context. Respondents were first asked "do you have a place or area on Lake Austin/ Travis that you consider special". If they answered yes, they were further instructed to rate the extent to which the items of place attachment described their feelings toward the lake ranging from 1 to 5, where 1 indicated "strongly disagree" and 5 "strongly agree".

A descriptive analysis of all the items of perceived crowding, coping and place attachment is presented in Table 5.

Table 5. Descriptives of measurement items

	M.	**S.D.**
Perceive crowding		
How would you describe the boating condition out on the lake during your visits to Lake Austin/Travis for the 2008 season?	5.19	2.06
Place attachment		
I feel my favorite place is a part of me.	3.52	1.04
I feel a strong sense of belonging to my favorite place.	3.60	1.03
I identify with my favorite place.	3.67	1.00
My favorite place is the best for activities I enjoy most.	4.08	.76
I can't imagine a better place for what I like.	3.67	.98

Table 5. Continued

Temporal substitution		
Decided that if I boated on Lake Austin/Travis in the future, I would boat at earlier and/or later times of the day	2.85	1.47
Decided that if I boated on Lake Austin/ Travis in the future, I would boat on weekdays rather than weekends	2.96	1.49
Realized that I could avoid the condition or situation in the future by boating on Lake Austin/Travis at a different time	2.94	1.43
Boated less or reduce boating frequency	2.25	1.38
Activity substitution		
Planned to do other things besides boating	2.19	1.25
Realized that doing some activity other than boating would allow me to avoid this obstacle	2.14	1.26
Felt frustrated and decided boating is no longer important to me	1.42	.89
Resource substitution		
Decided I would come back at the same time, but would boat at another area of Lake Austin/Travis	2.03	1.19
Avoid certain locations (i.e., coves, bays, dams, or marinas)	2.99	1.40
Boated on nearby lakes (e.g., Lake Austin/Travis, or Buchanan)	1.47	.10
Absolute displacement		
Planned not to return to Lake Austin/Travis	1.28	.75
Left the area all together	1.67	1.10
Direct action		
Talked with other members of my group or someone about how I was feeling	2.45	1.40
Decided to talk with lake authorities	1.73	1.08
Talked to someone who could do something concrete about the problem	1.68	1.02
Product shift		
Realized that the condition or situation I experienced was really suitable after all	2.43	1.13
Told myself it was unreasonable to expect that things should have been different at this location	2.34	1.23
Decided that the problem was a one-time occurrence	1.78	1.02
Decided that for this location, the condition or situation was what it should be	2.46	1.25
Rationalization		
Tried to view this condition or situation in a positive way	2.80	1.25
Told myself that there was nothing I could do about it, so I just enjoyed the experience for what it was	2.80	1.25
Told myself the condition or situation was actually a symptom of some larger problem	2.56	1.36

3.6. Data Analysis

The obtained data were processed with SPSS 21.0. Cases with missing values across all coping and place attachment items (n = 223) were removed, leaving a total of 1,560 cases for analysis. A t-test of perceived crowding scores between the removed and retained cases suggested that there was no significant difference (t = 1.421, p = .168). Missing data in the rest of the dataset were imputed through multiple imputation (MI) procedures in Lisrel 8.80 (Jöreskog & Sörbom, 2006) (percentage of missing values = 7.22%).

A confirmatory factor analysis (CFA) was initially performed in an attempt to confirm the factor structure proposed by Miller and McCool (2003). Assessment of model fit was based on χ^2 value, Root Mean Square Error of Approximation (RMSEA, Steiger, 2007), Comparative Fit Index (CFI, Bentler, 1990), Normed Fit Index (NFI, Bentler & Bonnett, 1980), and Non-Normed fit Index (NNFI, Bentler & Bonnett, 1980; Tucker & Lewis, 1973). The model fitted the data poorly (χ^2 = 2061.841; df = 68; RMSEA =.087; CFI =.892; NFI = .883; NNFI = .865). Hence, an exploratory factor analysis (EFA) on coping to explore its dimensionality was considered necessary before a CFA. The sample was randomly split into halves. With the first half of the sample, principal axis analyses with direct oblimin rotation and reliability assessments using Cronbach's alpha were undertaken to identify the dimensionality of coping. Subsequent analyses were conducted with the second half of the sample. CFA was used to confirm the factor structures of both coping and place attachment. Given the χ^2 value's sensitivity to sample sizes larger than 200 (Kline, 2011), the other indices have to be referenced. An

RMSEA value less than .08 indicates an acceptable model fit (Browne & Cudeck, 1993), and CFA, NFI, and NNFI values greater than .90 also indicate acceptable model fit (Bentler, 1990).

