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Using Recreation Specialization to Understand Conservation Support

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Abstract

Previous empirical research has not provided definitive support for an association between participation in outdoor recreation activities and conservation attitudes and behaviors. This paper explored the relationships that construct recreationists' conservation behaviors in the context of recreational fishing. Study objectives were to investigate relationships of recreation specialization and personal motivations and attitudes that mediate conservation attitudes and behaviors; and explore causal connections between conservation attitudes and behaviors. Analyses generally supported the theoretical propositions in the model. Recreation specialization and the other concepts taken together appeared to provide insights to understanding patterns of conservation attitudes and behaviors. By knowing the causal relationships explaining conservation attitudes and behaviors, managers can better understand the extent of anglers' support for various conservation measures.

KEYWORDS: *Conservation attitudes and behaviors, recreation specialization, experience preferences, consumptive orientation, recreational fishing*

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Since Dunlap and Heffernan (1975) first explored the proposition of whether participation in outdoor recreation activities leads to increased environmental concerns and behaviors, others have also examined the relationship (e.g., Theodori, Luloff, & Willits, 1998; Van Liere & Noe, 1981). Except for a few (e.g., Jackson, 1986; Thapa & Graefe, 2003), however, empirical research has not provided definitive support for an association between outdoor recreation participation and conservation attitudes and behaviors.

Three main factors are commonly suggested for these inconsistent findings. First, the conceptual framework of aggregate recreational activities classified simply as appreciative and consumptive (Dunlap & Heffernan, 1975) may not facilitate an understanding the heterogeneity of recreationists' conservation attitudes and behaviors (Tarrant & Green, 1999; Theodori et al., 1998). Such a simple classification likely fails to consider the extent of resource consumptiveness associated with particular recreational activities (Theodori et al., 1998).

Second, recreationists' within-group diversity such as socioeconomic or recreation specialization differences has usually been disregarded in previous studies (Tarrant & Green, 1999; Van Liere & Noe, 1981). Findings regarding the relationship between specialization and environmental concerns have indicated strong support for a relationship of increasing concerns for resource conservation by specialization level (e.g., Kauffman, 1984). Accordingly, more specialized recreationists are more aware of their own resource impacts and, subsequently, are likely to be more concerned with reducing adverse user impacts on natural resources (Ditton, Loomis, & Choi, 1992; Fisher, 1997). An examination based on a conventional assumption that recreationists are a homogenous group will not adequately reflect the effects of within-group diversity on a heterogeneous array of conservation issues.

Third, maintenance of the same measurement level of specificity or generality for both attitudes and behaviors has often been overlooked (Fishbein & Ajzen, 1975; Wall, 1995). Thus, general attitudes toward the environment used often in studies may not be compatible with particular behaviors because they do not predict the diverse aspects of particular behaviors. Therefore, it is recommended that "to find variation in environmental attitudes and to discover how attitudes are related to environmental problems, studies of attitudes needed to focus on public reactions to local and specific environmental issues" (Wall, 1995, p. 298).

Consequently, it is probably best to explore the relationships that help foster recreationists' conservation behaviors in the context of a single recreation activity (fishing, in this paper), which has been typically considered a consumptive form of recreation. Assessment in this context was chosen because it is presumably even more imperative in light of previously inconsistent findings. Although previous studies (e.g., Jackson, 1986; Thapa & Graefe, 2003) have supported the hypothesis that anglers were less involved in conservation orientations than other nonconsumptive activities, other studies (e.g., Van Liere & Noe, 1981) provided only weak or no support for the hypothesis. In contrast, Theodori et al. (1998) found a higher association between fishing and conservation behaviors than with other nonconsumptive activities (e.g., picnicking and mountain biking) and conservation behaviors.

Another important element in the paper is the inclusion of recreationists' diversity, based on the extent to which they have been socialized into fishing (e.g., level of

recreation specialization). Previous specialization studies indicated that sub-groups of anglers, for example, vary in terms of behavior, experience, skill and the importance of an activity (e.g., Ditton et al., 1992). Thus, an integration of recreation specialization and conservation attitudes and behavior needs to be modeled in an interconnected causal manner. This causal model is beneficial in that other explanatory elements (e.g., experience preferences, consumptive orientation) explained by recreation specialization, but often tested separately, can also be incorporated.

Recently, structural equation modeling (SEM) has been used increasingly for understanding causal mechanisms in outdoor recreation and leisure studies. SEM allows researchers to examine a set of causal relationships with multiple independent and dependent variables or factors (Bollen, 1989). This approach is well suited here because various dependent variables used to understand recreation specialization can be included as endogenous factors for testing the causal mechanisms of recreationists' development of conservation attitudes and behaviors. The objectives of this study were to: (1) understand the conservation attitudes and behaviors of recreational anglers using multiple dimensional concepts; (2) investigate relationships of recreation specialization and motivations and attitudes that mediate conservation attitudes and behaviors in a multivariate manner; and, (3) explore causal connections between conservation attitudes and conservation-oriented behaviors.

Literature Review

This section provides theoretical perspectives for the following concepts used in the model to examine the causal process of conservation attitudes and behaviors: recreation specialization, experience preferences, consumptive orientation, and conservation attitudes and behaviors.

