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## Effect of gender on Mississippi hunter motivations and substitutability of hunting

Vanessa Carina Oquendo

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EFFECT OF GENDER ON MISSISSIPPI HUNTER MOTIVATIONS AND  
SUBSTITUTABILITY OF HUNTING

By

Vanessa Carina Oquendo

A Thesis  
Submitted to the Faculty of  
Mississippi State University  
in Partial Fulfillment of the Requirements  
for the Degree of Master of Science  
in Wildlife and Fisheries Science  
in the Department of Wildlife, Fisheries, and Aquaculture

Mississippi State, Mississippi

December 2010

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By

Vanessa Carina Oquendo

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SUBSTITUTABILITY OF HUNTING

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Self-administered mail questionnaires were sent to a stratified sample of 1,000 male and 1,000 female Mississippi resident licensed hunters to determine effect of gender on hunting motivations and substitutability of hunting. Exploratory factor analysis and analysis of covariance were used to analyze hunting motivations. Logistic regression was used to determine effects of 14 independent variables on probability of resident hunters reporting a substitute activity. Males and females differed on achievement-oriented “social recognition” and “seeking stimulation” motivations and on affiliative-oriented “family togetherness” motivations. Gender had no significant effect on resident hunter probability of reporting substitute activities. Age and importance of hunting as an outdoor activity had significant effects on probability of reporting substitute activities, with each being related positively to the response variable. Fishing was the most frequently reported substitute activity for males and females. However, females reported more substitute activities than males.

## DEDICATION

I dedicate my thesis to my parents, Jose and Maria Isabel Oquendo, and to my brothers, Brian and Alan. Thank you, Mama and Daddy, for helping me reach this important milestone in my life. Your love and support for me has been unparalleled by anyone else on Earth. Thank you, Brian, for shaping me into a person who judges people with my heart, not my eyes. Thank you, Alan, for your encouragement and for looking out for me my whole life. I love you all very much.

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## CHAPTER I INTRODUCTION

### **Introduction**

The number of individuals ages 16 and older who hunt nationwide has declined by approximately 11%, from 14.1 million in 1990 to 12.5 million in 2006 (U.S. Dept. of the Interior and U.S. Dept. of Commerce, 2007) and has been predicted to further decline (Brown, Decker, & Enck, 2000; Decker, Enck, & Brown, 1993; Responsive Management & National Shooting Sports Foundation, 2008; Schulz, Millspaugh, & Zekor, 2003). Declining participation in hunting poses a threat to natural resource agencies that depend on funding for conservation from sales of licenses, firearms, and related equipment (Enck, Decker, & Brown, 2000). Additionally, despite 51% of the country's population consisting of women, only approximately 9% of hunters were females (U.S. Dept. of the Interior and U.S. Dept. of Commerce, 2007). Women also represented 8.3% of the licensed resident hunting population in Mississippi (Hunt, personal communication, 2009). Understanding why declining hunting participation and gender disparities are occurring has been an important topic in the wildlife management field that struggles to defend hunting as a socially acceptable activity and for financial support for wildlife management (Heberlein, Serup, & Ericsson, 2008).

As demographics change, it is important to attract participants from under-represented groups for recruitment into hunting to increase revenue for wildlife conservation. Women serve as the largest group of non-traditional clientele to recruit

into hunting. However, because previous research has been based on random samples of participants consisting of primarily White males (i.e. traditional clientele), limited information exists on female recreational experiences due to insufficient sample size (Hayslette, Armstrong, & Mirarchi, 2001; Hunt, Floyd, & Ditton, 2007; Manning, 1999). Studying current female hunters is necessary to understand their outdoor recreation needs and translate those needs for the recruitment, education, and marketing efforts of agencies. This would assist agencies with promotion of wildlife recreation opportunities for women. Additionally, studying female hunters can assist researchers in better understanding female recreation behavior. To attract more women into hunting, it is vital to investigate their motivations for hunting and other outdoor activities in which they participate.

Motivations are defined as inner forces that drive humans to achieve goals or outcomes, (Pizam, Neumann, & Reichel, 1979). Previous studies on motivations have not illustrated a clear breakdown of the effect of gender on hunting motivations (Adams & Steen, 1997; Decker, Provencher, & Brown, 1984; Manning, 1999; Purdy & Decker, 1986). Understanding women's motivations to hunt in light of women's historic and traditional inequality in leisure participation (Deem, 1986; Manning, 1999) may provide important information to natural resource managers about why women hunt and further allow managers to provide desired hunting opportunities for women.

Activity substitution involves substituting one recreation activity for another that satisfies the participants' motives (Hendee & Burdge, 1974; Manning, 1999). Certain activities may be better suited than others to produce the same benefits as hunting, especially for different types of individuals (Daigle, Hrubes, & Ajzen, 2002). A better understanding of activity substitution is needed to construct similarities and differences



of males and females' behaviors in recreation participation and to improve development of comprehensive information bases of recreation activities (O'Leary & Dottavio, 1981). Knowing suitable substitute activities for women may confirm the theory of substitutability's equal application to men and women. Additionally, such knowledge can assist agencies with locating potential markets to attract female hunters. Further, managers and planners will be able to maximize public benefits derived from hunting and have greater knowledge of what activities can be substituted easily for hunting (Decker, Brown, & Gutierrez, 1980; Lewis & Kaiser, 1991).

### **Objectives**

The purpose of this research was to examine effect of gender on hunter motivations and its effect on substitutability of recreational hunting in Mississippi. My objectives for this thesis were to 1) determine if scores on motivational scales measuring hunting motivations differ between resident male and female hunters in Mississippi, 2) determine if gender affected probability of reporting acceptable substitute activities for hunting in Mississippi, and 3) compare the spectrum of suitable substitute activities for hunting between resident male and female hunters in Mississippi. Additionally, I wrote this thesis with the intent to publish results in the Human Dimensions of Wildlife journal, and I formatted it according to Publication Manual of the American Psychological Association (5th edition) for submission to the journal.

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## CHAPTER II

### MOTIVATIONS FOR HUNTING OF MALES AND FEMALES IN MISSISSIPPI

#### **Introduction**

Hunting is a recreational activity enjoyed by 12.5 million individuals in the United States (U.S. Dept. of the Interior and U.S. Dept. of Commerce, 2007). It also is an important tool for managing wildlife populations and provides millions of dollars toward conservation endeavors (Anderson & Loomis, 2006; Decker, Brown, & Siemer, 2001). Approximately 304,000 resident and non-resident hunters in Mississippi spent 6,835,000 days and an estimated \$519,808,000 hunting various wildlife in 2006 (U.S. Dept. of the Interior and U.S. Dept. of Commerce, 2007).

The 11% decline in the U.S. hunting population from 1990 to 2006 (U.S. Dept. of the Interior and U.S. Dept. of Commerce, 2007) poses a threat to state and federal agencies that depend on hunters for funding, in part, wildlife management (Anderson & Loomis, 2006; Enck, Decker, & Brown, 2000; Heberlein, Serup, & Ericsson, 2008). Hunting participation also is predicted to further decline (Brown, Decker, & Enck, 2000; Decker, Enck, & Brown, 1993; Responsive Management & National Shooting Sports Foundation, 2008; Schulz, Millspaugh, & Zekor, 2003). Additionally, despite 51% of the U.S. population consisting of women, only 9% of the country's hunters are females (U.S. Dept. of the Interior and U.S. Dept. of Commerce, 2007). In Mississippi, women represented only 8.3% of the hunter population (Hunt, personal communication, 2009).

Understanding why declining hunting participation and gender disparities are occurring is important for the continued financial and political support of state and federal wildlife agencies (Decker & Enck, 1996; Enck, et al., 2000). Various social and psychological forces, such as motivations, can provide agencies with valuable insight into hunting participation (Decker & Enck, 1996). Understanding motivations to hunt can especially help agencies provide hunting opportunities that cater to multiple segments of the population, hence maximizing hunting benefits to the public (Decker, Brown, & Gutierrez, 1980; Hendee, 1974).

Motivations are defined as inner forces that drive humans to achieve goals or outcomes (Pizam, Neumann, & Reichel, 1979). Driver and his associates created an item pool for the Recreation Experience Preference (REP) scales to identify and quantify the relative importance of different psychological outcomes that recreation participants desire and expect out of their experiences (Driver, 1977). Nineteen different psychological domains were identified through cluster analysis of scale item measurements and served as activity-general motivations that could be achieved through most, if not all, outdoor recreation activities. Driver's (1977) 19 psychological domains were further reduced into three different motivational orientations for wildlife recreation by Decker, Provencher, and Brown (1984). These motivational orientations were affiliative, achievement, and appreciative. Affiliative hunters would be expected to participate in hunting primarily to spend time with other individuals and improve relationships with them. Achievement hunters would be expected to participate in hunting primarily to achieve a particular goal, such as gaining a sense of self-confidence. Appreciative hunters would be expected to participate in hunting primarily to seek peace and solitude in the outdoors by connecting with nature. Achievement-oriented motivations consisted of Driver's (1977) activity-

general items and activity-specific items, such as bagging an animal, that can only be achieved through hunting (Decker et al., 1984). Affiliative-oriented and appreciative-oriented motivations consisted of Driver's (1977) activity-general items. Decker and Connelly (1989) found that 65% of the applicants for antler-less deer licenses in New York primarily possessed an appreciative motivation, 24% had an affiliative motivation, and 11% were achievement-oriented. Other studies across the United States since 1968 have consistently shown appreciative and affiliative-oriented motivations to be more important to hunters than bagging game (Bhandari, Stedman, & Luloff, 2006; Duda, 1993; Hayslette, Armstrong, & Mirarchi, 2001; Responsive Management & National Shooting Sports Foundation, 2008). Studies also have found that female hunters placed greater importance on appreciative motivations than achievement motivations compared to men (Decker, et al., 1984; Purdy & Decker, 1986). However, female hunters in Texas placed slightly greater importance on achievement motivations in a study conducted by Adams and Steen (1997). Additionally, other studies have found that women generally may participate more in culturally and family-centered activities than men (Manning, 1999; Zuzanek, 1978).

Disparities in results of motivations to hunt for women in previous studies warrant further research. These studies have not illustrated a clear breakdown of the effect of gender on hunting motivations, especially in light of gender inequality and females traditionally not engaging in as many leisure activities as men (Deem, 1986; Manning, 1999) because females have been more constrained than men (Jackson & Henderson, 1995). The sports arena, including hunting, has historically been a male-dominated institution (Messner & Sabo, 1990; Wearing, 1991) and the meaning of leisure to women

has not been fully understood because of historical societal expectations placed on women (Henderson, 1996; Shaw, 2001).

Based on previous research and theory, I would expect male and female hunters in Mississippi to differ in their motivations to hunt. I would expect female hunters to place greater importance on affiliative and appreciative motivations than achievement motivations compared to men. Incorporating gender into measuring motivations to participate in hunting is necessary to better understand how male and female hunters differ in their desired benefits sought from this activity. Additionally, resistance to traditional female roles could potentially be uncovered and further conceptualized in the context of leisure engagement (Shaw, 2001). State and federal wildlife agencies can improve their clientele information base from dichotomous differences, and they can prioritize programs and budgets that provide various benefits to male and female hunters (Pierce, Manfredi, & Vaske, 2001). Women can especially be engaged to become part of recreation planning, recruitment, and marketing if more information is known about their desired experiences. Therefore, the objective of this study was to determine effect of gender on motivations to hunt in Mississippi.

### **Methods**

I developed and mailed a 12-page self-administered questionnaire to a stratified random sample of 2,000 individuals (1,000 White resident male hunters and 1,000 White resident female hunters), age 18 and older, who purchased either a Mississippi Type 100 – Sportsman, Type 101 – All Game Hunting and Fishing, or Type 103 – Small Game Hunting and Fishing license during the 2008-2009 hunting season. Individuals were selected from the 2008-2009 electronic license file maintained by the Mississippi

Department of Wildlife, Fisheries, and Parks (MDWFP). I followed Dillman's (2007) Tailored Design Method for questionnaire design. Five out of the 12 pages of the mail questionnaire consisted of hunting motivation items and related covariates developed from previous studies. The remaining pages consisted of items that were not pertinent to the theoretical investigation of hunting motivations and items that were collected for MDWFP's purposes.

The five pages of the questionnaire pertaining to hunting motivations contained four parts. The first part consisted of items related to the covariates years hunted, age, income level, and education level that have been found to be significant to the study of hunting motivations in previous studies (Floyd & Gramann, 1993; Milliken & Johnson, 2002; Stevens, 2002; Wildt & Ahtola, 1978). First, I asked an open-ended question related to how many years respondents had been hunting. Second, I asked an open-ended question for respondents to report their age. Third, I asked closed-ended questions to gather information about the respondent's income level and education level. I asked respondents to report their approximate annual household income before taxes in \$20,000 increments from "under \$20,000" to "\$200,000 and above". I asked their greatest completed level of education in which "1" through "8" was elementary school, "9" through "12" was high school, "13" through "16" was college, and "17" through "22+" was graduate school.

The second part of the questionnaire was designed to measure hunters' achievement-oriented motivations. I asked hunters to rate the relative importance of 14 achievement-related motivations on a five-point measurement scale with the following response format: 1 = "not at all important", 2 = "slightly important", 3 = "moderately important", 4 = "very important" and 5 = "extremely important". I operationalized the



achievement-related motivational construct combining original activity-general items from Driver's (1977) "reinforcing self-image", "social recognition", and "seeking stimulation" subscales of the "achievement" domain from his recreation experience preference scales and combining activity-specific items from Decker and associates (Decker, et al., 1984).

The third part of the questionnaire was designed to measure hunters' affiliative-oriented motivations. I asked hunters to rate the relative importance of 12 affiliative-related motivations on a five-point measurement scale with the following response format: 1 = "not at all important", 2 = "slightly important", 3 = "moderately important", 4 = "very important" and 5 = "extremely important". I operationalized the affiliative-related motivational construct combining original activity-general items from Driver's (1977) "family togetherness" domain and the "being with friends" and "being with similar people" subscales of the "being with people (social contact)" domain from his recreation experience preference scales.