To test H1 and H2, a path model of crowding predicting all coping dimensions was tested with the pooled sample. To test H3, an invariance test of the regression paths (beta) was performed between high and low attachment groups. The median for the mean place attachment scores (Median = 3.80) was used to create the high and low attachment groups. Tests of equivalence in factor structure and factor loadings were conducted before the beta equivalence test.

3.7. Results

The profile of survey participants is summarized in Table 6. The high attachment group represents 51.5% (n = 804) of the sample. Respondents in the low attachment group represented 48.5% (n = 756) of the sample. According to results of chi-square tests, these two groups were not significantly different from each other regarding education, employment, race, or income. Their boating behaviors, including years they have spent boating, days they spent on the lakes during past twelve months, distance between the lakes and their primary residences, and years they owned the residences on the lakes did not vary significantly.

Table 6. Descriptive summary of participants

Socio-demographic and -economic	***Pooled sample***	***High attachment group***	***High attachment group***	
Education (%)				χ^2 = 9.19
9th to 12th grade (high school graduate)	3.1	4.4	1.8	
13-15 years (some college)	17.5	17.8	17.2	
16 years (college graduate)	31.3	31.0	31.7	
17+ years (some graduate work)	12.2	11.7	12.6	
Masters, Doctoral, or Professional degree	35.9	35.0	36.7	
Employment (%)				χ^2 = 11.32
Employed, Full time	64.8	67.7	61.8	
Retired, not working	17.1	17.3	18.0	
Retired, working part time	7.9	6.8	9.0	
Others	10.2	8.2	11.2	
Race (%)				χ^2 = 33.28
Native American or Alaskan native	2.0	2.5	1.6	
Asian	.6	.5	.7	
Hispanic	3.4	3.1	3.8	
African American	.2	.3	.4	
White	93.8	93.6	93.5	
Income (%)				χ^2 = 8.13
< $75,000	12.2	11.9	12.6	
$75,000 ~$199,999	46.8	49.3	43.8	
$200,000 - $299,999	17.1	15.0	19.5	
$300,000 or more	23.9	23.8	24.1	
Boating behavior (M., S.D.)				
How long have you been boating? (in years)	27.74(16.07)	28.32(15.74)	27.12(16.40)	*t* = -.46
How many days did you spend boating, on any lake, during the past 12 months?	36.60(36.56)	37.16(36.44)	36.00(36.70)	*t* = -.61
How far is this lake from your primary residence? (in miles)	25.23(79.48)	25.36(74.84)	25.09(84.16)	*t* = -.06

Table6. Continued

Socio-demographic and - economic	***Pooled sample***	***High attachment group***	***High attachment group***	
Boating behavior (M., S.D.)				
How long have you owned the residence on lake Austin/Travis? (in years)	14.73(12.26)	14.65(12.15)	14.82(12.39)	*t* = .21

Exploratory factor analysis (EFA) was performed on the first half of the random-split sample (*n* = 805) using the principal axis method with direct oblimin rotation of the items of coping (Table 7). Factors with Eigenvalues greater than one were retained. This procedure resulted in a four-factor solution. The Cronbach's alphas of factor-based scales were all above the generally agreed-on lower limit of .70 (Hair, Anderson, Tatham, & Black, 2002) except for that of the second factor, cognitive adjustment, which was .694. In particular, the cognitive adjustment factor included items from both product shift and rationalization.