Recreation Specialization

Recreation specialization provides a general framework for understanding anglers' attitudinal and behavioral differences in natural resources conservation. Bryan (1977) proposed the concept of recreation specialization as a means of identifying and segmenting anglers' within-group diversity in a single recreational activity. Bryan's inductive reasoning (1977) helped him to define recreation specialization as "a continuum of behavior from the general to the particular reflected by equipment and skills used in the sport and activity setting preferences" (p.175).

Even with extensive study of recreation specialization over the last 30 years, there has been little agreement as to definition and measurement. Without getting into these issues here in detail (see Ditton et al. [1992] and Scott and Shafer [2001] for more), the use of three dimensions of recreation specialization, namely, behavior, skill and knowledge and commitment as proposed by McIntyre and Pigram (1992), and Scott and Shafer (2001) appears to have strong support recently from various empirical studies (e.g., Oh & Ditton, 2006). In general, as the behavioral dimension of specialization increases, so do the skill and knowledge and commitment dimensions. In this way, the specialization framework shows iterative circularity in mutually reinforcing each measure, "in that development in one enhances the likelihood of reciprocal increase in the other" (McIntyre & Pigram, 1992, p. 4).

As level of angler specialization increases along a continuum in fishing, there are focus shifts from fish consumption to resource conservation and more emphasis on the activity's nature and settings (Bryan, 1977; Ditton et al., 1992). As anglers become more socialized into fishing and more dependent on particular resources for the types of fishing they pursue (Ditton et al., 1992), they likely become more perceptive of natural resource disturbances and loss than their low specialization counterparts. Consequently, high specialization anglers have a more comprehensive view of natural resources and the need for attentive management (Oh & Ditton, 2006). The understanding and acceptance of management restrictions as well as the assignment of a higher value to particular natural resources are also hypothesized as closely connected to recreationists' concerns for resource conservation. Previous studies have generally revealed an increasing concern for resource conservation consistent with increased specialization level (e.g., Virden & Schreyer, 1988).

Accordingly, it is expected that in an interconnected causal framework, level of recreation specialization has direct and indirect causal influences on intermediate concepts (i.e., experience preference, consumptive orientation) and, ultimately, conservation concerns. These conservation concerns include ascribing high benefit valuation of natural resources and support for management regulations. Finally, recreation specialization should positively affect conservation behaviors such as support for various natural resources management measures.

Activity Specific and Activity General Experience Preferences

Recreationists' experience preferences can best be understood in terms of the multiple satisfaction approach (Hendee, 1974). As Fedler and Ditton (1986) have indicated, fishing participation involves many other dimensions besides catching fish such as attaining general outdoor experiences and escaping life's routine. In conjunction with the diversity of benefits typically sought from fishing, most previous research indicated a low importance rating for catching and keeping fish vis-à-vis other benefits sought.

The theory of recreation specialization suggests a focus shift from activity-specific experience preferences to activity-general experience preferences as level of specialization increases (Ditton et al., 1992). In other words, high specialization anglers are more likely than low specialization anglers to attach high importance to more general fishing experiences while placing low importance on activity-specific experience preferences. Thus, previous studies have focused mostly on exploring the existence of the positive or negative relationship between the level of specialization and these motivation measures (e.g., Fisher, 1997).

However, this reasoning may be insufficient to capture the extent of association between level of specialization and these two types of experience preferences. High specialization anglers who attach more importance to activity-general experience preferences may not also attach low importance to activity-specific experience preferences. For example, as Finn and Loomis (2001) showed, the importance of catching fish (activity-specific) and non-catch motives (activity-general) are rather highly dependent on previous success in catching fish. Accordingly, by expanding the interactive relationships between recreation specialization and activity-specific and activity-general experience preferences and between activity-specific and activity-general experience

preferences, other complex causal effects not previously seen can be incorporated to explain conservation attitudes and behaviors.

Consumptive Orientation

Consumptive orientation is defined as "the degree to which an angler values the catch-related outcomes of the angling experience" (Sutton & Ditton, 2001, p.52). Anglers at different levels of recreation specialization place different importance on catching and keeping fish. Due to the common nature of the two domains (i.e., consumptive orientation and activity-specific elements), consumptive orientation is not well differentiated from *activity-specific* elements. Some previous studies have actually used activity-specific items for purposes of segmentation by consumptive orientation (Fedler & Ditton, 1986).

Consumptive orientation towards catching fish, however, is viewed instead as an attitudinal rather than motivational domain (Graefe, 1980). Although angler motivations are understood as predictable outcomes of a fishing experience, attitudinal dimensions of consumptive orientation would likely include an angler's overall orientation towards fishery resources (Graefe, 1980). Further, anglers' decisions upon harvesting fish are also affected by various motivational factors as well as the angling catch rate of others, angling effort and social normative pressures (Finn & Loomis, 2001; Hunt, Haider, & Armstrong, 2002). Accordingly, it is logical that consumptive orientation is used as an independent element partially explained by angler motivations.

Anglers who attach lower importance to activity-specific measures and higher importance to activity-general measures are likely to have more satisfying fishing experiences despite low catch rates (Ditton et al., 1992; Sutton & Ditton, 2001). As anglers with a low consumptive orientation have positive attitudes towards conservation, they are more likely to give high importance to conservation-oriented behaviors such as management compliance and voluntary catch and release (Sutton & Ditton, 2001).