The fourth part of the questionnaire was designed to measure hunters' appreciative-oriented motivations. I asked hunters to rate the relative importance of 12 appreciative-related motivations on a five-point measurement scale with the following response format: 1 = "not at all important", 2 = "slightly important", 3 = "moderately important", 4 = "very important" and 5 = "extremely important". I operationalized the appreciative-related motivational construct combining original activity-general items from Driver's (1977) "scenery", "general nature experience" and "learn about nature" subscales from the "relationships with nature" domain of his recreation experience preference scales.

I used a modified version of Dillman's (2007) Tailored Design Method for survey mailing procedures. I administered the survey from October to December of 2009. I made initial contact with participants via a pre-notice letter which alerted them of the study and that a questionnaire would be coming within the next week. One week after the pre-notice letter, I sent a complete packet consisting of an introductory letter, questionnaire, and postage-paid business reply envelope to participants. One week after the first mailing of the complete packet, I sent a thank you/reminder postcard to participants. Two weeks after the postcard mailing, I sent a second complete packet to participants who had not yet responded. Three weeks after the second mailing of the complete packet, I sent a final complete packet to participants who had not yet responded via regular mail instead of following Dillman's (2007) suggestion of using express mail.

I logged off returned useable, non-deliverable, and non-eligible surveys. I numerically coded non-numeric responses of returned useable surveys. Any questionnaire received after a 90-day data collection period was not used in analyses. I entered data from eligible questionnaires into a Microsoft® Access database. Prior to analyses of hunting motivations, I checked for missing and obscure values in the data. I deleted any respondents who did not answer at least 50% of the items related to the achievement-oriented, affiliative-oriented, or appreciative-oriented constructs from further analysis of each of those individual constructs. Therefore, if respondents did not answer at least 50% of the items on a particular motivational construct, then they were deleted from analysis of that construct but were retained in analyses of the other constructs. Specifically, 1.5% (n = 10) of respondents did not answer at least 7 of the 14 items in the achievement-oriented construct, 1.2% (n = 8) of respondents did not answer at least 6 of the 12 items in the affiliative-oriented construct, and 2.9% (n = 19) of

respondents did not answer at least 6 of the 12 items in the appreciative-oriented construct. For those who responded to some, but not all, of the motivation items of each measurement scale pertaining to each motivational construct, I used the Markov chain Monte Carlo (MCMC) algorithm for SAS<sup>®</sup> Version 9.1 (SAS Institute, Inc., 2008) to replace missing values with estimated values based on how respondents answered other similar items for each motivational construct (Schafer, 1997). Furthermore, I checked for possible non-response bias using Fisher's (1996) methods, because some segments of the hunter population could be over-represented or under-represented. I calculated response probabilities using a logistic regression model that included independent variables from the electronic license file (age and gender), and response status (1 = responded, 0 = not responded) as the binary dependent variable. I obtained non-response adjustment weights from the inverse of the response probabilities.

I used SAS<sup>®</sup> Version 9.1 (SAS Institute, Inc., 2008) and SPSS<sup>®</sup> Version 16.0 (SPSS, Inc., 2009) to conduct necessary analyses. I set my significance level at  $\alpha = 0.05$  throughout my study. I determined statistical power following Cohen (1988). I conducted an exploratory factor analysis in SPSS<sup>®</sup> using principal components analysis with varimax rotation to verify the groupings of motivation items. I considered item groupings with eigenvalues  $> 1.0$  to be valid factors, and I retained individual items within a factor if the factor loading was greater than 0.5 (Kim & Mueller, 1978). I used appropriate tests for normality and transformed variables using square root and reflection transformations for analysis purposes when appropriate. I also used weighted descriptive statistical procedures for the covariates (years hunted, age, income level, and education level) to be representative of the White hunter population in Mississippi and to account for non-response bias and the proportion of males and females in that population. I used

Cronbach's alpha to ensure the reliability of items used for motivation scales (Cronbach, 1951); a Cronbach's alpha greater than 0.70 was considered to be adequate (Nunnally, 1978).

I used Analysis of Covariance (ANCOVA) in PROC GLM of SAS<sup>®</sup> to detect differences between males and females in motivations to hunt while controlling for covariates (Floyd & Gramann, 1993). Controlling for other variables allowed me to test the main effect of gender on the motivational orientations. For the ANCOVA, I considered 1) whether years hunted, age, income level, and education level had linear relationships with hunting motivations; and 2) if any covariate with a linear relationship to hunting motivations had parallel regression lines. I conducted a preliminary analysis on covariates to test if they were related linearly to hunting motivations. If any covariate had no linear relationship with the motivational orientation, then I used a one-way Analysis of Variance (ANOVA) to test for gender differences on that particular motivational construct. I also calculated the average construct score, average score for each individual item, and average item score for each motivational orientation.

## **Results**

### **Response Rates**

I obtained useable data from 661 individuals of which 307 were resident males and 354 were resident females (Table 2.1). I obtained 142 non-deliverable surveys and 49 non-eligible surveys, of which 41 were refusals and eight were respondents who did not hunt. I calculated response rates by dividing number of returned useable surveys by total number of surveys minus number of non-deliverable and non-eligible surveys (Dillman, 2007). Overall response rate was 36.5%. Females had the greatest response

rate at 38.8%, whereas males had a response rate of 34.3%. I obtained a large enough sample size for males and females to achieve 99% statistical power when examining group differences (Cohen, 1988; McNamara, 1994). Fisher's (1996) analysis of non-response indicated younger females were under-represented in this study. Any overall population estimate in this study was corrected for this under-representation using weighting procedures. After this correction, population estimates were generalizable to the White resident licensed hunter population with a 3.8% margin of error.

## **Motivations for Hunting in Mississippi**

### *Exploratory Factor Analysis and Scale Reliability*

I obtained 6 different motivational constructs from the exploratory factor analysis (Table 2.2). Activity-general and activity-specific items in the achievement motivational orientation collapsed into 3 constructs that coincided with Driver's (1977) "reinforcing self-image", "social recognition", and "seeking stimulation" subscales. Items in the affiliative motivational orientation collapsed into 2 constructs that coincided with Driver's (1977) "family togetherness" and "being with people (social contact)" domains. The appreciative motivational orientation remained as one construct.

The "reinforcing self-image" construct encompassed three items: "gain a sense of self confidence", "increase my feelings of self-worth", and "feel like a better person after hunting". Rotated component matrix factor loadings for "reinforcing self-image" motivations ranged from 0.748 to 0.836 (Table 2.2). I obtained adequate internal consistency of the "reinforcing self-image" motivational construct items with a Cronbach's alpha of 0.86 (Table 2.2), indicating items were reliably measuring one construct and could be additive in terms of the measurement scale. The "social

recognition” construct encompassed four items: “be recognized for hunting”, “show others I can hunt”, “make a good impression on others”, and “be seen by others hunting”. Rotated component matrix factor loadings for “social recognition” motivations ranged from 0.727 to 0.795 (Table 2.2). I obtained adequate internal consistency of the “social recognition” motivational construct items with a Cronbach’s alpha of 0.84 (Table 2.2), indicating items were reliably measuring one construct and could be additive in terms of the measurement scale. The “seeking stimulation” construct encompassed seven items: “bag an animal”, “bag a trophy species”, “experience the thrills of hunting”, “get all charged up”, “be someplace where things are exciting”, “because hunting is stimulating and exciting”, and “test the extent to which I can hunt”. Rotated component matrix factor loadings for “seeking stimulation” motivations ranged from 0.583 to 0.817 (Table 2.2). I obtained adequate internal consistency of the “seeking stimulation” motivational construct items with a Cronbach’s alpha of 0.83 (Table 2.2), indicating items were reliably measuring one construct and could be additive in terms of the measurement scale.

The “family togetherness” construct encompassed three items: “help bring my family closer together”, “get the family to do something together”, and “get the family to spend some time together”. Rotated component matrix factor loadings for “family togetherness” motivations ranged from 0.880 to 0.892 (Table 2.2). I obtained adequate internal consistency of the “family togetherness” motivational construct items with a Cronbach’s alpha of 0.93 (Table 2.2), indicating items were reliably measuring one construct and could be additive in terms of the measurement scale. The “being with people (social contact)” construct encompassed eight items: “have company of people who hunt with me”, “be with people who enjoy hunting like I do”, “hunt with my

companions”, “be with other members of my group”, “be with people having similar interests”, “be with people having similar values”, “be with people who are enjoying themselves”, and “be with my friends”. Rotated component matrix factor loadings for “being with people (social contact)” motivations ranged from 0.658 to 0.824 (Table 2.2). I obtained adequate internal consistency of the “being with people (social contact)” motivational construct items with a Cronbach’s alpha of 0.93 (Table 2.2), indicating items were reliably measuring one construct and could be additive in terms of the measurement scale.

The appreciative construct encompassed 12 items: “enjoy the scenery”, “study nature”, “be in a natural setting”, “enjoy the smells and sounds of nature”, “take in the scenic beauty”, “learn more about nature”, “look at the pretty view”, “be close to nature”, “take in the natural surroundings”, “observe the scenic beauty”, “obtain a feeling of harmony with nature”, and “find out more about natural settings”. Because only one component was extracted for appreciative motivations from the factor analysis, the solution could not be rotated. Therefore, component matrix factor loadings for appreciative motivations ranged from 0.791 to 0.902 (Table 2.2). I obtained adequate internal consistency of the appreciative motivational scale items with a Cronbach’s alpha of 0.97 (Table 2.2), indicating items were reliably measuring one construct and could be additive in terms of the measurement scale.

### *Covariates*

Weighted and unweighted descriptive statistics for the covariates years hunted, age, income level, and education level are presented in Table 2.3. Weighted average years hunted for all resident hunters was 28.1 years (SE = 0.6, n = 642). Females had

been hunting for an average of 14.8 years (SE = 0.7, n = 339); males had been hunting for an average of 32.8 years (SE = 0.8, n = 303). Weighted average age of all resident hunters was 40.7 years (SE = 0.6, n = 646). Average age of females was 40.8 years (SE = 0.7, n = 342); average age of males was 44.9 years (SE = 0.8, n = 304). Weighted median household income before taxes for all resident hunters was \$60,000 – \$79,999 (n = 600). Median household income before taxes for females was \$60,000 – \$79,999 (n = 315); median household income for males was \$60,000 - \$79,999 (n = 285). Weighted average greatest completed level of education completed for all resident hunters was 13.6 years (SE = 0.1, n = 642). Most females (66.5%, n = 228) and most males (60.2%, n = 179) had at least a high school diploma. Average greatest completed education level for females was 14.0 years (SE = 0.1, n = 341); average greatest completed education level for males was 13.7 years (SE = 0.2, n = 301).

#### *Construct 1: Reinforcing Self-Image (Achievement)*

Average “reinforcing self-image” construct score for males was 7.1 (SE = 0.2, n = 297) and 6.8 (SE = 0.2, n = 343) for females; average item score for the “reinforcing self-image” motivational construct was 2.3 (SE = 0.1, n = 297) for males and 2.4 (SE = 0.1, n = 343) for females (Table 2.4). As per Table 2.7, I did not find a statistically significant relationship among covariates years hunted ( $F_{2, 566} = 1.09, P = 0.337$ ), income level ( $F_{2, 566} = 0.24, P = 0.791$ ), or education level ( $F_{2, 566} = 1.17, P = 0.311$ ) on “reinforcing self-image” motivational scores. I found a statistically significant relationship between the covariate age ( $F_{2, 566} = 4.00, P = 0.019$ ) and “reinforcing self-image” motivational scores. When I tested age alone as a covariate, I still found a statistically significant relationship with “reinforcing self-image” scores ( $F_{2, 632} = 3.19, P = 0.042$ ). When I tested equality of



slopes for male and female “reinforcing self-image” scores by age, I found there was not a statistically significant difference between groups ( $F_{1, 632} = 1.48, P = 0.224$ ). Therefore, I retained age as a covariate. I found no statistically significant difference ( $F_{2, 633} = 2.25, P = 0.134$ ) in adjusted mean scores for “reinforcing self-image” between males ( $\bar{x} = 7.1, SE = 0.2, n = 297$ ) and females ( $\bar{x} = 6.8, SE = 0.2, n = 343$ ).

I found the regression lines for the covariates years hunted, age, and income level suggested an interaction effect and indicated each of those covariates differently affected males and females on their “reinforcing self-image” scores. For every year hunted, females’ “reinforcing self-image” scores remained consistent. For every year hunted, males’ “reinforcing self-image” scores decreased by 0.03. Therefore, males placed lesser importance on “reinforcing self-image” motivations as they hunted more years. For every one year increase in age, females’ “reinforcing self-image” scores increased by 0.17. For every one year increase in age, males’ “reinforcing self-image” scores decreased by 0.27. Females placed greater importance on “reinforcing self-image” motivations as they aged. Males placed lesser importance on “reinforcing self-image” motivations as they aged. As the annual household income for females increased by 1 level (e.g. \$20,000 increment), their “reinforcing self-image” scores remained consistent. As the annual household income for males increased by 1 level, their “reinforcing self-image” scores decreased by 0.23. Therefore, males placed lesser importance on “reinforcing self-image” motivations as their annual household income increased by 1 level.

### *Construct 2: Social Recognition (Achievement)*

Average “social recognition” construct score for males was 6.6 (SE = 0.2, n = 297) and 6.7 (SE = 0.1, n = 343) for females; average item score for the “social recognition” motivational construct was 1.6 (SE = 0.0, n = 297) for males and 1.7 (SE = 0.0, n = 343) for females (Table 2.4). As per Table 2.8, I did not find a statistically significant relationship among covariates years hunted ( $F_{2, 566} = 0.12, P = 0.886$ ), income level ( $F_{2, 566} = 0.06, P = 0.943$ ), or education level ( $F_{2, 566} = 1.18, P = 0.308$ ) on “social recognition” motivational scores. I found a statistically significant relationship between the covariate age ( $F_{2, 566} = 4.78, P = 0.009$ ) and “social recognition” motivational scores. When I tested age alone as a covariate, I still found a statistically significant relationship with “social recognition” scores ( $F_{2, 632} = 15.54, P < 0.001$ ). When I tested equality of slopes for male and female “social recognition” scores by age, I found a statistically significant difference between groups ( $F_{1, 632} = 6.99, P = 0.008$ ). Therefore, I did not retain age as a covariate. I found “social recognition” scores varied depending on age of respondents. Differences were pronounced between groups at various ages. After evaluating “social recognition” scores for the range of ages of respondents, I found adjusted mean “social recognition” scores for females who were between 18 and 33 years old were less than males (Table 2.9), meaning younger females indicated that “social recognition” motivations were less important as reasons for hunting in Mississippi than younger males. Additionally, I found adjusted mean “social recognition” scores for males who were 62 years or older were less than females, meaning males over the age of 62 indicated that “social recognition” motivations were less important as reasons for hunting in Mississippi than females over the age of 62. Females over the age of 62 indicated that “social recognition” motivations were more important as reasons for

hunting in Mississippi than males over the age of 62. I did not find statistically significant differences between groups for other ages.

