

MODELING RECREATION PARTICIPANTS' WILLINGNESS TO SUBSTITUTE USING MULTI-ATTRIBUTE INDICATORS

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Abstract.— A logistic regression was used to predict anglers' resource-substitution decisions based on three dimensions of recreation specialization (behavior, skill and knowledge, and commitment), two dimensions of place attachment (place identity and place dependence), and three demographic indicators. Results indicated that place dependence was the most effective predictor. Also, boat ownership, level of activity importance, income, age, place identity, club membership, and gender were the next most effective predictors of willingness to substitute. Personal and behavioral commitment demonstrated different effects on willingness to make substitution decisions. Furthermore, male and higher income anglers showed a greater willingness to substitute.

1.0 INTRODUCTION

We used a logistic regression model of demographic characteristics, recreation specialization and place attachment to better understand resource substitution. Early resource substitution research focused on defining substitutable clusters or types of activities (Hendee & Burdge, 1974). Next, direct-question methods were used to describe and examine behavior choices made by recreationists (Shelby & Vaske, 1991). Recently, a transactional coping approach has been used to broaden the scope of substitutability research even further (Schuster et al., 2003). Cognitive (i.e., rationalization and product shift), and behavioral

(i.e., absolute displacement, temporal substitution, activity substitution, resource substitution, and direct action) coping mechanisms were identified by Schuster et al. To fully understand coping mechanisms, various elements and their attributes must be evaluated in combination.

2.0 VARIABLES AFFECTING WILLINGNESS TO SUBSTITUTE

Several variables are known to influence individuals' willingness to make resource substitutions. First, we would expect more specialized recreationists to have fewer substitutable alternatives available (Manfredo & Anderson, 1987). Second, the greater the attachment, the less likely an individual is to make a resource substitution (Williams et al., 1992). Third, people with different social and economic characteristics are affected differently by leisure constraints (Fedler & Ditton, 2001). Further understanding of resource substitution will clarify how people will react to constraints on their recreation behavior and demonstrate the benefit of using multi-attribute indicators.

2.1 Specialization

We expect specialized anglers to be less likely to identify other substitutable alternatives (Scott & Shafer, 2001). Salz et al. (2001) found that frequency of participation increases as specialization levels increase. They also found that more-specialized anglers were more interested in a qualitative overall experience, whereas less specialized anglers were most interested in the catch aspects of fishing.

While Scott and Shafer (2001) argued that recreational specialization involved skill development and the acquisition of knowledge and familiarity, they emphasized that these should not be confused with previous experience. As commitment to an activity

increases, susceptibility to other influences (e.g., participation in a new activity) decreases (Buchanan, 1985). Further, commitment may help provide a more comprehensive theoretical understanding of leisure and its influence on human behavior. This includes the personal and behavioral investments people make over time. Personal commitments include a strong affective attachment and “inner conviction that the activity is worth doing for its own sake” (Scott & Shafer, 2001). Personal commitment is likely to contribute to perceived self-determination because of the intrinsic rewards people accrue over time. With regard to behavioral commitment, Scott and Shafer (2001) suggested that behavioral commitment is associated with the “costs” of activity withdrawal as reflected in social ties to the activity. Examples of such investments include boat ownership and membership in a fishing club.

2.2 Place Attachment

Place attachment is conceptualized as the affective bond that associates individuals with a physical environment (Mesch & Manor, 1998; Milligan, 1998). Korpela (2001) indicated that resource users who have experienced a strong bond with resource places are reluctant to leave a “favorite” place for another. Willingness to substitute has been associated with lower place attachment scores (Williams et al., 1992). Place attachment is made up of place identity and place dependence (Williams & Roggenbuck, 1989). Place identity reflects the emotional aspect of the human-environment relationships (Williams et. al., 1992) while place dependence is the functional aspect (Stokols & Shumaker, 1981). In this paper, we sought to explore how individuals’ functional and emotional meanings connected to previous use of a setting influence their resource substitution decisionmaking.

2.3 Demographic Characteristics

Previous research suggests that anglers with lower incomes may be affected more by constraints related to the costs of fishing and are thus less likely to substitute. Likewise, age and gender have been found to be related to how constraints influence leisure behavior (Godbey, 1985). In addition, gender

influences on substitution decisionmaking are also a salient research topic due to the increasing fishing participation rates for females (Fedler & Ditton, 2001) and the potential for constraints on this group. The goal of this paper is to understand the multi-attributes of resource substitution using recreation specialization, place attachment and participants’ demographic characteristics.