Conservation Attitudes and Behaviors

The bivariate associations between recreation specialization and conservation concerns have been examined previously for various recreational activities (e.g., Dyck, Schneider, Thompson, & Virden, 2003). In a recreation specialization context, previous studies of conservation concerns have employed various dependent variables such as level of management support (Salz et al., 2001), environmental preferences focused on specific activity settings (Virden & Schreyer, 1988), and concern for the environment in general (Dyck et al., 2003; Thapa & Graefe, 2003). However, according to Ajzen and Fishbein (1980), a lack of congruence or specificity in examining the relationships between attitudinal and behavioral measures can be problematic for participants in a single recreational activity. Congruence or specificity indicates that recreationists in a particular activity are more likely to be susceptible to environmental altercations where the activity is practiced (Tarrant & Green, 1999). Also, it has been suggested that associations were stronger between outdoor recreation activities and attitudes toward specific aspects of the environment necessary for participating in those activities than between outdoor recreation activities and attitudes toward more remote resources or environmental issues in general (Dunlap & Heffernan, 1975; Wall, 1995).

As a result, it is more credible to decode recreationists' conservation attitudes and behaviors in specific environmental settings in the context of a particular recreational activity (i.e., fishing) and according to their level of specialization.

Except for a few studies (e.g., McFarlane & Boxall, 1996), which used a basic manner of economic terms (e.g., willingness to donate to conservation), the concept of economic benefits has not been used previously as an attitudinal measure. Willingness-to-pay above trip costs (net WTP: WTP, hereafter) quantifies anglers' net benefits (or consumer surplus) derived from direct and indirect resource use values by consuming non-tradable fishing services (Huppert, 1983). Despite a dissenting view of WTP as a behavioral intention (e.g., Barro, Manfredo, Brown, & Peterson, 1996), it is more plausible that WTP be viewed as an attitudinal variable that influences behavioral intention or predicts real behaviors (Kahneman, Ritov, Jacovitz, & Grant, 1993). Furthermore, in modeling the causal chain towards conservation behaviors, WTP is affected by the indicators of personal norms and motivations as well as an awareness of the consequences. Kauffman (1984) added that "strong and specific economic interests of an affected group usually take precedence over solving an environmental problem" (p. 25). Collectively, economic implications as an attitudinal measure should be evaluated to understand the process of conservation attitudes.

Finally, the ultimate goal of conservation attitude studies has been to investigate the explanatory impacts of attitudes on conservation behaviors. Several studies have found causal connections between attitudes and behaviors at a weak or modest level (e.g., Theodori et al., 1998). Various reasons have been offered to explain why attitudes do not predict behaviors well (Tarrant & Green, 1999): (1) attitudinal and behavioral measures are often not made at the same level of specificity; (2) the two constructs are not appropriately measured; and, (3) the influence of external factors is not adequately taken into account. To resolve weaknesses (1) and (2) in this study, a compatible measurement of recreationists' conservation attitudes and behaviors is necessary; A multifaceted process is required for weakness (3). Newhouse (1990) identified diverse variables associated with conservation behaviors. Accordingly, while attitudes are deemed as one of the most influential factors, other variables such as locus of control, personal responsibility, and knowledge should also be considered. Because internal locus of control (i.e., an individual's perception of one's ability to create change through his or her own behavior) and personal responsibility (i.e., individual's feeling of duty or obligation) are closely related to other motivational and attitudinal constructs such as consumptive orientation, an integrated approach to capture other variables in the model of conservation behaviors was considered beneficial to incorporate these effects. An overall theoretical model based on the aforementioned concepts is presented in Figure 1.

This study seeks a more comprehensive understanding of the dynamic nature of conservation attitudes and behaviors and how various factors are intercorrelated in the model settings. To test the hypothesized set of relationships only instead of every possible causal relationship, the theoretical framework was constructed based on a sequential mental element process (e.g., Ajzen & Fishbein, 1980; Manfredo & Shelby, 1988) to understand social behavior (recreation specialization → experience preferences & consumptive orientation → conservation attitudes → conservation behaviors). Based on the theoretical frameworks described previously, it is hypothesized that (1)

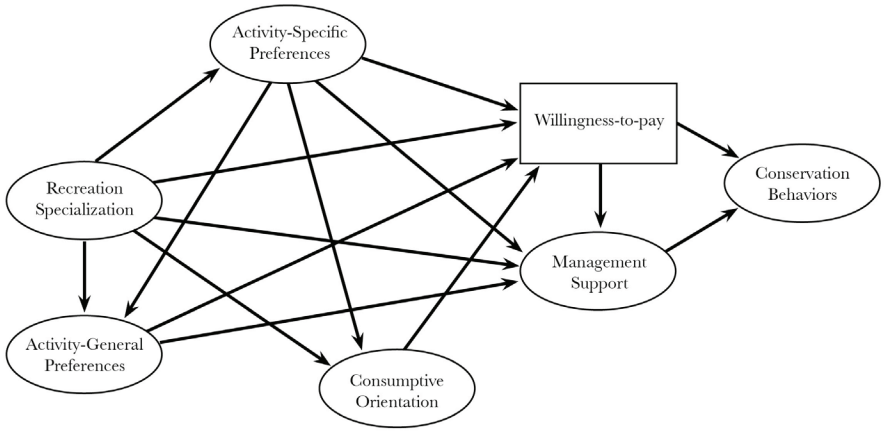

FIGURE 1. *Hypothesized relationships of the proposed model from recreation specialization to conservation behaviors*