Table 7. EFA of coping item: first-half of the sample

Factor	**M.**	**S.D.**	**Factor loading**	**Eigen value**	**Cronbach α**
Factor 1: Temporal substitution	2.89	1.25		3.407	.817
Realized that I could avoid the condition or situation in the future by boating on Lake Austin/Travis at a different time	2.90	1.42	.855		
Decided that if I boated on Lake Austin/ Travis in the future, I would boat on weekdays rather than weekends	2.97	1.49	.691		
Decided that if I boated on Lake Austin/Travis in the future, I would boat at earlier and/or later times of the day	2.81	1.48	.661		
Factor 2: Cognitive adjustment	2.36	.84		2.117	.694
Decided that for this location, the condition or situation was what it should be	2.41	1.24	.734		

Table7. Continued

Factor	M.	S.D.	Factor loading	Eigen value	Cronbach α
Factor 2: Cognitive adjustment					
Realized that the condition or situation I experienced was really suitable after all	2.44	1.13	.621		
Tried to view this condition or situation in a positive way	2.79	2.24	.579		
Decided that the problem was a one-time occurrence	1.78	1.02	.494		
Factor 3: Direct action	1.97	.97		1.751	.723
Decided to talk with lake authorities	1.70	1.04	.913		
Talked to someone who could do something concrete about the problem	1.77	1.15	.716		
Talked with other members of my group or someone about how I was feeling	2.43	1.40	.489		
Factor 4: Activity substitution	1.93	.92		1.192	.713
Realized that doing some activity other than boating would allow me to avoid this obstacle	2.14	1.26	.670		
Planned to do other things besides boating	2.19	1.25	.654		
Felt frustrated and decided boating is no longer important to me	1.42	.89	.626		

Principle axis extraction with direct oblimin rotation
When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Next, a confirmatory factor analysis (CFA) analysis was conducted on the identified four factors of coping with the second half of the sample (n = 755). The four factors were allowed to co-vary. Table 8 presents the CFA result of coping. The fit indices suggest an acceptable fit of the measurement model of coping to the sample data (χ^2 = 315.374; df = 59; RMSEA =.077; CFI =.936; NFI = .923; NNFI = .916).

Table 8. CFA of coping items: second-half of the sample

Dimensions and Items	M.	S.D.	Factor Loading	α	Composite Reliability
Factor 1: Temporal substitution	2.94	1.25		.823	.825
Realized that I could avoid the condition or situation in the future by boating on Lake Austin/Travis at a different time	2.98	1.44	.818***		
Decided that if I boated on Lake Austin/ Travis in the future, I would boat on weekdays rather than weekends	2.95	1.48	.792***		
Decided that if I boated on Lake Austin/Travis in the future, I would boat at earlier and/or later times of the day	2.89	1.45	.735***		
Factor 2: Cognitive adjustment	2.38	.87		.726	.728
Decided that for this location, the condition or situation was what it should be	2.52	1.26	.719***		
Realized that the condition or situation I experienced was really suitable after all	2.41	1.45	.647***		
Tried to view this condition or situation in a positive way	2.79	1.25	.673***		
Decided that the problem was a one-time occurrence	1.78	1.03	.483***		
Factor 3: Direct action	1.94	.89		.668	.722
Decided to talk with lake authorities	1.68	1.03	.879***		
Talked to someone who could do something concrete about the problem	1.66	1.00	.666***		
Talked with other members of my group or someone about how I was feeling	2.48	1.39	.469***		
Factor 4: Activity substitution	1.90	.91		.728	.738
Realized that doing some activity other than boating would allow me to avoid this obstacle	2.13	1.25	.816***		
Planned to do other things besides boating	2.16	1.22	.696***		
Felt frustrated and decided boating is no longer important to me	1.42	.87	.565***		

χ^2= 315.374(df = 59) with p = .000; RMSEA = .077, CFI= .936, NFI = .923, NNFI = .916
***p < .001

CFA analysis was also performed on place attachment items with the second half of the sample. The result is displayed in Table 9. Modification indices indicated that model fit could be significantly improved by permitting covariance between two error terms ("My favorite place is the best for activities I enjoy most." and "I can't imagine a better place for what I like.") ($\Delta\chi^2 = 51.733$; $\Delta df = 1$). Therefore, the model was respecified under the assumption that error among the items could be attributed to measurement concerns such as the similar language in the two items (Byrne, Shavelson, & Muthén, 1989). The measurement model of place attachment fit the data adequately ($\chi^2 = 24.343$; df = 4; RMSEA=0.079; CFI=0.994; NFI = .993; NNFI = .985) (see Table 5).