3.0 METHODS

Data were derived from a 2005 statewide survey of 3,554 licensed anglers in Texas. Survey procedures followed a slightly modified version of those advocated by Dillman (1978). We did not include persons age 65 years and above as they were not included in this sampling frame. Completed surveys were received from 1,205 of the 3,554 license holders; 1,136 were returned usable for an effective response rate of 40 percent. A logistic regression method was used for nonresponse adjustment purposes (Fisher, 1996). The substitution question was only asked of freshwater anglers because of difficulties in identifying particular saltwater fishing sites compared to freshwater where water bodies are discrete. Thus, 683 freshwater records were used in the substitution data analysis.

3.1 Variables

3.1.1 Dependent variable: Resource Substitution

Substitution behavior was assessed by direct inquiry. A dichotomous YES/NO question was asked of anglers: “If you could not go fishing where you fish most often, is there another lake or water body that would provide you with the same fishing enjoyment and satisfaction at a similar cost?”

3.1.2 Independent variables

Predictors of substitution behavior included recreation specialization and demographics. A three-dimensional model (from Oh & Ditton, 2006) was used to determine level of recreation specialization. We used seven variables to represent the three dimensions of recreation specialization. They were: total fishing days in fresh water (TOTAL_DAY) for the *behavior*

dimension; a self-evaluation of skill (SKILL) and knowledge (KNOWLEDGE) for the *skill and knowledge dimension*; and, whether they own a boat (OWN_BOAT), the importance of fishing compared to other activities (IMPORTANT), whether they were a member of a fishing club or organization (CLUB), and three sub-commitment questions (COMMITMENT) for the *commitment dimension*. TOTAL_DAY was a sum of total days of fishing reported in all freshwater locations in the past 12 months. SKILL and KNOWLEDGE questions were three-level variables and asked as follows: “*how do you compare your fishing ability/knowledge to that of other freshwater anglers in general?*” OWN_BOAT and CLUB questions made use of dummy variables, scored 1 if *Yes*, 0 if *No*. IMPORTANT was ordinal, indicating the level of importance respondents attributed to fishing compared to other activities. It ranged from *just one of many* to their *most important* outdoor activity. COMMITMENT was an index variable incorporating three personal commitment variables used by Kim et al. (1997) (Cronbach’s alpha = .809). Next, we used seven items from Williams and Roggenbuck’s (1989) place attachment scale to measure place identity (Cronbach’s alpha = .883) and place dependence (Cronbach’s alpha = .803). Demographic variables used were age, gender, and household income. Household income was measured by 11 intervals from under \$10,000 to \$100,000 above.

3.2 Data Analysis

After data diagnostics, logistic regression was used to detect the effects of the independent variables on the odds of an angler having a substitute fishing location for where they fished most often. Interpretation of the fitted logistic regression model was based on the odds ratio, which is often used to describe the strength of effects (Hamilton, 1992). An odds ratio of greater than 1 indicates that the odds of substitution are a positive function of the independent variable whereas an odds ratio of less than 1 indicates that the odds of substitution are a negative function of the independent variable. The percent change in the odds ratios (Ω) is a useful way to interpret the effect of the 12 independent variables and is calculated as $(\Omega - 1) * 100$. To compare

the effects across independent variables, odds ratios were standardized on the X-variables and percent change was calculated as $(\Omega^*(x) - 1) * 100$.

4.0 RESULTS

Results of the logistic regression are displayed in Table 1. Of the three demographic variables tested, willingness to substitute was negatively related to age, positively related to household income, and greater for males than for females. For the specialization indicators, for anglers who own a boat, other things being equal, the odds of substitution increase by 33 percent; for anglers who are members of a fishing club or organization, other things being equal, the odds of substitution increase by 25 percent; for every additional increase in the level of importance of fishing compared to other activities, other things being equal, the odds of substitution increase by 11 percent.

For the place dependence dimension, for every additional increase in the level of place dependence, other things being equal, the odds of resource substitution decrease by 31 percent. For place identity dimensions, for every additional increase in the level of place identity, other things being equal, the odds of resource substitution decrease by 11 percent. When the effects of the two independent variables on resource substitution are compared, place dependence had a stronger effect ($\Omega^*(X) = -26.6$ percent) than place identity ($\Omega^*(X) = -8.8$ percent). In comparing the effect of selected independent variables on the dependent variable of substitution, the percent change in odds ratio standardized values indicated that place dependence, boat ownership, level of activity importance, income, age, place identity, club membership and gender were statistically significant independent. A Wald Test was used to check that the substitution logistic model was adequate.