recreation specialization will facilitate activity-general and activity- specific experience preferences as well as consumptive orientation and ultimately contribute to fostering conservation attitudes (H.1); (2) there will be a significant association between experience preferences and consumptive orientation, which jointly with recreation specialization contribute to explaining conservation attitudes (H.2); and (3) there will be a significant association between recreationists' economic benefits and management support (i.e., conservation attitudes collectively), which subsequently contribute to predicting conservation behaviors (H.3) (Figure 1).

Methods

Sampling

A two-step data collection approach was used to identify a group of anglers. The initial survey involved the completion of a mail survey of licensed Texas anglers, who were selected from about 1,500,000 residents who purchased fishing licenses in the 1997 fiscal year. From the initial survey, 4,052 anglers responded for an effective response rate of 50.4%, of which 2,073 (51%) indicated they fished in saltwater at least once during the previous twelve months. A follow-up survey was sent to these 2,073 saltwater anglers during spring of 2000; both surveys made use of the survey method advocated by Salant and Dillman (1994). When 124 non-deliverables were deleted from consideration, the 1,102 usable returns resulted in an effective response rate of 57%. Of the 1,102 respondents, 494 were deleted because they did not meet the criteria necessary for analyses such as entirely missing values in *at least one* of the sub-scales used in model estimation. The final data set included 608 responses after inserting mean values for other variables as needed to secure sufficient sample size. Caution should be exercised when generalizing survey results to the population level without

a check on non-response but it was not our goal to make generalizations about Texas anglers.

Data Analysis Procedures

Data were analyzed with SEM using SPSS and EQS (Bentler & Wu, 1995). Prior to using SEM to test the proposed model, Exploratory Factor Analysis (EFA) was conducted to reduce the number of variables in underlying constructs. When a precise linkage between the variables used and their latent constructs is not known or hypothesized, the EFA is an appropriate way to discover underlying structure. Consequently, the EFA was used to combine variables that were correlated but independent of other subsets of variables into the underlying constructs. The EFA, using the latent root criterion of 1.0 and a factor loading of 0.4 for a factor inclusion by a varimax rotation, was used to determine the number of sub-constructs. As a result, the composite score of each construct with multiple items was calculated and treated as an indicator variable to measure latent factors such as specialization and consumptive orientation. This procedure is useful for decreasing multicollinearity or error variance correlations among indicators and hence desirable in measurement model analysis (Bollen, 1989).

The next step was to test the overall structural equation model of relationships among latent factors. Using a two-step modeling approach is beneficial because a constructed measurement model shows the confirmation of acceptable fit to the data and provides a confirmatory assessment of validity (Anderson & Gerbing, 1988). The SEM process begins with the use of confirmatory factor analysis to evaluate and re-specify an acceptable measurement model (Hatcher, 1994). The Confirmatory Factor Analysis (CFA) of the measurement model specifies the posited links between the latent variables and their observed measures. Once the measurement showed an acceptable fit, the structural model with the specification of causal relationships between the latent variables was tested. The nomological validity of a theoretical model can be tested by performing a chi-square difference test in which the theoretical model is compared to the measurement model. A finding of no significant difference indicates the theoretical model is successful in accounting for the observed relationships between the latent constructs (Anderson & Gerbing, 1988).

Variable Measurement

Specialization was measured using a three dimensional model suggested by McIntyre and Pigram (1992) and Scott and Shafer (2001): *behavior*, *skill and knowledge*, and *commitment*. Two items, total number of days fishing in salt water in the last 12 months and total number of days fishing in the last 12 months, were used for the behavioral dimension. To represent the skill and knowledge dimension, three items of fishing skill and knowledge level were used: Anglers were asked to compare their saltwater fishing skills to that of other anglers; general fishing ability to that of other anglers; and a level of skill constraint to fishing participation. Four items were used to measure the level of the commitment dimension based on their level of coping with constraints to fishing participation: "my family or friends don't want to fish with me more often", "other leisure activities take up my time", "it is difficult to find others to fish with",

and "my friends don't fish much". For directional consistency, commitment items were reversely coded. The result of the CFA used to test theorized latent specialization process confirmed the three-dimensional approach and the Cronbach's alpha reliabilities were computed at all above 0.60 (0.95 for the behavioral dimension, 0.82 for skill and knowledge, and 0.72 for commitment).

Experience preferences were operationalized using 18 scale items, developed originally by Driver and associates (e.g., Driver & Knopf, 1976) to measure the importance of activity-general benefits in recreational pursuits. In addition, a number of items were added to measure activity-specific benefits, as developed for angler research (Fedler & Ditton, 1986). Each used a 5-point Likert scale ranging from not at all important (1) to extremely important (5). The scale has four subscales: *interacting with fish* (e.g., "for the fun of catching fish") and *achievement* (e.g., "to win a trophy fish") for *activity-specific* benefits; *being in a natural environment* (e.g., "to be outdoors") and *escaping individual stressors* (e.g., "for relaxation") for *activity-general* benefits. The results of the EFA used to group variables that were correlated indicated these four constructs and scale reliabilities were all satisfactory between 0.63 and 0.80.