Table 9. CFA of place attachment Items: second-half of the sample

Dimensions and Items	**M.**	**S.D.**	**Factor Loading**	**Composite reliability**	**Cronbach's *α***
Place attachment	3.75	.82		.905	.902
I identify with my favorite place.	3.71	.99	.931***		
I feel a strong sense of belonging to my favorite place.	3.64	1.02	.974***		
I feel my favorite place is a part of me.	3.56	1.06	.933***		
My favorite place is the best for activities I enjoy most.	4.08	.78	.384***		
I can't imagine a better place for what I like.	3.72	.98	.724***		

Chi-square = 24.343 (df = 4) with p = .000; RMSEA = .079, CFI = .994, NFI =.993, NNFI = .985
***p < .001

Given the adequate fit of the measurement model of both coping and place attachment to the sample data, an estimation of a structural model between perceived crowding and coping mechanisms and an invariance test regarding place attachment were warranted to test the hypothesized relationships on the pooled sample. Results supported the factor structure (χ^2 = 659.279, *df* = 68; RMSEA =.075; CFI = .937; NFI = .930, NNFI = .916) and structural relationships between perceived crowding and coping mechanisms (χ^2 = 659.279, *df* = 68; RMSEA =.075; CFI = .937; NFI = .930, NNFI = .916) (see Table 10). Path coefficients are illustrated in Table 11. Respondents' perceptions of crowding had significant, positive relations with all the coping mechanisms with the exception of cognitive adjustment (β = -.268, p < .001). Therefore, H1 was partially supported. Additionally, perceived crowding had the strongest relation with temporal substitution and a weaker relation with cognitive coping. Therefore, H2 was partially supported.

Table 10. Fit indices that examined the hypothesized relationships between perceived crowding and coping mechanisms: pooled sample

	χ^2	df	RMSEA	CFI	NFI	NNFI
Measurement model	659.279	68	.075	.937	.930	.916
Structural model	659.279	68	.075	.937	.930	.916

Table 11. Path analysis of perceived crowding and coping: pooled sample

Path	β (SE)	R^2
Perceived crowding → Temporal substitution	.443*** (.032)	.196
Perceived crowding → Cognitive adjustment	-.268*** (.031)	.072
Perceived crowding → Direct action	.265*** (.029)	.070
Perceived crowding → Activity substitution	.434*** (.033)	.189

***p < .001

Table 12 and Table 13 summarize the results of the invariance test between the high attachment and low attachment groups. Results in Table 8 suggest that significant differences exist between the high and low attachment groups regarding the crowding-coping relationships ($\Delta df = 4$; $\Delta\chi^2 = 36.742$). Specifically, these two groups varied in the relationships between crowding and temporal substitution ($\Delta df = 1$; $\Delta\chi^2 = 15.490$), direct action ($\Delta df = 2$; $\Delta\chi^2 = 27.713$), and activity substitution ($\Delta df = 2$; $\Delta\chi^2 = 7.161$). For respondents who have a higher level of place attachment, the likelihood of adopting temporal substitution ($\beta = .513$, $p < .001$), direct action ($\beta = .391$, $p < .001$), or activity substitution ($\beta = .487$, $p < .001$) was higher than for respondents who have lower place attachment (temporal substitution: $\beta = .339$, $p < .001$; direct action: $\beta = .128$, $p < .01$; activity substitution: $\beta = .367$, $p < .001$). However, the likelihood of highly attached respondents adopting cognitive adjustment ($\beta = -.272$, $p < .001$) was not different from that for those who have lower place attachment ($\beta = -.272$, $p < .001$). Therefore, H3 was not supported.

Table 12. Group analysis perceived crowding and coping

	χ^2	df	Δdf	$\Delta\chi^2$	RMSEA	CFI	NFI	NNFI
Baseline(pooled sample)	659.279	68			.075	.937	.930	.916
PA high	417.374	68			.081	.941	.931	.922
PA low	326.402	68			.070	.927	.910	.902
H1:factor structure	743.776	136			.076	.936	.923	.914
H2: factor loading	793.619	150	14	49.843***	.075	.932	.918	.918
Final	760.493	148	12	16.717	.073	.935	.921	.921
H3: beta	797.235	152	4	36.742***	.074	.932	.918	.919
β_1	775.983	149	1	15.490***	.074	.934	.920	.919
β_2	760.861	149	1	.368	.073	.935	.921	.921