5.0 DISCUSSION

Several resource substitution topics will be discussed involving recreation specialization, place attachment, and demographic characteristics. First, the analysis revealed that personal commitment and behavioral commitment work differently on willingness to

Table 1.—Results of the logistic regression analysis on willingness to substitute including: odds ratios (Ω), percent change and standardized odds ratios ($\Omega^*(X)$)

Variable	Coefficient	Std. deviation	z	P> z	Odds ratio Ω	Percent change in Ω	Percent change in $\Omega^*(X)$	X effect ranking
OWN_BOAT	.2878051	0.4955419	5.22	0.000*	1.333497	33.35%	15.33%	2
CLUB	.225592	0.3001672	2.32	0.020*	1.253064	25.31%	7.01%	7
LOG_TOTAL_DAY	.0354425	1.172335	1.45	0.146	1.036078	3.61%	4.24%	11
KNOWLEDGE	.0674655	0.6435239	1.05	0.294	1.069793	6.98%	4.44%	10
SKILL	.0740679	0.6465216	1.13	0.257	1.07688	7.69%	4.91%	9
COMMITMENT	-.0394555	0.8482048	-1.02	0.305	0.961313	-3.87%	-3.29%	12
PLACE IDENTITY	-.1125068	0.8177993	-2.12	0.034*	0.893591	-10.64%	-8.79%	6
PLACE DEPEND	-.3711237	0.8348881	-7.31	0.000*	0.689959	-31.00%	-26.64%	1
IMPORTANT	.1005324	1.260801	4.41	0.000*	1.105759	10.58%	13.51%	3
AGE	-.0082543	12.16695	-3.7	0.000*	0.99178	-0.82%	-9.56%	5
MALE	.1817608	0.357514	2.47	0.013*	1.199327	19.93%	6.71%	8
INCOME	.0415522	3.036341	4.55	0.000*	1.042428	4.24%	13.45%	4

*Indicates $p \leq 0.05$.

substitute. Behavioral commitments (i.e., club membership or boat ownership) generally increased the willingness to make resource substitutions while personal commitment was not a significant predictor of substitution. Sutton and Ditton (2005) similarly found that, notably, commitment was not a significant predictor of willingness to substitute another type of fishing. Behavioral commitment, rather than personal commitment, is more likely to contribute to a perception of diminished self-determination (Lee & Scott 2006). For example, anglers who purchased a powerboat or paid for a fishing club membership have substantial investments or “side bets” that contributes to maintaining their consistent recreation behavior. These side bet investments are emotional as well as financial (Ditton et al., 1992). Once significant amounts of money and time are invested, anglers are likely to fish more often and take more trips to other places. Thus, these investments not only keep them involved in fishing, but also increase their ability to fish elsewhere. This helps explain why anglers with powerboats or who are club members are more willing to make resource substitution decisions. Those without a behavioral commitment may choose freely to participate or not at locations other than where they fish most often. In conclusion, multidimensional approaches of commitment are more useful than

univariate measures for explaining resource substitution decisions.

Second, we found different survey design effects when a functional or emotional approach was used. As Bricker and Kerstetter (2000) noted, anglers who are highly experienced and knowledgeable are less likely to be dependent on one specific water body. They are more likely to have a repertoire of substitute water bodies and thus be less dependent on or rooted to any one particular place. Our results were unexpected, however, in light of Bricker and Kerstetter’s inference that anglers’ past experience, and level of knowledge and skill were significant predictors of resource substitution. This may have been due to how recreational settings were characterized in the survey questions. We asked for a broad, sweeping impression of alternative fishing sites (functional approach) instead of inquiring about specific recreation setting (emotional approach). Thus, we found place dependence and place identity were effective predictors for modeling resource substitution when a functional approach was used. Moreover, place dependence (functional attachment) is associated with the area’s physical characteristics and can increase when the resource is close by allowing for frequent visitation (Vaske & Kobrin, 2001).

Third, our results partially supported previous research on the importance of demographic characteristics on substitution decision making. While Ditton and Sutton (2004) reported that only age and education level contributed significantly to willingness to substitute other activities for recreational fishing, we found additional significant demographic variables. Our results reiterated those of Christensen and Yoesting (1977), in which the older adults were less willing to substitute the relatively few activities they participated in for other activities. Also, as reported previously by Fedler and Ditton (2001), anglers with more income were less constrained in leisure and thus more willing to make a substitution. Finally, our result examining gender and substitution supported previous findings by Ditton and Sutton (2004) that female anglers were less willing than male anglers to make substitutions.

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