Consumptive orientation was measured using a scale, as modified in Anderson, Ditton and Hunt (2007) from Graefe's original scale (1980). Each item was measured on a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5). This scale was designed to measure four subscales of consumptive orientation: *catching something* (e.g., "if I thought I wouldn't catch any fish, I wouldn't go fishing"); *catching a trophy fish* (e.g., "the bigger the fish I catch, the better the fishing trip"); *keeping fish* (e.g., "I usually eat the fish I catch"); and, *number of fish caught* (e.g., "the more fish I catch, the happier I am"). The scale reliabilities between 0.68 and 0.76 were satisfactory, and the EFA confirmed these four sub-constructs.

Management support was conceptualized as an angler's evaluation of or belief statement about management rules and regulation and was measured by asking respondents whether they supported or opposed various management tools. The scale had 11 items, measured on a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5), and delivered two different subscales, *catch-related regulations* (e.g., minimum size limit) and *general fishing regulations* (e.g., closed season) based on the EFA. The scale reliabilities were 0.79 and 0.80, respectively.

Resource valuation was measured using a contingent valuation technique with the *closed-ended* (or referendum) format. Respondents were asked the following contingent valuation question: "If the prices of goods and services were to *increase*, causing this typical trip to cost $___ *more* than this trip (refer to the total cost of this trip), would you cancel this trip?" For the economic valuation, 17 bid values ranging from $5 to $165 were randomly inserted to elicit a YES/ NO response. This question measured WTP in excess of trip costs or consumer's surplus associated with the fishing experience. The logistical regression model was used to estimate WTP with four explanatory variables of income, gender, satisfaction level of fishing experience, and number of years fishing in saltwater (See Oh [2005] for more detailed results). The estimated mean WTP value was $109 per trip.

Conservation behaviors were measured by making inquiries about specific conservation-oriented behaviors such as their compliance with fishing rules and regulations in the context of recreational fishing. However, due to a concern that these self-reports

might be biased and/or less reliable and our inability to ask questions that might reveal lawbreaking and put respondents in jeopardy (Manfredo & Shelby, 1988), scale items were asked in the context of actions of their closest fishing companions or social circle. The goal was to use the behavior of their fishing companions as a proxy for their own behavior (Burch, 1969). The scale, measured on a 5-point Likert scale ranging from never (1) to always (5), had three subscales: *voluntary support* (e.g., "they exceed their daily bag limits"); *abiding by the rules* (e.g., "they abide by Texas Parks and Wildlife licensing requirements when fishing saltwater"); and *catch-and-release practice* (e.g., "they voluntarily practice catch and release"). For directional consistency, the voluntary support subscale was reverse coded. Scale reliabilities were 0.67, 0.48 and 0.53 for the three subscales, respectively.

Subscale scores were computed by summing scores for individual items based on these results for the further SEM analysis. The summation was performed to reduce the number of variables in each factor and, consequently, was included as an indicator in further analyses. (Since detailed results could not be reported here, see Oh [2005] for additional information).

Results

The final data set for the SEM analysis included 608 anglers. Briefly, most (85%) respondents were male with a mean age of 44. Most (52%) had an earned household income of more than $70,000, followed by 36% between $40,000 and $69,999. Most (84%) were Anglo, followed by 12% Hispanic and 2% African American. On average, respondents had fished in salt water for 25 years, and when asked to compare their fishing ability to other saltwater anglers, most (74%) indicated they were equally skilled or more skilled than other saltwater anglers.

Structural Equation Model Analysis

The relationships between the latent factors and the manifest indicator variables that measured those factors are depicted in the measurement model (Hatcher, 1994). Although the measurement models tested were not identical after inserting the certain unidirectional causal relationships between latent factors in the structure model, the main principles are described in the Figure 1. Accordingly, since constructed measurement models did not show causal relationships among latent variables, the free correlations between latent factors were allocated and tested for the measurement models.

The initial measurement model was estimated using the maximum likelihood method. One indicator of *catch-and-release practice* was deleted due to a low alpha coefficient below 0.30[1]. As a result, a revised measurement model of seven latent factors with 14 indicators was derived for the CFA (Table 1). The fit indices of the measurement model indicated a good fit of the data (GFI = 0.96, CFI = 0.93, NFI = 0.89, RMSEA =0.05). Thus, the proposed model was tentatively accepted as the final measurment model. The highly significant t values for the coefficients ($p < .001$) provided evidence of the convergent validity of the indicators (Anderson & Gerbing, 1988). The construct reliabilities, comparable to Cronbach's alpha, which ranged from 0.52 to 0.75, were low but generally acceptable. In particular, the low internal consistency

[1] Due to the deletion of this indicator, conservation behavior was only partially measured in this study.