Table 12. Continued

	χ^2	df	Δdf	Δ χ^2	RMSEA	CFI	NFI	NNFI
β_3	788.206	150	2	27.713***	.074	.933	.918	.918
β_4	767.654	150	2	7.161*	.073	.935	.921	.921
Final	760.861	149			.073	.935	.921	.921

***p < .001; *p < .05

Table 13. Path analysis of perceived crowding and coping: by group

Path	β (SE)		R^2	
	PA High	PA Low	PA High	PA Low
Perceived crowding → Temporal substitution	.513***(.045)	.339***(.043)	.263	.115
Perceived crowding → Cognitive adjustment	-.272*** (.031)	-.272***(.031)	.074	.074
Perceived crowding → Direct action	.391*** (.042)	.128**(.040)	.153	.016
Perceived crowding → Activity substitution	.487*** (.046)	.367***(.045)	.237	.135

***p < .001; **p < .01

3.8. Discussion

The research findings contribute to the understanding of recreationists' adoption of specific coping strategies in response to perceived crowding in the context of recreational boating. As the level of perceived crowding increased, so did the likelihood of boaters' use of temporal substitution, direct action, and activity substitution. This finding is consistent with past coping studies in water-based activities and other recreational settings (e.g., Becker et al., 1981; Hammitt & Patterson, 1991; Robertson & Regula, 1994; Shelby & Vaske, 1991; Sutton & Ditton, 2005) illustrating that recreationists use a variety of behavioral coping behaviors, such as shifting the use to weekdays, avoiding spots with popular vistas, and recreating in an alternative

waterbody, to accommodate undesirable use levels. However, we found that boaters were less likely to employ cognitive coping strategies in response to increased crowding, which is contradictory to the results of most previous work (e.g., Shindler & Shelby, 1995; Shelby et al., 1988). Those earlier studies commonly observed that boaters used product shift by redefining their expectation for encounters with other boaters in reaction to encountering more people than expected. Nonetheless, in examining coping strategies with stress in recreational activities, Miller and McCool (2003) identified that respondents were less likely to employ cognitive adjustment strategies as stress levels increased. The negative association between crowding/stress and cognitive adjustment found in our study and Miller & McCool (2003) suggest that cognitive coping strategies were more likely to be associated with lower levels of crowding/stress.

In comparing the relative strength among the regression paths, we also found that boaters were most likely to use temporal substitution behaviors. A moderate level of perceived crowding was associated more with direct action and activity substitution. These observations were somewhat different from what Miller and McCool (2003) found, which suggested that more severe stress was associated with direct action and absolute displacement. Our findings could be a reflection of the profile of the sample. Most boaters who responded to our surveys live close to the lakes (average distance from the lake to their main residence: 25.23 miles) and have a fairly long history of boating on the lakes (average time boating on the lakes: 27.74 years). They may have greater awareness of peak use periods for the lakes and be able to better anticipate crowding conditions. Their experiences of living and boating in the area also afford them

knowledge in dealing with crowded situations by boating in different times of a day or a week or participating in other water-based activities instead. These boaters were also more inclined to take direct action. They are generally highly educated (median education level: college graduate) and affluent (median income level: $150,000~$199,999; 23.9% of them has income over $300,000). To them, direct action may not be as expensive or energy-consuming as it is thought to be (Miller & McCool, 2003).

Contrary to the hypothesis on the effect of place attachment, we found that high attached boaters and their less attached counterparts had no statistically significant difference in the crowding - cognitive adjustment relationship. Instead, highly attached boaters exhibited a higher tendency to adopt temporal substitution, direct action, and activity substitution. This finding may also be associated more with the characteristics of the sample than with the ineffectiveness of the social judgment framework for explaining respondents' selection of coping mechanisms. Respondents in our sample are akin to locals, the type of experienced recreationists who are familiar only with a particular setting (e.g., the lakes in our study context) and highly dependent on the setting for their desired recreational experiences (Schreyer et al., 1984). Locals are more ready to adjust how they use the resource (e.g., modifying the time they boat or the activities they do) rather than substituting the resource cognitively (e.g., changing the expectation of the setting density or redefining the experience supported by the setting). In other words, our sample is probably too limited in coping choices for us to adequately examine the overall use of coping mechanisms. A more mobile sample that comprises

recreationists less dependent on local resources such as veterans who are familiar with other similar settings (Schreyer et al., 1984) or tourists may help delineate how place attachment influences the crowding-coping relationship.