I found the regression lines for the covariates years hunted, age, income level, and education level suggested an interaction effect and indicated each of those covariates differently affected males and females on their “social recognition” scores. For every year hunted, females’ “social recognition” scores remained consistent. For every year hunted, males’ “social recognition” scores decreased by 0.03. Therefore, males placed lesser importance on “social recognition” motivations as they hunted more years. For every one year increase in age, females’ “social recognition” scores increased by 0.13. For every one year increase in age, males’ “social recognition” scores decreased by 0.27. Females placed greater importance on “social recognition” motivations as they aged. Males placed lesser importance on “social recognition” motivations as they aged. As the annual household income for females increased by 1 level (e.g. \$20,000 increment), their “social recognition” scores increased by 0.04. As annual household income for males increased by 1 level, their “social recognition” scores decreased by 0.23. Females placed greater importance on “social recognition” motivations as their annual household income increased by 1 level. Males placed lesser importance on “social recognition” motivations as their annual household income increased by 1 level. For every year of education acquired, “social recognition” scores for females decreased by 0.05. For every year of education acquired, “social recognition” scores for males increased by 0.59. Females placed lesser importance on “social recognition” motivations as they acquired more education. Males placed greater importance on “social recognition” motivations as they acquired more education.

### *Construct 3: Seeking Stimulation (Achievement)*

Average “seeking stimulation” construct score was 21.6 (SE = 0.3, n = 640) for males and for females; average item score for the “seeking stimulation” motivational construct was 3.1 (SE = 0.0, n = 297) for males and 3.1 (SE = 0.0, n = 343) for females (Table 2.4). As per Table 2.10, I did not find a statistically significant relationship among covariates years hunted ( $F_{2, 566} = 0.67, P = 0.513$ ), income level ( $F_{2, 566} = 0.39, P = 0.680$ ), or education level ( $F_{2, 566} = 0.63, P = 0.530$ ) on “seeking stimulation” motivational scores. I found a statistically significant relationship between the covariate age ( $F_{2, 566} = 13.80, P < 0.001$ ) and “seeking stimulation” motivational scores. When I tested age alone as a covariate, I still found a statistically significant relationship with “seeking stimulation” scores ( $F_{2, 632} = 26.72, P < 0.001$ ). When I tested equality of slopes for male and female “seeking stimulation” scores by age, I found a statistically significant difference between groups ( $F_{1, 632} = 5.59, P = 0.018$ ). Therefore, I did not retain age as a covariate. I found “seeking stimulation” scores varied depending on age of respondents. After evaluating “seeking stimulation” scores for the range of ages of respondents, I found adjusted mean “seeking stimulation” scores for females who were between 18 and 36 years old were less than males (Table 2.11). I did not find statistically significant differences between groups for other ages.

I found the regression lines for the covariates years hunted, age, and income level suggested an interaction effect and indicated each of those covariates differently affected males and females on their “seeking stimulation” scores. For every year hunted, females’ “seeking stimulation” scores increased by 0.06. For every year hunted, males’ “seeking stimulation” scores decreased by 0.03. Females placed greater importance on “seeking stimulation” motivations as they hunted more years. Males placed lesser importance on

“seeking stimulation” motivations as they hunted more years. For every one year increase in age, females’ “seeking stimulation” scores increased by 0.13. For every one year increase in age, males’ “seeking stimulation” scores decreased by 0.23. Females placed greater importance on “seeking stimulation” motivations as they aged. Males placed lesser importance on “seeking stimulation” motivations as they aged. As annual household income for females increased by 1 level (e.g. \$20,000 increment), their “seeking stimulation” scores increased by 0.14. As annual household income for males increased by 1 level, their “seeking stimulation” scores decreased by 0.23. Females placed greater importance on “seeking stimulation” motivations as their annual household income increased by 1 level. Males placed lesser importance on “seeking stimulation” motivations as their annual household income increased by 1 level.

#### *Construct 4: Family Togetherness (Affiliative)*

Average “family togetherness” construct score for males was 10.8 (SE = 0.2, n = 299) and 11.4 (SE = 0.2, n = 343) for females; average item score for the “family togetherness” motivational construct was 3.6 (SE = 0.1, n = 299) for males and 3.8 (SE = 0.1, n = 343) for females (Table 2.5). As per Table 2.12, I did not find a statistically significant relationship among covariates years hunted ( $F_{2, 569} = 0.51, P = 0.602$ ), age ( $F_{2, 569} = 0.19, P = 0.828$ ), or education level ( $F_{2, 569} = 0.64, P = 0.530$ ) on “family togetherness” motivational scores. I found a statistically significant relationship between the covariate income level ( $F_{2, 569} = 4.03, P = 0.018$ ) and “family togetherness” motivational scores. When I tested income level alone as a covariate, I still found a statistically significant relationship with “family togetherness” scores ( $F_{2, 591} = 4.82, P = 0.008$ ). When I tested equality of slopes for male and female “family togetherness”

scores by income level, I found there was not a statistically significant difference between groups ( $F_{1, 591} = 1.01, P = 0.314$ ). Therefore, I retained income level as a covariate. I found a statistically significant difference ( $F_{1, 592} = 6.83, P = 0.009$ ) in adjusted mean scores for “family togetherness” between males ( $\bar{x} = 10.8, SE = 0.2, n = 299$ ) and females ( $\bar{x} = 11.4, SE = 0.2, n = 343$ ).

I found the regression lines for the covariate years hunted suggested an interaction effect and indicated years hunted differently affected males and females on their “family togetherness” scores. For every year hunted, females’ “family togetherness” scores remained consistent. For every year hunted, males’ “family togetherness” scores increased by 0.03. Therefore, males placed greater importance on “family togetherness” motivations as they hunted more years.

#### *Construct 5: Being with People-Social Contact (Affiliative)*

Average “being with people (social contact)” construct score for males was 27.7 (SE = 0.4, n = 300) and 27.1 (SE = 0.4, n = 343) for females; average item score for the “being with people (social contact)” motivational construct was 3.5 (SE = 0.1, n = 300) for males and 3.4 (SE = 0.1, n = 343) for females (Table 2.5). As per Table 2.13, I did not find a statistically significant relationship among covariates years hunted ( $F_{2, 569} = 0.04, P = 0.965$ ), age ( $F_{2, 569} = 0.65, P = 0.524$ ), income level ( $F_{2, 569} = 0.98, P = 0.377$ ), or education level ( $F_{2, 569} = 2.44, P = 0.088$ ) on “being with people (social contact)” motivational scores. Therefore, I performed a one-way ANOVA to test the main effect of gender on “being with people (social contact)” scores. I did not find a statistically significant difference ( $F_{1, 641} = 0.19, P = 0.665$ ; Table 2.13) in mean “being with people

(social contact)” scores between males ( $\bar{x} = 27.7$ , SE = 0.4, n = 300) and females ( $\bar{x} = 27.1$ , SE = 0.4, n = 343).

I found the regression lines for the covariate education level suggested an interaction effect and indicated education level differently affected males and females on their “being with people (social contact)” scores. For every year of education acquired, females’ “being with people (social contact)” scores increased by 0.08. For every year of education acquired, males’ “being with people (social contact)” scores decreased by 0.59. Females placed greater importance on “being with people (social contact)” motivations for each year of education acquired. Males placed lesser importance on “being with people (social contact)” motivations for each year of education acquired.

#### *Construct 6: Appreciative*

Average appreciative construct score for males was 45.6 (SE = 0.6, n = 296) and 44.8 (SE = 0.6, n = 346) for females; average item score for the appreciative motivational orientation was 3.8 (SE = 0.1, n = 293) for males and 3.7 (SE = 0.1, n = 340) for females (Table 2.6). As per Table 2.14, I did not find a statistically significant relationship among covariates years hunted ( $F_{2, 561} = 2.03$ ,  $P = 0.132$ ), age ( $F_{2, 561} = 2.09$ ,  $P = 0.125$ ), income level ( $F_{2, 561} = 0.71$ ,  $P = 0.494$ ), or education level ( $F_{2, 561} = 0.27$ ,  $P = 0.766$ ) on appreciative motivational scores. Therefore, I performed a one-way ANOVA to test the main effect of gender on appreciative scores. I did not find a statistically significant difference ( $F_{1, 631} = 0.38$ ,  $P = 0.540$ ; Table 2.14) in mean appreciative scores between males ( $\bar{x} = 45.6$ , SE = 0.6, n = 296) and females ( $\bar{x} = 44.8$ , SE = 0.6, n = 346).

I found the regression lines for the covariates years hunted, age, income level, and education level suggested an interaction effect and indicated each of those covariates

differently affected males and females on their appreciative scores. For every year hunted, females' appreciative scores increased by 0.11. For every year hunted, males' appreciative scores remained consistent. Therefore, females placed greater importance on appreciative motivations as they hunted more years. For every one year increase in age, appreciative scores for females and males increased by 0.14 and 0.04, respectively. Females and males placed greater importance on appreciative motivations as they aged. As annual household income for females increased by 1 level (e.g. \$20,000 increment), their appreciative scores increased by 0.16. As annual household income for males increased by 1 level, their appreciative scores decreased by 0.84. Females placed greater importance on appreciative motivations as their annual household income increased by 1 level. Males placed lesser importance on appreciative motivations as their annual household income increased by 1 level. For every year of education acquired, appreciative scores for females remained consistent. For every year of education acquired, appreciative scores for males decreased by 0.84. Therefore, males placed lesser importance on appreciative motivations for each year of education acquired.

## **Discussion**

### *Factors*

I had expected items drawn from Driver's (1977) domains from his recreation experience preference scales would factor into achievement, affiliative, and appreciative motivational constructs presented by Decker and associates (1984). However, results of the principal component analysis indicated items pertaining to Decker and associates' (1984) achievement and affiliative motivations did not factor into stand-alone constructs. Achievement-oriented items collapsed into 3 different constructs, affiliative-oriented



items collapsed into 2 different constructs, and the appreciative-oriented items remained as one construct. Resulting constructs paralleled original Driver (1977) psychological domains and subscales from his recreation experience preference scales. Activity-specific items, such as “bagging an animal” and “bagging a trophy species”, factored into the “seeking stimulation” subscale of Driver’s (1977) achievement domain that contained activity-general items, such as “being someplace exciting” and “getting all charged up”. These results indicated that use of summated scales for Decker and associates’ (1984) motivational orientations are not sufficient enough in understanding achievement-oriented and affiliative-oriented motivations of hunters in Mississippi. Had I retained achievement and affiliative motivational orientations by Decker and associates (1984), I may have committed a Type II error and found no significant differences between resident males and females on those motivations when they in fact existed. Future research on hunting motivations should continue using Driver’s (1977) recreation experience preference scales and verifying item groupings through factor analysis.

It was my intent to measure each of achievement, affiliative, and appreciative motivations as individual constructs as per Decker and associates (1984). Based on previous gender, leisure, and motivation research, I expected to find differences between resident males and females on achievement and affiliative constructs and no differences between groups on the appreciative construct. Because the factor analyses indicated the achievement motivation items factored into 3 separate constructs and the affiliative motivation items factored into 2 separate constructs, my hypotheses had to be reassessed post-finding. I still expected to find differences between resident males and females in general because each of the factored constructs measured achievement or affiliative motivations. Therefore, I hypothesized to find significant differences between resident

male and female hunters on achievement-oriented motivations of “reinforcing self-image”, “social recognition”, and “seeking stimulation” and on affiliative-oriented motivations of “family togetherness” and “being with people (social contact)”. I expected males to score greater on each of the achievement-oriented constructs than females, and I expected females to score greater on each of the affiliative-oriented constructs than males. I expected to find no differences between resident male and female hunters on the appreciative-oriented construct. I expected neither group to score greater than the other on appreciative motivations.

#### *Achievement-oriented Motivations for Hunting*

I found no difference between males and females on importance of “reinforcing self-image” motivations for hunting regardless of their age. I also found differences at various ages between males and females on importance of “social recognition” motivations for hunting. These results suggested younger females did not place greater importance on achievement-oriented motivations. Previous research (Decker, et al., 1984; Purdy & Decker, 1986) indicated females should not place greater importance on achievement-oriented motivations. I found this to be the case for females at younger ages but not at older ages. Norton (2007) described 5 stages of hunting an individual goes through over time as part of hunter behavior and development theory, which could help explain why younger males ranked “social recognition” and “seeking stimulation” motivations as more important but placed lesser importance on them as they got older. These stages were the shooter stage, the limiting out stage, the trophy stage, the method stage, and the sportsmen stage. Male hunters at younger ages may be in the beginning developmental stages of being a hunter in which they seek to test and show others their

abilities and seek stimulating rewards through bagging game (Norton, 2007). Younger males may be in the shooter, limiting out, or trophy stages where those in the shooter stage desire to test their competence in shooting, those in the limiting out stage enjoy shooting in the context of bagging game, and those in the trophy stage seek out selective game (Norton, 2007). As males got older, they could have been progressing to the method and sportsmen stages of hunting where those in the method stage pay attention to how they take game and those in the sportsmen stage place more importance on the actual hunting experience than bagging game (Norton, 2007). Norton (2007) indicated the importance of hunters showing competence in the sport lessens as hunters age. However, resident females did not fit Norton's (2007) hunting stage model. Females placed greater importance on "reinforcing self-image", "social recognition", and "seeking stimulation" as they got older. This may suggest resident females' slight resistance to perceived traditional and historical gender roles in society by possessing sufficient knowledge and skills to participate in a male-dominated activity (Wearing, 1995), and that gender stereotyping of hunting may not be as prominent as it once was for those who hunt.