TABLE 1.
Properties of the final measurement model

Construct and Indicators	Standardized Loadings	*t-value*	Construct and Indicator Reliability
Specialization			0.52
Behavior	.44	8.27**	0.19
Skill / knowledge	.58	10.25**	0.34
Commitment	.53	9.26**	0.28
Activity-specific benefits			0.70
Interacting with fish	.74	18.58**	0.55
Achievement	.72	17.20**	0.52
Activity-general benefits			0.61
Being in a natural environment	.72	15.12**	0.52
Escaping individual stressors	.61	13.32**	0.37
Consumptive orientation			0.60
Catching something	.35	9.26**	0.12
Keeping fish	.71	9.92**	0.50
Catching a trophy fish	.64	10.65**	0.41
Number of fish caught	.37	9.63**	0.14
Management support			0.75
Catch-related regulations	.98	33.61**	0.96
General fishing regulations	.52	13.67**	0.27
Conservation behaviors			0.60
Voluntary support	.82	23.32**	0.67
Abiding by the rules	.47	10.10**	0.22

** Indicates statistical significance at the 0.001 level.

scores are not remarkable since non-scaled indicators were used (e.g., the specialization construct) or where indicators were generated from the transformation of individual items (i.e., summation of individual items in consumptive orientation) (Hatcher, 1994). Because the overall evaluation of this measurement model appeared satisfactory, the model was generally accepted as the "final" measurement model for moving on to specifying the proposed theorectical model.

An initial path model with causal relationships between latent factors was conducted against the postulated model in Figure 1. The overall fit of the model was good (GFI = 0.96, CFI = 0.92, NFI = 0.88, RMSEA = 0.05). To test the nomological validity of a theoretical model compared to the measurement model, a chi-squre difference test was performed. When the chi-square for the theoretical model was subtracted from the chi-square for the measurement model the resulting difference value was 24.2. The critical value with $df = 5$ at $p < 0.001$ is 20.5; thus, this chi-square difference was significant. This showed that the theoretical model was unsucessful in accounting

for the relationships between the latent variables and that this model did not provide an acceptable fit to the data.

For a specification search process of modifying models, it was less risky to drop insignificant parameters than to add new ones (Bentler & Chou, 1987). Consequenlty, we sought to identify parameters that could be dropped without significantly impairing the model's fit. A Wald test suggested three paths be deleted, namely: from recreation specialization to consumptive orientation, from activity general experience preferences to management support, and from management support to conservation behaviors. The revised model was re-estimated after deleting these and the overall goodness of fit indices were acceptable, with GFI, CFI and NFI values in excess of or close to 0.9 and RMSEA below 0.06 (GFI = 0.96, CFI = 0.92, NFI = 0.88, RMSEA = 0.05). When the revised model did not provide a significantly worse fit to the initial theoretical model, the revised model was further compared to the measurement model. The chi-square difference was 26.0, which was less than a critical value of 26.1 ($df = 8$) at $p < 0.001$. The non-signifcant chi-square indicated that the causal relationships described in the revised model were succesful in accounting for the observed relationships between latent constructs (Hatcher, 1994).

Results of Latent Variables Regression

Based on the revised path model, the standardized coefficents and *t*-values for each path are presented in Figure 2. In general, the results indicated relatively strong support for the positive effects of recreation specialization on conservation attitudes and, consequently, on conservation behaviors. Overall, the proposed three hypotheses were generally supported. As expected, recreation specialization had a strong positive influence on activity-general experience preferences ($\beta = 0.29$, $t = 4.65$) (H.1). The positive coefficient ($\beta = 0.21$, $t = 4.23$, $R^2 = 0.05$) from specialization to activity-specific experience preferences, however, was not expected and could be different from what was expected from theory (H.1). In light of activity-specific experience preferences positively influencing activity-general experience preferences ($\beta = 0.45$, $t = 7.33$), the previous positive relationship, however, was not totally unexpected.

For the regression on activity-general experience preferences, the explanatory power of the model was relatively high ($R^2 = 0.34$). Consumptive orientation was postively affected by activity specific experience preferences ($\beta = 0.49$, $t = 5.49$, $R^2 = 0.24$). As expected, when management support was the dependent variable, there was negative influence from consumptive orientation ($\beta = -0.76$, $t = -4.66$) as well as positive effects of recreation specialization ($\beta = 0.22$, $t = 4.17$), activity-specific experience preferences ($\beta = 0.36$, $t = 4.30$), and resource valuation ($\beta = 0.16$, $t = 3.38$), on managemenet support ($R^2 = 0.55$) (H.2). Furthermore, in contrast with the negative effects of activity-specific experience preferences ($\beta = -0.08$, $t = -1.64$), and consumptive orientation ($\beta = -0.09$, $t = -1.57$) despite its lack of significance at the 0.05 signficance level, only recreation specialization ($\beta = 0.20$, $t = 3.11$) was positively related in the regression to resource valuation ($R^2 = 0.05$) (H.2). Finally, conservation behaviors were only positively influenced by resource valuation (WTP) ($\beta = 0.14$, $t = 2.79$, $R^2 = 0.02$) (H.3).