Our CFA analysis of the coping items adapted from Miller & McCool (2003) did not yield satisfactory fit-indices. The potential specification issue of cognitive coping mechanisms could be another reason that the CFA analysis of Miller and McCool's (2003) checklist failed. As in Miller and McCool (2003), the two cognitive coping strategies, product shift and rationalization, collapsed into one factor. This finding suggests we may need to consider reconceptualizing cognitive coping as unidimensional as opposed to dual-dimensional. Previous studies have illustrated the complexity of cognitive coping, especially rationalization. For example, Johnson and Dawson (2004) found that only a small number of wilderness hikers reported the use of rationalization to cope with crowding. They indicated that recreationists may employ rationalization subconsciously or in conjunction with product shift, which would be difficult to document even through qualitative methods. Moreover, Manning and Valliere's (2001) evidence of rationalization is largely conjectural. They postulated that recreationists had employed rationalization when they continued using the carriage roads of Acadia National Park as in the past but reported being just as satisfied despite increasing levels and diversity of use. The present definitions and measures of product shift and rationalization render it difficult to differentiate the two mechanisms from each other. Thus, future research may consider cognitive coping as a single coping mechanism.

Alternatively, revising the definition of rationalization by emphasizing cost-benefit tradeoffs made by recreationists may help identify this type of coping mechanism better.

This study examined the selection of mechanisms to cope with crowding and investigated the effect of place attachment on the crowding-coping relationship with data collected with boaters on two Texas lakes. The examination of the hypothesized relationships was constrained by measurement imperfection in second-hand data. First, the coping question asked respondents to indicate their response to obstacles in recreational boating rather than the crowding issue in specific. It is likely that coping mechanisms may be used in response to factors (e.g., conflict with other boaters, degraded environmental conditions etc.) other than crowding. Future studies of the crowding-coping relationship need to monitor the actual use of the resource to make sure that use levels are spatially and temporally related to the measure of coping mechanism (Johnson & Dawson, 2004). Second, beyond the misspecification issue, a closer examination of the coping checklist suggests that the operationalization of coping mechanisms may be another cause of the ill-fitted CFA model. To begin with, the coping question asking respondents to rate the extent to which each statement described their responses to start, continue, or increase their participation in recreational boating on Lake Austin/Travis could be confusing. The question itself is contradictory to what several options suggest. For example, to continue or increase participation in recreational boating on Lake Austin/Travis, absolute displacement would never be a viable option. Similarly, boating less, reducing boating frequency, or doing some activity other than boating is not consistent with starting, continuing, or increasing boating participation.

Next, the wording of several coping indicators is problematic. An activity substitution indicator, “felt frustrated and decided boating is no longer important to me”, was worded as if it were a cognitive coping strategy. Two of the direct action items, “decided to talk with lake authorities” and “talked to someone who could do something concrete about the problem” were so similarly worded that they may induce salient error covariance (Byrne et al., 1989). One of the items initially conceptualized as a temporal substitution option, “boated less or reduce boating frequency”, may cross-load on the activity substitution dimension. Lastly, since the samples from two lakes were analyzed as a pooled sample, a resource substitution option, “boated on nearby lakes, e.g., Lake Austin/Travis, or Buchanan, could be understood instead as an absolute displacement mechanism. Such measurement issues could have led to unacceptable fit-indices of a CFA model. Future studies on coping mechanisms with crowding should strive for more precise measurements to refine the coping checklist.

4. CONCLUSION

In this dissertation, I examined the crowding-satisfaction relationship in the context of recreational boating. Using the samples of boaters on Lake Austin and Lake Travis in central Texas, I addressed two research questions presented in Section 2 and 3. In Section 2, I conceptualized and tested a path model of crowding and satisfaction to help elucidate factors contributing to boaters' satisfaction with their experiences in the crowded setting condition. The variables tested in this model included expectations of encounters, setting density, perceptions of safety, enjoyment, and experience use history. In Section 3, drawing on the social judgment framework, I examined how place attachment influenced boaters' selection among various coping mechanisms in response to crowding.