#### *Affiliative-oriented Motivations for Hunting*

I found differences between males and females on importance of "family togetherness" motivations for hunting regardless of their age. Results of "family togetherness" motivations were consistent with previous gender research indicating women participate in family-centered outdoor activities (Manning, 1999; Wearing & Wearing, 1988). I found no difference between males and females on importance of "being with people (social contact)" motivations for hunting. This indicated "being with

people (social contact)” motivations were important equally to males and females. Results of “being with people (social contact)” motivations suggested that males and females equally valued positive interpersonal relationships in the context of hunting. Therefore, hunting is a fairly important social activity for males and females.

#### *Appreciative-oriented Motivations for Hunting*

As expected, I found no difference between males and females on appreciative motivations. This indicated that being in natural settings at any capacity is a moderately to very important reason for hunting in Mississippi to males and females. This was expected because hunting involves appreciation for the natural environment to a great extent. Additionally, greater importance was placed on appreciative motivations as males and females aged. This is consistent with hunter behavior and development theory framed by Norton’s (2007) hunting stages where younger hunters primarily seek to show their competence and abilities and bag game, and then they progress to placing more importance on being around nature than bagging game as they get older.

#### *Overall Motivations for Hunting*

Consistent with previous research conducted by Duda (1993), Hayslette and others (2001), Bhandari and others (2006), and Responsive Management and the National Shooting Sports Foundation (2008), I found resident hunters in Mississippi did not indicate achievement-oriented motivations to be the most important reasons to hunt. Based on average item scores with each motivational construct, resident females and resident males ranked appreciative-oriented motivations first, affiliative-oriented motivations second, and achievement-oriented motivations third. Additionally, I found age and income level to be significant covariates for achievement-oriented motivations

and “family togetherness” motivations, respectively. I did not find years hunted and education level to be significant covariates with either of the motivation orientations. Fuller (2006) also did not find those covariates to be significant on motivational orientations between African-American and Anglo male hunters in Mississippi. I believe it is possible that hunter motivations may not be as linked to education level and years hunted as previous research has implied (Floyd & Gramann, 1993). Future research on motivations should investigate other variables related to the initiation and socialization of hunting and constraints to hunting between men and women.

My study only investigated White resident hunters in Mississippi. Further differences may exist within gender groups (Henderson, 1996), which warrants further investigation into how motivations can change with different men and women in terms of other demographic variables, such as race or ethnicity. Other limitations to my study were centered on motivations not fully explaining differences in hunting behavior between men and women. Motivations are dynamic and can change over time. Studying motivations is only the first step in understanding why individuals participate in hunting (Iso-Ahola, 1980). The relative importance hunters placed on various items measuring different motivation orientations in my study did not necessarily represent the actual needs of those hunters or that they are obtaining those benefits. Future research should investigate the level of satisfaction obtained by hunting participants, especially a multiple satisfaction approach (Hendee, 1974; Iso-Ahola, 1980). Motivations and satisfaction are inextricably linked because satisfaction serves as a measurement of how well individuals met their motivations (Manning, 1999). Subsequent research also should examine the gendered aspects of hunting involvement. Understanding involvement in hunting for men and women can provide useful information on the attraction, meaning, and centrality

of hunting based on each group's general attitudes on life because involvement implies motivations to be an on-going process (Wiley, Shaw, & Havitz, 2000).

Hunting can be viewed as an activity with the potential to enhance women's empowerment and improve existing social structure that assumes women do not have special needs when it comes to leisure (Shaw, 2000). Natural resources managers can focus on programs that center around the family to recruit and retain more females in hunting. This may aid in increasing hunting participation and subsequently in increasing revenue for wildlife management. Therefore, to better understand female hunters, future research should continue studying their motivations to hunt and how they are affected by various covariates. Previous research indicated years hunted, age, income level, and education level (Floyd & Gramann, 1993) were covariates for hunting. The regression lines for these covariates suggested interaction effects for motivational constructs. However, my analysis of covariance demonstrated that in most cases for the motivational constructs, covariates did not have a linear relationship with the dependent variable (motivation scores of each construct) regardless of how the regression lines looked because this was a violation of the first assumption of an analysis of covariance. Further research should be conducted to better understand why the interactions between covariates and motivations are occurring. Future research also should focus on understanding male and female motivations to hunt using all 19 original domains from Driver's (1977) recreation experience preference scales to better understand effect of gender on leisure behavior.

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Table 2.1 Response categories and rates by gender for the Survey of Mississippi Resident Hunters conducted from October to December 2009.

Category	White males	White females	Overall totals
# Mailed	1000	1000	2000
# Not returned	589	559	1148
# Returned useable	307	354	661
# Non-eligible <sup>a</sup>	29	20	49
# Non-deliverable	75	67	142
Response rate <sup>b</sup>	34.3%	38.8%	36.5%

<sup>a</sup> Non-eligibles included 41 refusals and 8 were respondents who did not hunt.

<sup>b</sup> Response rate calculated by dividing number of returned useable surveys by total number of surveys sent minus number of non-deliverable and non-eligible surveys.

Table 2.2 Factor analysis results for achievement-oriented, affiliative-oriented and appreciative-oriented motivations to hunt in Mississippi for the Survey of Mississippi Resident Hunters conducted from October to December 2009. Rotated component matrix factor loadings for achievement and affiliative-oriented motivations are presented. Component matrix factor loadings are presented for appreciative motivations.

Motivation Construct	Scale items (I hunt in Mississippi to:)	Factor Loading	Cronbach's Alpha
<i>Achievement</i>			
Reinforcing self-image	gain a sense of self-confidence	0.814	0.86
	increase my feelings of self-worth	0.836	
	feel like a better person after hunting	0.748	
Social recognition	show others I can hunt	0.795	0.84
	make a good impression on others	0.758	
	be recognized for hunting	0.795	
Seeking stimulation	be seen by others hunting	0.727	0.83
	get all charged up	0.632	
	be someplace where things are exciting	0.583	
	experience the thrills of hunting	0.765	
	test the extent to which I can hunt	0.605	
	because hunting is stimulating and exciting	0.817	
	bag an animal	0.623	
bag a trophy species	0.604		
<i>Affiliative</i>			
Family togetherness	help bring my family closer together	0.880	0.93
	get the family to do something together	0.892	
	get the family to spend some time together	0.882	
Social contact	have company of people who hunt with me	0.658	0.93
	be with people who enjoy hunting like I do	0.762	
	hunt with my companions	0.752	
	be with other members of my group	0.784	
	be with people having similar interests	0.782	
	be with people having similar values	0.792	
	be with people who are enjoying themselves	0.699	
be with my friends	0.824		
<i>Appreciative</i>			
	enjoy the scenery	0.827	0.97
	study nature	0.791	
	be in a natural setting	0.865	
	enjoy the smells and sounds of nature	0.858	
	take in the scenic beauty	0.895	
	learn more about nature	0.852	
	look at the pretty view	0.836	
	be close to nature	0.899	
	take in the natural surroundings	0.902	
	observe the scenic beauty	0.893	
	obtain a feeling of harmony with nature	0.850	
	find out more about natural settings	0.859	

Table 2.3 Descriptive statistics for all variables included in the ANCOVA for the Survey of Mississippi Resident Hunters conducted from October to December 2009. Standard error of the mean and standard deviation for the median are reported where appropriate. Unweighted descriptive statistics are presented for resident males and females.

Covariates	n <sup>a</sup>	Mean ( $\bar{x}$ ) or Median (Md)	SE or SD	Range
Years hunted	O: 642 M: 303 F: 339	O: $\bar{x}$ = 28.1 M: $\bar{x}$ = 32.8 F: $\bar{x}$ = 14.8	O: SE = 0.6 M: SE = 0.8 F: SE = 0.7	0 – 65 years
Age	O: 646 M: 304 F: 342	O: $\bar{x}$ = 40.7 M: $\bar{x}$ = 44.9 F: $\bar{x}$ = 40.8	O: SE = 0.6 M: SE = 0.8 F: SE = 0.7	18 – 74 years
Income level <sup>b</sup>	O: 600 M: 285 F: 315	O: Md = 4 (\$60,000-\$79,999) M: 4 (\$60,000-\$79,999) F: 4 (\$60,000-\$79,999)	O: SD = 3.0 M: SD = 2.5 F: SD = 2.4	1 – 11
Education level <sup>c</sup>	O: 642 M: 301 F: 341	O: $\bar{x}$ = 13.6 (Some college) M: 13.7 (Some college) F: 14.0 (Some college)	O: SE = 0.1 M: SE = 0.2 F: SE = 0.1	1 – 22+

<sup>a</sup> O = Overall; F = Females; M = Males.

<sup>b</sup> Measured on an 11-point scale with response categories ranging from 1 = under \$20,000 to 11 = \$200,000 and above in \$20,000 increments.

<sup>c</sup> Measured on a scale in which “1” through “8” was elementary school, “9” through “12” was high school, “13” through “16” was college, and “17” through “22+” was graduate school.

Table 2.4 Scale items used to measure resident male and female achievement-oriented motivations for hunting in Mississippi, individual item mean scores (standard error), mean construct scores (standard error), and mean item scores (standard error) for the Survey of Mississippi Resident Hunters conducted from October to December 2009.

Motivation Construct	Scale items (I hunt in Mississippi to:)	Individual Item Mean (SE)	Mean Construct Score (SE)	Mean Score of all Construct Items (SE)
Reinforcing self-image	gain a sense of self-confidence	M: 2.5 (0.1) F: 2.4 (0.1)	M: 7.1 (0.2) F: 6.8 (0.2)	M: 2.3 (0.1) F: 2.4 (0.1)
	increase my feelings of self-worth	M: 2.2 (0.1) F: 2.1 (0.1)		
	feel like a better person after hunting	M: 2.4 (0.1) F: 2.2 (0.1)		
Social recognition	show others I can hunt	M: 1.6 (0.1) F: 1.8 (0.1)	M: 6.6 (0.2) F: 6.7 (0.1)	M: 1.6 (0.0) F: 1.7 (0.0)
	make a good impression on others	M: 1.8 (0.1) F: 1.7 (0.1)		
	be recognized for hunting	M: 1.8 (0.1) F: 1.8 (0.1)		
	be seen by others hunting	M: 1.4 (0.1) F: 1.4 (0.1)		
Seeking stimulation	get all charged up	M: 2.3 (0.1) F: 2.3 (0.1)	M: 21.6 (0.3) F: 21.6 (0.3)	M: 3.1 (0.0) F: 3.1 (0.0)
	be someplace where things are exciting	M: 3.0 (0.1) F: 3.0 (0.1)		
	experience the thrills of hunting	M: 3.9 (0.1) F: 3.8 (0.1)		
	test the extent to which I can hunt	M: 2.9 (0.1) F: 2.8 (0.1)		
	because hunting is stimulating and exciting	M: 3.6 (0.1) F: 3.6 (0.1)		
	bag an animal	M: 2.8 (0.1) F: 3.1 (0.1)		
	bag a trophy species	M: 3.1 (0.1) F: 3.0 (0.1)		

Table 2.5 Scale items used to measure resident male and female affiliative-oriented motivations for hunting in Mississippi, individual item mean scores (standard error), mean construct scores (standard error), and mean item scores (standard error) for the Survey of Mississippi Resident Hunters conducted from October to December 2009.

Motivation Construct	Scale items (I hunt in Mississippi to:)	Individual Item Mean (SE)	Mean Construct Score (SE)	Mean Score of all Construct Items (SE)
Family togetherness	help bring my family closer together	M: 3.6 (0.1) F: 3.8 (0.1)	M: 10.8 (0.2) F: 11.4 (0.2)	M: 3.6 (0.1) F: 3.8 (0.1)
	get the family to do something together	M: 3.6 (0.1) F: 3.8 (0.1)		
	get the family to spend some time together	M: 3.6 (0.1) F: 3.8 (0.1)		
Being with people (social contact)	have company of people who hunt with me	M: 3.7 (0.1) F: 3.6 (0.1)	M: 27.7 (0.4) F: 27.1 (0.4)	M: 3.5 (0.1) F: 3.4 (0.1)
	be with people who enjoy hunting like I do	M: 3.6 (0.1) F: 3.7 (0.1)		
	hunt with my companions	M: 3.2 (0.1) F: 3.3 (0.1)		
	be with other members of my group	M: 3.1 (0.1) F: 3.1 (0.1)		
	be with people having similar interests	M: 3.5 (0.1) F: 3.4 (0.1)		
	be with people having similar values	M: 3.4 (0.1) F: 3.4 (0.1)		
	be with people who are enjoying themselves	M: 3.5 (0.1) F: 3.6 (0.1)		
	be with friends	M: 3.6 (0.1) F: 3.1 (0.1)		

Table 2.6 Scale items used to measure resident male and female appreciative-oriented motivations for hunting in Mississippi, individual item mean scores (standard error), mean construct scores (standard error), and mean item scores (standard error) for the Survey of Mississippi Resident Hunters conducted from October to December 2009.

Motivation Construct	Scale items (I hunt in Mississippi to:)	Individual Item Mean (SE)	Mean Construct Score (SE)	Mean Score of all Construct Items (SE)
Appreciative	enjoy the scenery	M: 4.0 (0.1) F: 4.0 (0.1)	M: 45.6 (0.6) F: 44.8 (0.6)	M: 3.8 (0.1) F: 3.7 (0.1)
	study nature	M: 3.4 (0.1) F: 3.2 (0.1)		
	be in a natural setting	M: 4.0 (0.1) F: 3.9 (0.1)		
	enjoy the smells and sounds of nature	M: 4.0 (0.1) F: 4.0 (0.1)		
	take in the scenic beauty	M: 4.0 (0.1) F: 4.0 (0.1)		
	learn more about nature	M: 3.7 (0.1) F: 3.5 (0.1)		
	look at the pretty view	M: 3.6 (0.1) F: 3.7 (0.1)		
	be close to nature	M: 4.0 (0.1) F: 3.8 (0.1)		
	take in the natural surroundings	M: 3.9 (0.1) F: 3.9 (0.1)		
	observe the scenic beauty	M: 3.8 (0.1) F: 3.8 (0.1)		
	obtain a feeling of harmony with nature	M: 3.6 (0.1) F: 3.6 (0.1)		
	find out more about natural settings	M: 3.6 (0.1) F: 3.4 (0.1)		



Table 2.7 Results of ANCOVA and final model on reinforcing self-image motivation scores of resident male and female hunters in Mississippi for the Survey of Mississippi Resident Hunters conducted from October to December 2009.