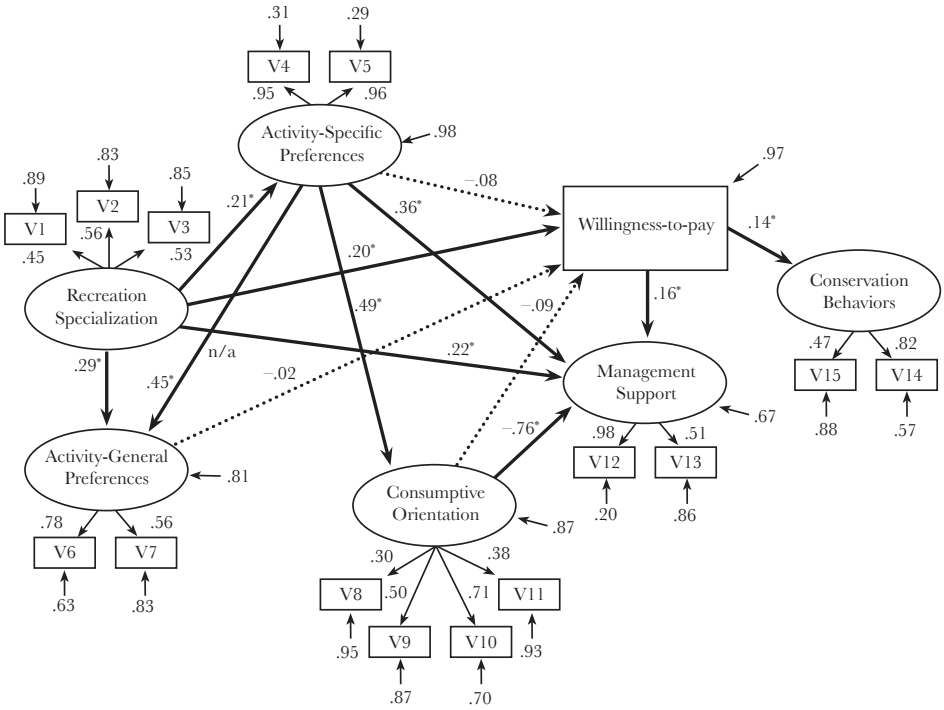

FIGURE 2. *Final structural model from recreation specialization to conservation behaviors*

Solid lines indicate paths that were significant at the 0.05 level.
Dotted lines indicate paths that were not significant at the 0.05 level.

Discussion

The purpose of the study was to examine the integrated causal relationships of anglers' conservation attitudes and behaviors, using recreation specialization as a starting point. With well-grounded conceptual development and empirical support since its initiation, recreation specialization provides an overall structure including other accrued constructs, leading to an explanation of effects on conservation attitudes and behaviors. Accordingly, experience preferences and consumptive orientation were used as mediating causal factors between specialization and conservation attitudes and behaviors in an effort to extend the theoretical propositions in the causal manner. While previous studies have paid attention to segmenting recreationists into managerially relevant groups by specialization level (e.g., Virden & Schreyer, 1988; Salz et al., 2001), none have heretofore investigated the integrated causal relationships with various other constructs to explain the formation process of conservation attitudes and behaviors.

In contrast with studies that have used indexed items of conservation attitudes (e.g., Dyck et al., 2003), we incorporated the concept of economic valuation by mea-

suring WTP as a part of attitudes toward resource conservation. It was reasoned that high specialization anglers were more willing to pay to ensure resources and experiences continue to remain available for their future use (Oh, Ditton, Anderson, Scott, & Stoll, 2005). Thus, higher WTP was understood as a higher level of conservation concern (Goulder & Kennedy, 1997). WTP measured using contingent valuation typically includes a variety of values such as use, nonuse, and option values[2] .While contingent economic valuation tools to measure WTP are usually flexible about measuring different values separately and/or jointly, our focus here was mainly to assess use value derived from angler participation and experiences. Thus, with regard to the conceptualization of conservation attitudes, it was reasoned that anglers who report higher WTP are more likely to support management-related regulations as a proxy for conservation behaviors, *ceteris paribus* (i.e., with all other factors remaining the same).

Overall, study results provided evidence that our empirical analysis generally supported the theoretical propositions of the model. Recreation specialization had a positive influence on activity-specific and activity-general experience preferences (H.1). WTP was also positively affected by recreation specialization (H.2). In addition to the paths from activity-specific experience preferences and WTP, recreation specialization was positively related to the management support construct, while the latter was negatively related to consumptive orientation (H.2). Finally, for attitudinal and behavioral relationships, only WTP was positively related to conservation behaviors (H.3). These important relationships are discussed further as follows.

First, recreation specialization was a principal factor in explaining activity-specific and activity-general experience preferences. Typically, a unidimensional approach has been used to test for an association between recreation specialization and experience preferences. However, the interactive relationships between these constructs were typically over-simplified by disregarding factors such as the *importance* of catch-related motives (Finn & Loomis, 2001) or other situational variables such as catch rate and angling effort (Hunt et al., 2002; Sutton & Ditton, 2001). Also, it is important to note that the positive relationship between activity-specific experience preferences and activity-general experience preferences would not have been found without a multivariate approach.