4.1. Significance of the Research

My dissertation contributes to the current recreational crowding literature in a number of ways. First, the research presented in Section 2 improved the explained variance in satisfaction (14.1%). This is one step forward compared to earlier research, where less than 10% of variance explained in satisfaction was common (Manning, 2011). This study simultaneously tested the effects of setting density and perceived crowding on satisfaction. It is one of the few studies (e.g., Ditton et al., 1982; Tarrant et al., 1997) that have examined the social carrying framework in a complete manner. Consistent with past studies (e.g., Lee & Graefe, 2003; Shelby et al., 1983), this research

found that expectations of encounters was a much stronger predictor of perceived crowding and ultimate satisfaction than was setting density. This finding suggests that it is critical to communicate lake use level to recreationists using all possible tools (e.g., public radio, community newspapers, social media, and mobile apps) prior to their arrival. Furthermore, perceptions of safety and enjoyment were found to be significant mediators between perceived crowding and satisfaction. It suggests that: 1) Perceptions of safety arose from both setting density and behaviors of fellow recreationists (Gramann, 1982) and 2) People's emotion in recreational activities was a mediator between perceived crowding and satisfaction worthy of closer attention. This study did not find boaters' use experience history had any effect on the hypothesized paths probably due to the employment of coping mechanisms afforded by relatively long experiences of both regular and infrequent groups. Given the inconclusive findings in existing studies (Graefe et al., 1986; Arnberger & Haider, 2007; Hall & Shelby, 2000; Hammitt & Patterson, 1991), the investigation on the effect of past experience on perceptions of crowding should continue.

The framework tested in Section 3 of this dissertation expanded the previous work on coping in two major ways. To begin with, my research in this study analyzed recreationists' selections among possible coping mechanisms in response to different levels of perceived crowding. A great number of coping studies have focused on documenting the strategies people use to cope with stressors in various recreational settings (e.g., Williams et al., 1992; Johnson & Dawson, 2004). Only a few of them (Miller & McCool, 2003; Schuster et al., 2006) have examined how people would

choose among an array of coping options when the stress level varies. My results illustrated that boaters were more likely to use behavioral coping strategies than cognitive coping strategies when they perceived the crowding level to be higher. Second, this study examined the effect of place attachment on the crowding-coping relationship based on the tenets of the social judgment theory. Past search on coping has treated recreational settings as sets of facilities and activities that the settings can support; therefore, settings are interchangeable with others in that can provide similar facilities and activities. The study in Section 3 incorporated the idea that a recreational setting is an integrated place and tested how enduring emotional and affective meanings of recreation areas (Giuliani, 2013) influenced coping selection.

4.2. Limitations and Future Research

My dissertation contributes to a deeper understanding of recreational crowding. However, findings in this research should be interpreted with limitations in mind. The dissertation used second-hand data to test the proposed hypotheses. The sample mostly comprised residents nearby the lakes. Given the high dependence of boating activity on water resources, such a sample is representative of boaters. However, conclusions drawn from such a sample may not be generalized to a more mobile population of recreationists (e.g., hikers). Another aspect is that due to the measurement issue of the constructs, a rigorous testing of the theories was challenged. The most distinct example was the wording issue of coping mechanisms in the second study. The question was a double-barreled one that may have caused confusion. The wording of several behavioral coping

items made it ambiguous to decide on the coping dimension to which the item should belong. Improvements in the measurement of those constructs are desirable in future examinations.

To conclude my dissertation, I would like to highlight two primary directions that future research in recreational crowding can take. First, an examination of the crowing-coping-satisfaction relationship is warranted. Section 2 implied that coping might have played a critical role between crowding and satisfaction, and Section 3 illustrated how coping response was selected in response to different levels of crowding. An examination of the crowding-coping-satisfaction path will more fully reveal the significance of coping in the crowding-satisfaction relationship. Second, improvements of the coping measurement are needed. The results in Section 3 revealed a divergent factor structure of coping from what had been conceptualized. Additional empirical tests and reconceptualization are necessary to obtain a more reliable and valid measurement of coping.

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