<i>Preliminary ANCOVA</i>					
Source	<i>df</i>	Type III SS	MS	<i>F</i>	<i>P</i>
Model	9	170.74	18.97	1.75	0.075
Gender	1	0.06	0.06	0.10	0.750
Years hunted (Gender)	2	18.95	9.48	1.09	0.337
Age (Gender)	2	74.09	37.04	4.00	0.019
Income (Gender)	2	2.11	1.06	0.24	0.791
Education (Gender)	2	44.59	22.29	1.17	0.311
Error	566	6357.24	11.23		
Corrected Total	575	6527.98			
<i>Adjusted ANCOVA</i>					
Source	<i>df</i>	Type III SS	MS	<i>F</i>	<i>P</i>
Model	3	83.27	27.76	2.61	0.051
Gender	1	35.94	35.94	2.58	0.109
Age (Gender)	2	71.34	35.67	3.19	0.042
Error	632	7194.12	11.38		
Corrected Total	635	7277.39			
<i>Slope Test</i>					
Source	<i>df</i>	Type III SS	MS	<i>F</i>	<i>P</i>
Model	3	83.27	27.76	2.61	0.051
Age*Gender	1	24.17	24.17	1.48	0.224
Error	632	7194.12	11.38		
Corrected total	635	7277.39			
<i>Final Model</i>					
Source	<i>df</i>	Type III SS	MS	<i>F</i>	<i>P</i>
Model	2	59.10	29.55	3.17	0.043
Gender	1	19.17	19.17	2.25	0.134
Age	1	47.17	47.17	4.90	0.027
Error	633	7218.29	11.40		
Corrected Total	635	7277.39			

Table 2.8 Results of ANCOVA and final model on social recognition motivation scores of resident male and female hunters in Mississippi for the Survey of Mississippi Resident Hunters conducted from October to December 2009.

<i>Preliminary ANCOVA</i>					
Source	<i>df</i>	Type III SS	MS	<i>F</i>	<i>P</i>
Model	9	336.78	37.42	3.61	<0.001
Gender	1	10.22	10.22	1.01	0.315
Years hunted (Gender)	2	1.55	0.77	0.12	0.886
Age (Gender)	2	92.36	46.18	4.78	0.009
Income (Gender)	2	1.86	0.93	0.06	0.943
Education (Gender)	2	29.55	14.77	1.18	0.308
Error	566	6051.55	10.69		
Corrected Total	575	6388.33			
<i>Adjusted ANCOVA</i>					
Source	<i>df</i>	Type III SS	MS	<i>F</i>	<i>P</i>
Model	3	334.05	111.35	10.37	<0.001
Gender	1	86.67	86.67	7.15	0.008
Age (Gender)	2	333.60	166.80	15.54	<0.001
Error	632	7131.48	11.28		
Corrected Total	635	7465.53			
<i>Slope Test</i>					
Source	<i>df</i>	Type III SS	MS	<i>F</i>	<i>P</i>
Model	3	334.05	111.35	10.37	<0.001
Age*Gender	1	86.00	86.00	6.99	0.008
Error	632	7131.48	11.28		
Corrected total	635	7465.53			
<i>Final Model</i>					
Source	<i>df</i>	Type III SS	MS	<i>F</i>	<i>P</i>
Model	3	334.05	111.35	10.37	<0.001
Gender	1	86.67	86.67	7.15	0.008
Age	1	261.36	261.36	25.31	<0.001
Age*Gender	1	86.00	86.00	6.99	0.008
Error	632	7131.48	11.28		
Corrected Total	635	7465.53			

Table 2.9 Adjusted mean scores (standard error) by age for social recognition motivations of resident male and female hunters in Mississippi for the Survey of Mississippi Resident Hunters conducted from October to December 2009.

Age	Resident Males (SE) <sup>a</sup>	Resident Females (SE) <sup>a</sup>	<i>P</i>
18	8.60 (0.4)	7.09 (0.4)	0.008*
21	8.37 (0.4)	7.03 (0.3)	0.010*
24	8.14 (0.4)	6.97 (0.3)	0.012*
27	7.91 (0.3)	6.91 (0.3)	0.017*
30	7.68 (0.3)	6.84 (0.2)	0.025*
33	7.45 (0.3)	6.78 (0.2)	0.046*
36	7.22 (0.2)	6.72 (0.2)	0.097
39	6.99 (0.2)	6.66 (0.2)	0.231
42	6.76 (0.2)	6.59 (0.2)	0.534
45	6.53 (0.2)	6.53 (0.2)	0.998
48	6.30 (0.2)	6.47 (0.3)	0.564
51	6.07 (0.2)	6.41 (0.2)	0.291
54	5.84 (0.2)	6.34 (0.3)	0.154
57	5.61 (0.3)	6.28 (0.3)	0.090
60	5.38 (0.3)	6.22 (0.3)	0.058
62	5.23 (0.3)	6.18 (0.3)	0.045*
64	5.08 (0.3)	6.14 (0.4)	0.037*
66	4.92 (0.4)	6.10 (0.4)	0.031*
68	4.77 (0.4)	6.05 (0.4)	0.026*

<sup>a</sup> Average age of resident males and females was 44.9 and 40.8, respectively.

\* Statistically significant difference between resident males and females detected,  $P < 0.05$ .

Table 2.10 Results of ANCOVA and final model on seeking stimulation motivation scores of resident male and female hunters in Mississippi for the Survey of Mississippi Resident Hunters conducted from October to December 2009.

<i>Preliminary ANCOVA</i>					
Source	<i>df</i>	Type III SS	MS	<i>F</i>	<i>P</i>
Model	9	1853.69	205.97	5.95	<0.001
Gender	1	41.31	41.31	1.19	0.275
Years hunted (Gender)	2	46.25	23.13	0.67	0.513
Age (Gender)	2	955.01	477.51	13.80	<0.001
Income (Gender)	2	26.74	13.37	0.39	0.680
Education (Gender)	2	43.93	21.97	0.63	0.530
Error	566	19582.53	34.60		
Corrected Total	575	21436.22			
<i>Adjusted ANCOVA</i>					
Source	<i>df</i>	Type III SS	MS	<i>F</i>	<i>P</i>
Model	3	1887.15	629.05	17.82	<0.001
Gender	1	232.73	232.73	6.59	0.011
Age (Gender)	2	1886.93	943.46	26.72	<0.001
Error	632	22311.66	35.30		
Corrected Total	635	24198.82			
<i>Slope Test</i>					
Source	<i>df</i>	Type III SS	MS	<i>F</i>	<i>P</i>
Model	3	1887.15	629.05	17.82	<0.001
Age*Gender	1	197.28	197.28	5.59	0.018
Error	632	22311.66	35.30		
Corrected total	635	24198.82			
<i>Final Model</i>					
Source	<i>df</i>	Type III SS	MS	<i>F</i>	<i>P</i>
Model	3	1887.15	629.05	17.82	<0.001
Gender	1	232.73	232.73	6.59	0.011
Age	1	1742.08	49.35	49.35	<0.001
Age*Gender	1	197.28	197.28	5.59	0.018
Error	632	22311.66	35.30		
Corrected Total	635	24198.82			

Table 2.11 Adjusted mean scores (standard error) by age for seeking stimulation motivations of resident male and female hunters in Mississippi for the Survey of Mississippi Resident Hunters conducted from October to December 2009.

Age	Resident Males (SE) <sup>a</sup>	Resident Females (SE) <sup>a</sup>	<i>P</i>
18	26.05 (0.8)	23.45 (0.7)	0.010*
21	25.55 (0.7)	23.20 (0.6)	0.011*
24	25.04 (0.6)	23.00 (0.5)	0.012*
27	24.54 (0.6)	22.70 (0.5)	0.013*
30	24.03 (0.5)	22.45 (0.4)	0.017*
33	23.53 (0.5)	22.20 (0.4)	0.025*
36	23.03 (0.4)	21.95 (0.3)	0.045*
39	22.52 (0.4)	21.70 (0.3)	0.098
42	22.02 (0.4)	21.45 (0.3)	0.236
45	21.51 (0.3)	21.20 (0.4)	0.517
48	21.01 (0.4)	20.95 (0.4)	0.908
51	20.50 (0.4)	20.70 (0.4)	0.728
54	20.00 (0.4)	20.45 (0.5)	0.472
57	19.50 (0.5)	20.20 (0.5)	0.314
60	18.99 (0.5)	19.95 (0.6)	0.220
63	18.49 (0.6)	19.70 (0.6)	0.163
66	17.98 (0.7)	19.45 (0.7)	0.127
68	17.65 (0.7)	19.28 (0.7)	0.110

<sup>a</sup> Average age of resident males and females was 44.9 and 40.8, respectively.

\* Statistically significant difference between resident males and females detected,  $P < 0.05$ .

Table 2.12 Results of ANCOVA and final model on family togetherness motivation scores of resident male and female hunters in Mississippi for the Survey of Mississippi Resident Hunters conducted from October to December 2009.

<i>Preliminary ANCOVA</i>					
Source	<i>df</i>	Type III SS	MS	<i>F</i>	<i>P</i>
Model	9	201.12	22.35	2.10	0.028
Gender	1	8.95	8.95	0.18	0.672
Years hunted (Gender)	2	12.54	6.27	0.51	0.602
Age (Gender)	2	8.58	4.29	0.19	0.828
Income (Gender)	2	87.08	43.54	4.03	0.018
Education (Gender)	2	31.44	15.72	0.64	0.530
Error	569	6555.35	11.52		
Corrected Total	578	6756.48			
<i>Adjusted ANCOVA</i>					
Source	<i>df</i>	Type III SS	MS	<i>F</i>	<i>P</i>
Model	3	152.61	50.87	5.66	<0.001
Gender	1	9.61	9.61	0.38	0.540
Income (Gender)	2	85.55	42.77	4.82	0.008
Error	591	6794.09	11.50		
Corrected Total	594	6946.70			
<i>Slope Test</i>					
Source	<i>df</i>	Type III SS	MS	<i>F</i>	<i>P</i>
Model	3	152.61	50.87	5.66	<0.001
Income*Gender	1	2.61	2.61	1.01	0.314
Error	591	6794.09	11.50		
Corrected total	594	6946.70			
<i>Final Model</i>					
Source	<i>df</i>	Type III SS	MS	<i>F</i>	<i>P</i>
Model	2	150.00	75.00	6.53	0.002
Gender	1	78.44	78.44	6.83	0.009
Income	1	82.94	82.94	8.63	0.003
Error	592	6796.70	11.48		
Corrected Total	594	6946.70			

Table 2.13 Results of ANCOVA and final ANOVA on being with people (social contact) motivation scores of resident male and female hunters in Mississippi for the Survey of Mississippi Resident Hunters conducted from October to December 2009.

<i>Preliminary ANCOVA</i>					
Source	<i>df</i>	Type III SS	MS	<i>F</i>	<i>P</i>
Model	9	826.66	91.85	1.42	0.176
Gender	1	20.37	20.37	0.20	0.656
Years hunted (Gender)	2	15.56	7.78	0.04	0.965
Age (Gender)	2	102.05	51.02	0.65	0.524
Income (Gender)	2	80.56	40.28	0.98	0.377
Education (Gender)	2	259.73	129.86	2.44	0.088
Error	569	33641.34	59.12		
Corrected Total	578	34468.01			
<i>Final ANOVA</i>					
Source	<i>df</i>	Type III SS	MS	<i>F</i>	<i>P</i>
Gender	1	54.98	54.98	0.19	0.665
Error	641	39992.75	62.39		
Corrected Total	642	40047.73			

Table 2.14 Results of ANCOVA and final ANOVA on appreciative motivation scores of resident male and female hunters in Mississippi for the Survey of Mississippi Resident Hunters conducted from October to December 2009.

<i>Preliminary ANCOVA</i>					
Source	<i>df</i>	Type III SS	MS	<i>F</i>	<i>P</i>
Model	9	2035.82	226.20	1.79	0.067
Gender	1	226.93	226.93	1.84	0.176
Years hunted (Gender)	2	382.36	191.18	2.03	0.132
Age (Gender)	2	668.34	334.17	2.09	0.125
Income (Gender)	2	94.36	47.18	0.71	0.494
Education (Gender)	2	45.11	22.55	0.27	0.766
Error	561	69039.65	59.12		
Corrected Total	570	71075.47			
<i>Final ANOVA</i>					
Source	<i>df</i>	Type III SS	MS	<i>F</i>	<i>P</i>
Gender	1	119.71	119.71	0.38	0.540
Error	631	80884.65	128.18		
Corrected Total	632	81004.36			



CHAPTER III  
SUBSTITUTABILITY OF HUNTING IN MISSISSIPPI

**Introduction**

Participation in hunting in the United States has declined since 1990 and has been predicted to further decline due to increased constraints to participation and general demographic trends such as increased urbanization, increased minority populations, and an aging population (Decker, Brown, & Siemer, 2001; Decker, Enck, & Brown, 1993; Responsive Management & National Shooting Sports Foundation, 2008; Schuett, Scott, & O’Leary, 2009). The decline in hunting participation poses a threat to state and federal agencies that depend on hunters for funding, in part, wildlife management (Enck, Decker, & Brown, 2000). Declining hunting participation also poses a problem to agencies in terms of continued political support of hunting as a culturally relevant activity (Enck, et al., 2000).

In addition to demographic trends and constraints, declining hunting participation also may be exacerbated by inadequacies in current recruitment and retention practices in natural resources management. Declining hunting participation may be a result of failing to attract new participants into the activity (Enck, et al., 2000). Traditionally, hunting participation relied on a primarily father-son socialization process to initiate new individuals into hunting (Heberlein, Serup, & Ericsson, 2008; Responsive Management & National Shooting Sports Foundation, 2008). While this is still occurring, it is not at the same level as before because increased urbanization may have caused individuals to

acquire a new set of values and stop hunting before they teach their children (Decker, et al., 2001; Hayslette, Armstrong, & Mirarchi, 2001). Therefore, natural resource agencies have had to assume roles related to recruiting new individuals to hunting but little documentation exists that suggest they have been successful. This failure in recruitment includes failing to recruit women and individuals from minority populations.