Second, WTP was positively affected by recreation specialization and was significantly related to the management support construct. According to Oh et al. (2005), anglers are likely to place a higher value on particular natural resources as they become more dependent on those resources (e.g., for the types of fishing they pursue). Thus, when high specialization anglers reported a higher WTP than low specialization anglers, a higher proportion of the WTP value (assessed value for amenities derived from the fishing experience) was allocated to resource conservation based on the reasonable assumption of a comparable increase of each particular value making up total value. Likewise, we expected high specialization anglers, who are likely more sensitive to resource disturbances associated with natural resource loss than low specialization anglers, to report higher WTP, and have a more holistic view of their physical surroundings as they relate to their particular activity (Oh et al., 2005). Thus, it was reasoned they should have a greater appreciation of and support for resource management

[2] There are different ways to decompose the total economic value (e.g., Freeman, 2003).

practices that seek to reduce adverse user impacts than less specialized recreationists (Ditton et al., 1992).

Third, activity-specific experience preferences were negatively related to WTP (although significant at the 0.1 level) but positively related to management support. Likewise, consumptive orientation was negatively related to management support. The finding of a negative association between activity-specific experience preferences and WTP and a positive association between activity-specific experience preferences and management support may look contradictory. However, this may be explained to some extent in that management support for diverse fishing regulations dealt more with micro-management issues of fishing activity whereas WTP assessed components of use and nonuse values, which likely included the more general environmental issues involved. Accordingly, anglers who attach more importance to activity-specific experience preferences were likely more sensitive to specific setting changes by management regulations than to more global issues of resource conservation as expressed in consumer surplus (WTP) terms.

Finally, WTP was positively related to conservation behaviors but management support was not significantly related to conservation behaviors. When examining the relationships between attitudinal and behavioral measures (Jackson, 1986; Tarrant & Green, 1999; Wall, 1995), consistent measures were used for recreation anglers and their fishing settings. If, as Ajzen and Fishbein (1980) suggested previously, behavior is a function of attitudes and norms, then the association between attitudes and behaviors in the context of recreational fishing was only partially supported. In contrast to the well developed concept, application, and interpretation of WTP (i.e., based on previous nonmarket valuation studies) (Freeman, 2003), management support may not manifest itself well in a way here. The scale we used perhaps failed to incorporate the diverse facets of conservation attitudes thoroughly enough. In the future, more valid and reliable scales need to be developed to tap into attitudinal measurement.

According to Nord, Luloff and Bridger (1998), there has been little research in natural areas since the early 1980s that examines the effects of outdoor recreation on environmentalism or conservation orientation. Such research is seen as crucial for good policy and practice. They further stated that "if outdoor recreation leads to increased environmentalism, then funding, promoting, and operating parks and outdoor recreation facilities and programs may be effective components of a strategy for protecting and improving the natural environment" (p. 236).

Study results have additional implications for resource management. By knowing how conservation attitudes and behaviors develop, managers can achieve a more predictive understanding of participants' support for management and other conservation issues. The tentative evidence that recreation specialization is a good causal indicator contributing to conservation attitudes and behaviors suggests that management regimes by specialization level may increase participant support for management while at the same time providing them with high quality recreation experiences (Fisher, 1997; Salz et al., 2001). Also, a different finding was noted for the positive relationship between recreation specialization and activity-specific experience preferences. Although previous research (e.g., Bryan, 1977; Ditton et al., 1992) indicated a focus shift from activity-specific to activity-general experience preferences as level of specialization increases, our findings suggest that anglers' motivational propensity toward

recreation fishing activity is a multifaceted function affected by situational variables (e.g., choice of location, species target), catch rates and angling effort, and previous catch success above and beyond the influence of recreation specialization (Finn & Loomis, 2001; Sutton & Ditton, 2001). Unlike with activity-general experience preferences, managers have a certain degree of control over activity-specific experience preferences (Fisher, 1997). For example, diverse management practices that affect anglers' expected rewards can be implemented to enhance fishing experience outcomes (Fisher, 1997). Additonally, WTP can provide a useful reference value of benefit measurement in policy decision-making. Because of the monetized value of consumer surplus, WTP values can provide an understanding of quantified benefits in support of efficient management decision-making (Oh, et al., 2005).

Several study limitations are worth noting. First, the analysis design used here did not allow us to gain insight to which particular specialization variables influenced conservation attitudes and behaviors the most (Kuentzel & McDonald, 1992). Second, this cross-sectional study failed to consider the developmental aspects of recreation specialization as well as the effects of recreation specialization on levels of conservation attitudes and behaviors. To determine when and if recreationists become more specialized in an activity over time (Ditton et al., 1992), a longitudinal design is needed to understand the effects of recreation specialization on sequential changes of recreationists' conservation attitudes and behaviors over time. Third, we implied single directional causal relationships due to the ordering of variables in relationships. However, these relationships were only supported by the data set used here and, thus were not conclusive (Bollen, 1989). Finally, study results were based on the results of a particular group of saltwater anglers and their fishing-specific attitudes and behavior. Application of the model to other angler samples as well as with additional attitudinal and behavioral measures besides those used here will assist with generalization of study findings. In particular, the use of comprehensive measures of conservation behavior is needed to test the conceptual model for generalization purposes.

In conclusion, recreation specialization and other accrued concepts of motivations and attitudes appear to offer added insight to understanding the fostering process of conservation attitudes and behaviors. Further investigation of the interrelationships in the model will extend our understanding of outdoor recreation activities and the programmatic efforts to enhance conservation and the sustainable use of the natural resources on which they depend.

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