Women compose 51% of the U.S. population, but only 1% of them hunt; they represent only 9% of the nation's hunting population and only 8.3% of Mississippi's licensed hunters (Hunt, personal communication, 2009; U.S. Dept. of the Interior and U.S. Dept. of Commerce, 2007). Therefore, women are the most under-represented group of individuals in terms of the potential to offset declining hunting participation (Heberlein, et al., 2008). Female hunters are initiated differently into hunting, with most of them initiated by their husbands (Jackson, McCarty, & Rusch, 1989). Further, women may not be participating in hunting because they are following traditional gender roles, especially in the case of them not engaging in male-dominated sports such as hunting (Messner & Sabo, 1990; Wearing, 1991).

Declining hunting participation also may be from failing to retain existing hunters in the activity (Enck, et al., 2000). Although number of hunters in some regions of the U.S. remained relatively stable, proportion of the population that participates in hunting has declined (Enck, et al., 2000). Reasons why hunters have dropped out of the activity include lack of time, lack of interest, lack of opportunities, older age, work and family obligations, perceptions of hunting being cruel to animals, and lesser importance placed on hunting compared to other activities (Bissell, Duda, & Young, 1998; Enck, et al., 2000, Mehmood, Zhang, & Armstrong, 2003).

The decline in hunting participation due to changing demographics, constraints, and failing to recruit and retain individuals suggests a shift in natural resources use by the public and the benefits sought (Schuett, et al., 2009), indicating individuals may have found other outdoor activities that satisfy their needs. To help recruit new individuals into hunting and retain existing hunters, it is important to understand what other activities provide the same benefits sought through hunting and are capturing their interest. Knowing what other activities provide similar benefits to hunting can assist agencies in identifying and targeting groups of individuals who can be recruited more easily into the hunting population, or brought back into the hunting population.

The extent to which one activity can replace another activity and still satisfy the needs of participants defines the underlying concept of the theory of substitution in outdoor recreation research (Vaske, Donnelly, & Tweed, 1983). Substitutability theory was first summarized as the interchangeability of recreation activities that satisfy participants' motives and desires to an equal extent (Hendee & Burdge, 1974). When recreation participants, for one reason or another, cannot engage in their preferred activity they may find other activities to provide them with desired benefits (Brunson, & Shelby, 1993). For instance, 51% of anglers in Florida and Texas described other activities, such as hunting, camping, golf, and swimming that would substitute for fishing and still provide them the same experience they would have received from fishing (Ditton & Sutton, 2004).

Early interests in substitution theory primarily involved qualitative studies focusing on socioeconomic variables, time allotted for leisure participation, social groups, and personality and demographic variables related to defined types of activities sharing similar characteristics (Christensen & Yoesting, 1977; Vaske, Donnelly, &

Shelby, 1990). Quantitative studies defining recreation activity types based on statistical correlations followed the earlier qualitative explorations (Tinsley & Johnson, 1984). Categories of activities were identified using multivariate statistical techniques such as factor and cluster analysis and multidimensional scaling to explore similarities and differences of activities (Manning, 1999). Studies that documented activity clusters were limited in that they could not effectively generalize activity types to use to classify broad leisure patterns (Manning, 1999). These studies also treated activities too homogenously because other research has demonstrated different types of hunting (e.g., deer and goose hunting) are not the same and are not necessarily substitutable for each other (Baumgartner & Heberlein, 1981; Vaske et al., 1990; Manning, 1999). Other shortcomings included the identification of researcher-defined activity substitutes rather than participant-defined substitutes, and the treatment of general recreation activity types as if they are all the same (Vaske, et al., 1983; Manfredo & Anderson, 1987; Manning, 1999). Research conducted by Iso-Ahola (1986) also suggested that substitutability is influenced by why an activity must be substituted and by how participants perceive substitute activities.

Implementation of direct measures expanded the definition of substitutability to refer to the interchangeability of recreation experiences “such that acceptably equivalent outcomes” can be achieved by varying the timing, access, setting, or activity (Brunson & Shelby, 1993, p. 69). Behavioral and direct-question approaches have been developed. The behavioral approach attempts to report activities that respondents would substitute for their preferred activity if they could not participate in it (McCool & Utter, 1982). The direct-question approach asks participants to state activities they considered to be substitutable for a particular activity under study (Baumgartner & Heberlein, 1981; Choi,

Loomis, & Ditton, 1994; Ditton & Sutton, 2004; Manfredo & Anderson, 1987).

Baumgartner and Heberlein (1981) used the direct-question approach to investigate the substitutability of deer and goose hunting in Wisconsin. They found differences between goose and deer hunters in their motivations and number of substitutes reported. Studies using the direct question method yielded favorable findings and that such a method is a valid measure of substitutability (Manning, 1999). Other direct question studies provided insights into the multidimensionality of recreation substitution in which an activity, a resource or setting, time frame, and social group can be substituted (Shelby & Vaske, 1991; Backlund, Hammitt, & Bixler, 2006).

The substitutability literature has constructed a theoretical framework that assumed an equal application for men and women. Ditton and Sutton (2004) suggested that demographic characteristics, like gender, can drive substitution decisions. Previous research has not fully considered traditional gender roles in leisure, especially in the context of women being more constrained than men when it comes to engaging in leisure (Jackson, 1988), and how substitution decisions are affected by those roles. However, substitution decisions in the context of gender have become a popular research topic in the fishing literature due to an increase in female participation in fishing (Fedler & Ditton, 2001). There also is a lack of studies that address effect of gender on outdoor recreation motivations and how they translate into activity substitution. Because substitution originally was linked to motivations to engage in a preferred activity (Hendee & Burdge, 1974), participants who differ in motivations should theoretically report different substitute activities.

The objectives of this study were three-fold: 1) to determine substitutability of recreational hunting for resident hunters in Mississippi using a direct-question approach

in terms of the probability of reporting acceptable substitute activities, and in terms of the spectrum of activities reported, 2) to determine if 14 independent variables, with gender as the primary concern, had an effect on substitutability of hunting for resident hunters in Mississippi using a direct-question approach, and 3) determine if interaction effects existed between gender and the other 13 independent variables. Oquendo (2010) found resident males and females in Mississippi were similar in the achievement-oriented “reinforcing self-image”, the affiliative-oriented “being with people (social contact)” and appreciative-oriented motivations to hunt but differed in the achievement-oriented “social recognition” and “seeking stimulation” and in the affiliative-oriented “family togetherness” motivations to hunt (See Chapter II). Oquendo (2010) found younger females placed lesser importance on “social recognition” and “seeking stimulation” motivations than younger males, and females of all ages placed greater importance on “family togetherness” motivations than males (See Chapter II). Therefore, I expected to find a significant effect of gender on probability of reporting acceptable substitute activities, and I expected resident males and females in Mississippi to differ in reported suitable substitute activities for hunting.

### **Methods**

I developed and mailed a 12-page self-administered questionnaire to a stratified random sample of 2,000 individuals (1,000 White resident male hunters and 1,000 White resident female hunters), age 18 and older, who purchased either a Mississippi Type 100 – Sportsman, Type 101 – All Game Hunting and Fishing, or Type 103 – Small Game Hunting and Fishing license during the 2008-2009 hunting season. Individuals were selected from the 2008-2009 electronic license file maintained by the Mississippi

Department of Wildlife, Fisheries, and Parks (MDWFP). I followed Dillman's (2007) Tailored Design Method for questionnaire design. Four out of the 12 pages of the mail questionnaire consisted of hunting substitution and related items used as independent variables. The remaining pages consisted of items that were not pertinent to the theoretical investigation of the substitutability of hunting and items that were collected for MDWFP's purposes.

The four pages of the questionnaire pertaining to the substitutability of hunting contained four parts that followed a direct-question approach similar to that of Ditton & Sutton (2004). The first part of the questionnaire consisted of items related to hunter demographics. First, I asked open-ended questions for respondents to report their age and county of residence. Second, I asked closed-ended questions to gather information about the respondent's gender, income level, and education level. I asked respondents to report their approximate annual household income before taxes in \$20,000 increments from "under \$20,000" to "\$200,000 and above". I asked their greatest completed level of education in which "1" through "8" was elementary school, "9" through "12" was high school, "13" through "16" was college, and "17" through "22+" was graduate school.

The second part of the questionnaire was designed to measure hunters' participation in hunting. First, I asked an open-ended question related to how many years respondents had been hunting. Second, I asked closed-ended questions asking the respondent to indicate the importance of hunting as an outdoor activity and if they experienced constraints to hunting that caused them to find substitute activities.

The third part of the questionnaire was designed to measure hunters' motivations to hunt. I asked respondents to rate the relative importance of the achievement-oriented "reinforcing self-image", "social recognition", and "seeking stimulation", the affiliative-

oriented “family togetherness” and “being with people (social contact)”, and appreciative-oriented motivations to hunt in Mississippi using a five-point measurement scale with the following response format: 1 = “not at all important”, 2 = “slightly important”, 3 = “moderately important”, 4 = “very important” and 5 = “extremely important” to obtain total scores (See Chapter II).

The fourth part of the questionnaire was designed to measure hunters’ substitute activities for hunting. First, I asked respondents to indicate if there were was a substitute activity for hunting that would give them the same satisfaction and enjoyment as hunting. Second, I asked an open-ended question for respondents to list up to three outdoor activities they considered to be overall suitable substitutes for hunting. Then I asked respondents to indicate the extent to which their listed activities were good or poor substitutes for hunting using a five-point measurement scale with the following response format: 1 = “very poor”, 2 = “poor”, 3 = “fair”, 4 = “good” and 5 = “very good”. Third, I asked respondents to report how many days they participated in each of the activities they listed as substitutes for hunting in the past 12 months.

I used a modified version of Dillman’s (2007) Tailored Design Method for survey mailing procedures. I administered the survey from October to December of 2009. I made initial contact with participants via a pre-notice letter which alerted them of the study and that a questionnaire would be coming within the next week. One week after the pre-notice letter, I sent a complete packet consisting of an introductory letter, questionnaire, and postage-paid business reply envelope to participants. One week after the first mailing of the complete packet, I sent a thank you/reminder postcard to participants. Two weeks after the postcard mailing, I sent a second complete packet to participants who had not yet responded. Three weeks after the second mailing of the



complete packet, I sent a final complete packet to participants who had not yet responded via regular mail instead of following Dillman's (2007) suggestion of using express mail.

I logged off returned useable, non-deliverable, and non-useable surveys. I numerically coded non-numeric responses of returned useable surveys. Any questionnaire received after a 90-day data collection period was not used in analyses. I entered data from eligible questionnaires into a Microsoft® Access database. Prior to analyses of the substitutability of hunting, I checked for missing and obscure values in the data. Furthermore, I checked for possible non-response bias using Fisher's (1996) methods, because some segments of the hunter population could be over-represented or under-represented. I calculated response probabilities using a logistic regression model that included independent variables from the electronic license file (age and gender), and response status (1 = responded, 0 = not responded) as the binary dependent variable. I obtained non-response adjustment weights from the inverse of the response probabilities. I used SAS® Version 9.1 (SAS Institute, Inc., 2008) to conduct necessary analyses. I set my significance level at  $\alpha = 0.05$  throughout my study. I determined statistical power following Cohen (1988).

The independent variables were hunter demographics (gender, age, income, education level, and county of residence), hunting participation characteristics (importance of hunting compared to other outdoor activities, years hunted, and constraints to hunting), and hunting motivation scores (achievement-oriented motivation scores for "reinforcing self-image", "social recognition", and "seeking stimulation", affiliative-oriented motivation scores for "family togetherness" and "being with people (social contact)", and appreciative-oriented motivation scores; See Chapter II). The dependent variable was the probability of a respondent reporting an acceptable substitute

activity for hunting. I used descriptive statistical procedures consisting of frequencies and weighted means for independent variables.

I used the logistic regression model described by Ditton & Sutton (2004) to simultaneously test effects of the 14 independent variables on the probability of a respondent reporting at least one acceptable substitute activity for hunting. I deleted any respondents who indicated that there were no substitute activities for hunting and still erroneously reported acceptable substitute activities ( $n = 25$ ). Model estimation followed four steps. First, I included all main effects and any possible two-way interaction effects involving gender to test if each of the other independent variables had the same effect for males and females. Second, I deleted any non-significant interaction effects. Third, I estimated the model again on remaining variables to test for any significant interactions and main effects on the probability of reporting an acceptable substitute activity. Fourth, I deleted any non-significant main effects and estimated the model one more time. I looked at odds ratios to interpret the significant variables. An odds ratio greater than 1 indicated a positive relationship between the independent variable and the odds of reporting a substitute activity; an odds ratio less than 1 indicated a negative relationship between the independent variable and the odds of reporting a substitute activity (Agresti, 1996). I calculated an odds ratio of significant variables for different increments and confidence intervals for each significant variable.

To examine acceptable substitute activities reported by respondents, I determined number of different activities reported by females and males separately. Then I classified all activities reported by all respondents into different activity categories for ease of explaining results. I deleted any respondents who indicated that there were no substitute activities for hunting and still erroneously reported acceptable substitute activities ( $n =$

25). I also deleted any substitute activity categories containing activities that were rarely reported ( $n < 8$  for females and  $n < 6$  for males) by males and females from the analysis due to lack of sufficient sample size to illustrate the general number of acceptable substitute activities reported by 95% of respondents. I retained all acceptable substitute activities reported by respondents for examination of number and type of acceptable activities for males and females according to various age groups and according to the importance of hunting as an outdoor activity. I used frequencies and means to illustrate number and types of acceptable substitute activity categories reported, average extent to which activities were good or poor substitutes for hunting, and average number of days participated in activities only for those males ( $n = 90$ ) and females ( $n = 137$ ) who actually reported acceptable substitute activities in the survey. Additionally, I determined frequencies of reported acceptable substitute activities according to each significant main effect variable from final logistic analyses.

## **Results**

### **Response Rates**

I obtained useable data from 661 individuals of which 307 were resident males and 354 were resident females (Table 3.1). I obtained 142 non-deliverable surveys and 49 non-eligible surveys, of which 41 were refusals and eight were respondents who indicated they did not hunt. I calculated response rates by dividing number of returned useable surveys by total number of surveys minus number of non-deliverable and non-eligible surveys (Dillman, 2007). Overall response rate was 36.5%. Females had the greatest response rate at 38.8%, whereas males had a response rate of 34.3%. I obtained a large enough sample size for males and females to achieve 99% statistical power when

examining group differences (Cohen, 1988; McNamara, 1994). Fisher's (1996) analysis of non-response indicated younger females were under-represented in this study. Any overall population estimate in this study was corrected for this under-representation using weighting procedures. After this correction, population estimates were generalizable to the White resident licensed hunter population with a 3.8% margin of error.

### **Substitutability of Hunting in Mississippi**

Weighted descriptive statistics for all independent variables used for the estimation of the logistic regression model are presented in Table 3.2. For hunter demographic variables used for the substitution analysis, resident hunters consisted of 8% females. Average age of hunters was approximately 40.8 years (SE = 0.6, n = 621); their median income level was \$60,000 - \$79,999 (SD = 3.0, n = 578); their average greatest education level completed was 13.6 years or some college (SE = 0.1, n = 617). Approximately 48% of hunters resided in urban counties (Table 3.2). For hunting participation variables used for the substitution analysis, I found average importance of hunting as an outdoor activity was approximately 1.6 (SE = 0.0, n = 618). Hunters hunted an average of approximately 28.2 years (SE = 0.6, n = 618) and approximately 15% of them indicated that constraints have caused them to find substitute activities (Table 3.2). For hunting motivation variables used for the substitution analysis (See Chapter II; Table 3.2), I found the average score for resident hunters was approximately 7.2 (SE = 0.1, n = 608) on "reinforcing self-image"; 6.9 (SE = 0.1, n = 609) on "social recognition"; 22.2 (SE = 0.3, n = 600) on "seeking stimulation"; 10.9 (SE = 0.1, n = 615) on "family togetherness"; 27.6 (SE = 0.3, n = 607) on "being with people (social contact)"; 45.3 (SE = 0.5, n = 599) on appreciative motivations.

I did not detect any significant interaction effects involving gender and hunter demographic variables, indicating effect of each hunter demographic variable was consistent for males and females on probability of reporting an acceptable substitute activity. I did not find a statistically significant effect of gender ( $X^2 = 0.94, P = 0.332$ ), income level ( $X^2 = 0.78, P = 0.379$ ), education level ( $X^2 = 0.02, P = 0.883$ ), and county of residence ( $X^2 = 0.86, P = 0.354$ ) on probability of reporting an acceptable substitute activity (Table 3.3). I found a statistically significant effect of age ( $X^2 = 5.46, P = 0.020$ ) on probability of reporting an acceptable substitute activity (Table 3.4). Based on the odds ratio, the probability of resident hunters reporting an acceptable substitute activity was related positively to age. As per Table 3.5, a 10 year increase in age increases the odds of having a substitute activity by 1.22 times and a 40 year increase in age increases the odds of having a substitute activity by 2.24 times. In other words, the odds of a 30-year-old hunter reporting a substitute activity for hunting were 1.22 times greater than the odds of a 20-year-old hunter reporting a substitute activity, and the odds of a 60-year-old hunter reporting a substitute activity for hunting were 2.24 times greater than the odds of a 20-year-old hunter reporting a substitute activity.

I detected a significant interaction effect involving gender and constraints to hunting ( $X^2 = 5.75, P = 0.017$ ), indicating effect of constraints was inconsistent for males and females on probability of reporting an acceptable substitute activity (Table 3.4). The odds ratio for the interaction between gender and constraints suggested the probability of females indicating constraints to hunting did not cause them to find substitute activities was 1.30 times (95% confidence interval: 1.05 – 1.61) greater than males. I did not detect a significant interaction effect involving gender and the other hunting participation variables. I did not find a statistically significant effect of years hunted ( $X^2 = 0.19, P =$

0.667) and constraints to hunting ( $X^2 = 2.66, P = 0.103$ ) on probability of reporting an acceptable substitute activity (Table 3.3). I found a statistically significant effect of importance of hunting as an outdoor activity ( $X^2 = 62.93, P < 0.001$ ) on probability of reporting an acceptable substitute activity (Table 3.4). Based on the odds ratio, the probability of resident hunters reporting an acceptable substitute activity was related positively to the importance of hunting as an outdoor activity. As per Table 3.5, odds of a hunter reporting a substitute activity for hunting was 8.89 times greater for hunters who indicated hunting was their third most important outdoor activity compared to hunters who indicated hunting was their most important outdoor activity. In other words, the less importance hunters placed on hunting as an outdoor activity, the greater their odds of reporting a substitute activity for hunting.

I did not detect any significant interaction effects involving gender and the hunting motivation variables, indicating the effect of each hunting motivation variable was consistent for males and females on probability of reporting an acceptable substitute activity. I did not find a statistically significant effect of “reinforcing self-image” motivations ( $X^2 = 0.56, P = 0.455$ ), “social recognition” motivations ( $X^2 = 3.58, P = 0.058$ ), “seeking stimulation” motivations ( $X^2 = 0.76, P = 0.383$ ), “family togetherness” motivations ( $X^2 = 1.74, P = 0.187$ ), “being with people (social contact)” motivations ( $X^2 = 0.01, P = 0.906$ ), and appreciative motivations ( $X^2 = 1.78, P = 0.183$ ), on probability of reporting an acceptable substitute activity (Table 3.3; Table 3.4).

Out of the 354 females and 307 males who responded to the survey and accounting for appropriate deletions of individuals described in the methods, 309 females and 262 males responded to the hunting substitution question. Out of the 309 females and 262 males who responded to that question, 46.3% of females ( $n = 143$ ) and 35.5% of

males (n = 93) indicated that other activities could substitute for hunting. Out of the 143 females and 93 males who indicated other activities could substitute for hunting, most females (95.8%, n = 137) and most males (96.8%, n = 90) reported acceptable substitute activities. Females (n = 137) reported 70 different acceptable substitute activities; males (n = 90) reported 58 different acceptable substitute activities. After classifying activities, I obtained 19 different activity categories (Table 3.6; Table 3.7).

Out of the 137 females and 90 males who reported substitute activities, most females (70.8%, n = 97) and most males (81.1%, n = 73) reported fishing as a substitute activity for hunting. For females, average rating of fishing as a substitute activity for hunting was 4.3 (SE = 0.1, n = 92; Table 3.6) and average days participated in fishing was 26.8 (SE = 3.8, n = 88; Table 3.6). For males, average rating of fishing as a substitute activity for hunting was 4.4 (SE = 0.1, n = 72; Table 3.7) and average days participated in fishing was 37.9 (SE = 6.0, n = 68; Table 3.7). Approximately 37.2% of females (n = 51) and 31.1 % of males (n = 28) also reported camping as a substitute activity for hunting. For females, average rating of camping as a substitute activity for hunting was 4.1 (SE = 0.1, n = 48; Table 3.6) and average days participated in camping was 15.7 (SE = 4.3, n = 45; Table 3.6). For males, average rating of camping as a substitute activity for hunting was 4.2 (SE = 0.2, n = 27; Table 3.7) and average days participated in camping was 16.9 (SE = 5.9, n = 26; Table 3.7).

Females reported more substitute activities if their ages were between 37 and 46 years (Table 3.8). Males reported more substitute activities if their ages were between 47 and 56 years (Table 3.9). A greater percentage of females reported fishing as a substitute activity if their ages were between 37 and 46 years (19.0%, n = 26; Table 3.8). A greater percentage of males reported fishing as a substitute activity if their ages were between 47

and 56 years (27.8%, n =25; Table 3.9). Males and females reported fishing, camping, and other outdoor activities as substitute activities no matter how old they were. In addition to fishing, camping, and other outdoor activities, females of all ages also reported water activities, hiking, all-terrain vehicle riding, equestrian activities, exercise, running, walking, and nature viewing as substitute activities for hunting (Table 3.8). Males of all ages also reported sports as a substitute activity for hunting (Table 3.9). Number of substitute activities females reported generally increased as they aged (Table 3.8). Similarly, number of substitute activities males reported generally increased as they aged (Table 3.9).

Females reported more substitute activities if they rated hunting as their second most important outdoor activity (Table 3.10). Males reported more substitute activities if they rated hunting as their most important outdoor activity (Table 3.11). A greater percentage of females reported fishing as a substitute activity if they rated hunting as their second most important outdoor activity (29.9%, n = 41; Table 3.10). Similarly, a greater percentage of males reported fishing as a substitute activity if they rated hunting as their second most important outdoor activity (31.1%, n = 28; Table 3.11). Males and females reported fishing, camping, and hiking as substitute activities regardless of how important hunting was as an outdoor activity. In addition to fishing, camping, and hiking, females also reported water activities, all-terrain vehicle riding, exercise, running, walking, yard work and gardening, photography, nature viewing, and other outdoor activities as substitute activities at all levels of importance of hunting as an outdoor activity (Table 3.10). Males also reported sports as a substitute activity at all levels of importance of hunting as an outdoor activity in addition to fishing, camping, and hiking (Table 3.11). Number of substitute activities females reported generally declined as they



placed less importance on hunting as an outdoor activity (Table 3.10). Similarly, number of substitute activities males reported generally declined as they placed less importance on hunting as an outdoor activity (Table 3.11).

### **Discussion**

In this study, I wanted to use a direct-question approach to determine the probability of Mississippi resident hunters reporting acceptable substitute activities for hunting and determine the spectrum of activities reported. Additionally, I wanted to determine if gender had an effect on substitutability of hunting for resident hunters in Mississippi. With the theory of substitutability being previously linked to satisfying participant motives (Hendee & Burdge, 1974) and Oquendo (2010) finding differences between Mississippi resident male and female hunters on “social recognition”, “seeking stimulation”, and “family togetherness” motivations to hunt (See Chapter II), I expected to find a significant effect of gender on probability of reporting acceptable substitute activities. I also expected resident males and females in Mississippi to report different suitable substitute activities for hunting.

I did not find a significant effect of gender on probability of reporting an acceptable substitute activity. Although Oquendo (2010) found differences in “social recognition”, “seeking stimulation”, and “family togetherness” motivations to hunt between resident females and males in Mississippi (See Chapter II), gender had no significant bearing on the probability of a resident hunter reporting an acceptable substitute activity for hunting. This suggests that the probability of substituting activities within the theory of substitutability may be equally applicable to the social and cultural construction of resident female and male hunters in Mississippi and that substitution

decisions may be similar between groups. Instead, I found age, importance of hunting as an outdoor activity, and interaction between constraints and gender to have a significant effect on probability of reporting acceptable substitute activities.

Resident hunters were more likely to report a substitute activity for hunting as they got older. Resident female hunters reported as many as 18 different substitute activities when they were between 37 and 46 years of age. Resident male hunters reported as many as 17 different substitute activities when they were between 47 and 56 years of age. This suggests resident hunters in Mississippi may be participating in a wide variety of outdoor activities and may become more willing to substitute one activity for another, especially as they get older. Therefore, activity substitution decisions may vary by different age groups.

Age having a significant effect on probability of resident hunters reporting an acceptable substitute activity may pose a problem for hunting participation in Mississippi and throughout the United States because an aging society has been found to be an important demographic trend affecting hunting participation (Decker, et al., 2001). Attrition from hunting is more likely to occur with older individuals as they go through various stages of their life cycles (Yoesting & Christensen, 1981). Thus, retaining those individuals may be difficult because they have an expanded set of acceptable activities.

Further, as the hunting population ages and continued desertion from hunting occurs, resulting consequences may include decreased license sales and reduced funding for natural resources management (Responsive Management & National Shooting Sports Foundation, 2008). Managers may be best suited to design and provide a variety of hunting programs that focus on elements desired by individuals of all ages, especially younger individuals under the age of 16 (Responsive Management & National Shooting

Sports Foundation, 2008). Programs that focus on recruiting younger individuals to hunting and retaining current older hunters can be help sustain participation in the activity.

I found the importance of hunting as an outdoor activity had a significant effect on probability of reporting acceptable substitute activities. Resident hunters were more likely to report a substitute activity as they placed less importance on hunting as an outdoor activity. Resident females reported as many as 17 substitute activities when hunting was not their most important outdoor activity. Similarly, resident males reported as many as 15 substitute activities when hunting was not their most important outdoor activity. Average rating of importance of hunting as an outdoor activity was approximately 1.6 (SE = 0.03, n = 618; Table 3.2), indicating hunting may not be the most important outdoor activity to resident hunters in Mississippi and may explain why they reported a plethora of substitute activities. However, importance of hunting as an outdoor activity may not be divided equally between men and women. With women reporting more substitute activities for hunting at any level of importance of hunting suggests hunting may be less important to them compared to men.

I found a significant gender and constraints interaction effect on probability of resident hunters reporting an acceptable substitute activity. Previous gender literature have illustrated women experience more constraints than men when it comes to leisure (Jackson, 1988). However, I found resident females were 1.3 times more likely than resident males to indicate constraints to hunting did not cause them to find substitute activities. This may be because resident females are already participating in hunting and are able to negotiate constraints to hunting, causing them to not need to make substitution decisions.

I did not find a significant effect of the achievement-oriented “reinforcing self-image”, “social recognition”, “seeking stimulation”, affiliative-oriented “family togetherness” and “being with people (social contact)” or appreciative-oriented hunting motivations on probability of reporting acceptable substitute activities. This was not expected because the theory of substitutability originally involved the substitution of activities that satisfied a participant’s motives. Oquendo (2010) found “social recognition”, “seeking stimulation”, and “family togetherness” motivations to be different between female and male resident hunters (See Chapter II) and should have therefore had a bearing on probability of resident hunters reporting acceptable substitute activities for hunting. Substitution decisions by resident hunters in Mississippi may not be as linked to motivations as the theory of substitutability originally suggested. The theory of substitutability may be greater linked to the fundamental premise of why a substitution decision must be made and how participants perceive substitute activities (Iso-Ahola, 1986; Manning, 1999)

I expected resident male and female hunters to report different spectrums of suitable substitute activities because Oquendo (2010) found differences between groups on “social recognition”, “seeking stimulation”, and “family togetherness” motivations to hunt in Mississippi (See Chapter II). Although gender had no significant effect on probability of reporting acceptable substitute activities, resident males and females still differed in activities they reported as substitutes for hunting. Nonetheless, fishing was the most reported substitute activity by each group, which suggests males and females prefer to substitute hunting for another consumptive recreation activity. Females as a group reported more activities than males, indicating females may be drawn to a wide variety of outdoor activities to cater to their needs. Females also reported traditionally

feminine activities, such as equestrian activities and gardening. Therefore, differences between resident males and females may be more evident for outdoor activities that are considered to be masculine or feminine (Manning, 1999). Resident females and males still reported a few similar activities as substitutes for hunting, but this does not necessarily mean that males and females perceive those activities to be similar to hunting (Vaske, et al., 1983). Female and male resident hunters in Mississippi may differ in their actual desired outdoor recreation experiences instead of activities alone. My results, however, should be interpreted with caution as they were based on only those individuals who reported a substitute activity, which was a sample size that was smaller than the number of respondents who returned their questionnaires with useable data and indicated other activities could substitute for hunting. Additionally, differences in reported substitute activities cannot necessarily be completely attributed to differences in “social recognition”, “seeking stimulation”, and “family togetherness” motivations to hunt (See Chapter II).

Despite gender not having a significant effect on probability of resident hunters reporting an acceptable substitute activity, natural resource managers in Mississippi may still need to be cognizant of resident males and females differing in reported substitute activities. Natural resource managers in Mississippi may be best suited to continue to provide a wide variety of opportunities while still maintaining a healthy natural environment and a productive hunting environment (Vaske, et al., 1990). This can be accomplished by better understanding how use patterns shift as hunters choose substitute activities and how pressure is applied to other resources from those substitution decisions (Vaske, et al., 1990). For hunters, if suitable alternative activities, settings, and other resources are not available, this could result in a reduced hunter clientele base, reduced

hunting license sales, and reduced financial support for natural resources management. Because females reported more substitute activities than males, women should continue to be seen as a potential target group for recruitment into hunting in an effort to sustain the hunting population and for financial support for wildlife management perhaps through further development and expansion of gender-specific programs, such as *Becoming an Outdoors Woman*, that can be marketed in female-friendly outlets of substitute activities (e.g., gardening magazines). Natural resource managers also may need to keep in mind that importance of hunting as an outdoor activity and the gender and constraints interaction had a significant effect on probability of resident hunters reporting an acceptable substitute. This may be more important for resident female hunters who still may be more constrained to participating in hunting despite them indicating constraints have not caused them to find substitute activities.

The theory of substitutability was developed primarily from research on traditional clientele (i.e., White males), and further research is needed to better understand substitution decisions of under-represented individuals such as women. Understanding the meanings of leisure and construction of gender in the context of leisure can yield important information about opportunities males and females actually seek (Henderson, 1994). Therefore, more studies are needed to better understand effect of gender on leisure and substitute activities, especially in the context of women's lives (Green, Hebron, & Woodard, 1990) and contrasted within ethnic and racial groups (Barnett, 2006).

Although motivations to hunt did not have a significant effect on probability of resident hunters reporting an acceptable substitute activity, future research is needed to investigate willingness to substitute other activities for hunting in the context of each

motivation orientation instead of inquiring about substitute activities in general. Future research is also needed to closely examine the constraints resident hunters may have when it comes to participating in outdoor recreation to better understand why substitution decisions need to be made.

Identifying substitute activities for recreational hunting does not entirely explain substitute decisions of individuals (Choi, Loomis, & Ditton, 1994). Substitutability is a broad issue and should not be treated too simplistically (Manning, 1999), because recreation experiences vary with different settings, activities, time periods, and social groups (Shelby & Vaske, 1991; Baumgartner & Heberlein, 1981). Incorporating these attributes could potentially yield fewer substitutes that provide the same desired benefits (Shelby & Vaske, 1991). Future research efforts should investigate the temporal and resource dimensions of substitutability (Shelby & Vaske, 1991) and effect of social groups on recreation activities and social meanings of overall recreational experiences (Baumgartner & Heberlein, 1981; Buchanan, Christensen, & Burdge, 1981; Choi, et al., 1994; Snow, 1980) through hypothetical scenarios. Substitution behavior also should be investigated regarding a choice behavior model because directly reporting substitute activities may not necessarily predict choice behavior of individuals and subsequently not yield quality substitutes (Manfredo & Anderson, 1987; Peterson, Stynes, Rosenthal, & Dwyer, 1984).

Although I was able to gather the necessary information to conduct analyses on probability of resident hunters reporting acceptable substitute activities and compare spectrum of substitute activities reported by males and females, this study used a direct-question approach through a mail survey and therefore limited the kind of information gathered about substitution behavior. If appropriate resources are in place, behavioral

studies could be conducted to observe actual substitution behavior where the researcher documents activities that respondents substitute for their preferred activity in the event that they cannot participate in it (Vaske, et al., 1983; McCool & Utter, 1982). In the case that behavioral studies are not feasible, then direct studies could be conducted with improved survey instruments that asked respondents to rate the importance of various situational variables, such as setting, time period of participation, and with whom they participate in outdoor recreation to better understand substitution behavior.



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Table 3.1 Response categories and rates by gender for the Survey of Mississippi Resident Hunters conducted from October to December 2009.

Category	White males	White females	Overall totals
# Mailed	1000	1000	2000
# Not returned	589	559	1148
# Returned useable	307	354	661
# Non-eligible <sup>a</sup>	29	20	49
# Non-deliverable	75	67	142
Response rate <sup>b</sup>	34.3%	38.8%	36.5%

<sup>a</sup> Non-eligibles included 41 refusals and 8 were respondents who did not hunt.

<sup>b</sup> Response rate calculated by dividing number of returned useable surveys by total number of surveys sent minus number of non-deliverable and non-eligible surveys.

Table 3.2 Weighted descriptive statistics for all variables included in the logistic regression analysis for the Survey of Mississippi Resident Hunters conducted from October to December 2009. Standard error of the mean and standard deviation for the median are reported where appropriate.

Variables	n	Mean ( $\bar{x}$ ) or Median (Md)	SE or SD	Range
<i>Hunter Demographics</i>				
Gender (% Female)	625	$\bar{x} = 0.08$	0.01	0 (Male) – 1 (Female)
Age	621	$\bar{x} = 40.78$	0.56	18 – 74 years
Income level <sup>a</sup>	578	Md = 4.00	3.03	1 – 11
Education level <sup>b</sup>	617	$\bar{x} = 13.60$	0.11	1 – 22+
County of resident (% Urban)	604	$\bar{x} = 0.48$	0.02	0 (Rural) – 1 (Urban)
<i>Hunting Participation</i>				
Importance of hunting as an outdoor activity <sup>c</sup>	618	$\bar{x} = 1.57$	0.03	1 – 4
Years hunted	618	$\bar{x} = 28.21$	0.58	0 – 65 years
Constraints to hunting (% Yes)	485	$\bar{x} = 0.15$	0.02	0 (Yes) – 1 (No)
<i>Hunting Motivations<sup>d</sup></i>				
Reinforcing self-image	608	$\bar{x} = 7.16$	0.14	3 – 15
Social recognition	609	$\bar{x} = 6.86$	0.14	4 – 20
Seeking stimulation	600	$\bar{x} = 22.23$	0.25	7 – 35
Family togetherness	615	$\bar{x} = 10.85$	0.14	3 – 15
Social contact	607	$\bar{x} = 27.58$	0.31	8 – 40
Appreciative	599	$\bar{x} = 45.27$	0.45	12 – 60

<sup>a</sup> Measured on an 11-point scale with response categories ranging from 1 = under \$20,000 to 11 = \$200,000 and above in \$20,000 increments.

<sup>b</sup> Measured on a scale in which “1” through “8” was elementary school, “9” through “12” was high school, “13” through “16” was college, and “17” through “22+” was graduate school.

<sup>c</sup> Measured on a 4-point scale with the following response categories: 1 = most important outdoor activity, 2 = second most important outdoor activity, 3 = third most important outdoor activity, and 4 = none of the above.

<sup>d</sup> Measured items for each motivational construct on a 5-point scale with the following response categories: 1 = not at all important, 2 = slightly important, 3 = moderately important, 4 = very important, and 5 = extremely important.

Table 3.3 Results of the preliminary logistic regression analysis of all variables to test for significant effects on probability of reporting an acceptable substitute activity for hunting without non-significant interactions for the Survey of Mississippi Resident Hunters conducted from October to December 2009.

Parameter	df	Estimate	SE	Chi-square ( $\chi^2$ ) value	P
Intercept	1	-3.514	1.464	5.76	0.016
<i>Hunter demographics</i>					
Gender	1	0.179	0.185	0.94	0.332
Age	1	0.028	0.012	5.08	0.024
Income	1	-0.049	0.056	0.78	0.379
Education	1	-0.008	0.057	0.02	0.883
County	1	-0.115	0.124	0.86	0.354
<i>Hunting Participation</i>					
Hunting importance	1	1.086	0.155	48.89	<0.001
Years hunted	1	-0.005	0.012	0.19	0.667
Constraints	1	2.255	0.156	2.66	0.103
Constraints*Gender	1	0.357	0.157	5.22	0.022
<i>Hunting Motivations</i>					
Reinforcing self-image (transformed data)	1	0.495	0.663	0.56	0.455
Social recognition (transformed data)	1	1.460	0.772	3.58	0.058
Seeking stimulation	1	-0.052	0.026	4.06	0.044
Family togetherness (transformed data)	1	-0.178	0.135	1.74	0.187
Being with people (social contact) (transformed data)	1	0.015	0.131	0.01	0.906
Appreciative (transformed data)	1	0.120	0.090	1.78	0.183

Table 3.4 Results of the final logistic regression analysis of all variables to test for significant effects on probability of reporting an acceptable substitute activity for hunting without non-significant interactions and non-significant main effects from preliminary model for the Survey of Mississippi Resident Hunters conducted from October to December 2009.

Parameter	df	Estimate	SE	Chi-square ( $X^2$ ) value	<i>P</i>
Intercept	1	-2.894	0.736	15.46	<0.001
<i>Hunter demographics</i>					
Age	1	0.020	0.009	5.46	0.020
<i>Hunting Participation</i>					
Hunting importance	1	1.092	0.138	62.93	<0.001
Constraints*Gender	1	0.261	0.109	5.75	0.017
<i>Hunting Motivations</i>					
Seeking stimulation	1	-0.017	0.019	0.76	0.383



Table 3.5 Odds ratios for variables found to have a significant effect on probability of reporting an acceptable substitute activity for hunting for the Survey of Mississippi Resident Hunters conducted from October to December 2009.

Variable	Odds ratio	95% CI
<b>Age</b>		
1 year increase	1.02	1.00 – 1.04
10 year increase	1.22	1.20 – 1.24
20 year increase	1.50	1.47 – 1.52
30 year increase	1.83	1.80 – 1.86
40 year increase	2.24	2.21 – 2.28
<b>Importance of hunting as an outdoor activity</b>		
1 unit increase	2.98	2.28 – 3.90
2 unit increase	8.89	6.78 – 11.64
3 unit increase	26.49	20.23 – 34.70

Table 3.6 Percentage of resident female hunters (n = 137) by activity categories reported as acceptable substitutes for hunting, their mean substitution rating and mean days participated in each activity category during the past 12 months for the Survey of Mississippi Resident Hunters conducted from October to December 2009. Standard error reported in parentheses. Only those activities identified as a substitute by more than 5% of females are listed.

Activity Category <sup>a</sup>	Resident Female Hunters <sup>b</sup>		Mean Substitution Rating <sup>c</sup> (SE)	Mean Days (SE)
	n	%		
Fishing (All types)	97	70.8	4.3 (0.1)	26.8 (3.8)
Camping	51	37.2	4.1 (0.1)	15.7 (4.3)
Water activities	26	19.0	4.3 (0.3)	11.2 (2.8)
Hiking	21	15.3	4.0 (0.2)	8.0 (1.9)
All-terrain vehicle riding	16	11.7	4.5 (0.2)	53.1 (17.6)
Equestrian activities	15	10.9	4.6 (0.2)	64.2 (19.1)
Exercise, running, walking	14	10.2	4.1 (0.2)	129.6 (20.4)
Sports	13	9.5	4.4 (0.3)	34.6 (11.5)
Yard work/Gardening	12	8.8	3.9 (0.3)	112.9 (23.3)
Other outdoor activities <sup>d</sup>	12	8.8	3.7 (0.4)	46.2 (14.6)
Photography (All types)	11	8.0	4.5 (0.3)	63.5 (27.0)
Nature viewing	10	7.3	4.2 (0.3)	97.2 (38.7)
Social activities (Family and friends)	8	5.8	4.8 (0.2)	152.4 (61.5)

<sup>a</sup> Items ordered by greatest % of female hunters.

<sup>b</sup> Total adds up to more than 100% because female hunters could list up to three substitute activities.

<sup>c</sup> Substitution rating with the following response categories: 1 = very poor, 2 = poor, 3 = fair, 4 = good, 5 = very good.

<sup>d</sup> Other activities included: Nature walking, skiing, hand gliding, sky diving, mountain biking, military activities, field trials, compass courses, trapping, catching frogs, flying, and relic hunting.

Table 3.7 Percentage of resident male hunters (n = 90) by activity categories reported as acceptable substitutes for hunting, their mean substitution rating and mean days participated in each activity category during the past 12 months for the Survey of Mississippi Resident Hunters conducted from October to December 2009. Standard error reported in parentheses. Only those activities identified as a substitute by more than 5% of males are listed.

Activity Category <sup>a</sup>	Resident Male Hunters <sup>b</sup>		Mean Substitution Rating (SE) <sup>c</sup>	Mean Days (SE)
	n	%		
Fishing (All types)	73	81.1	4.4 (0.1)	37.9 (6.0)
Camping	28	31.1	4.2 (0.2)	16.9 (5.9)
Sports	27	30.0	3.9 (0.2)	55.0 (14.8)
Water activities	13	14.4	4.3 (0.3)	47.2 (23.6)
Other outdoor activities <sup>d</sup>	9	10.0	4.4 (0.2)	10.4 (3.6)
Hiking	8	8.9	3.8 (0.4)	17.1 (9.9)
All-terrain vehicle riding	6	6.7	4.2 (0.2)	71.4 (35.9)
Social activities (Friends and family)	6	6.7	4.5 (0.2)	189.8 (101.2)

<sup>a</sup> Items ordered by greatest % of male hunters.

<sup>b</sup> Total adds up to more than 100% because male hunters could list up to three substitute activities.

<sup>c</sup> Substitution rating with the following response categories: 1 = very poor, 2 = poor, 3 = fair, 4 = good, 5 = very good.

<sup>d</sup> Other activities included: Nature walking, skiing, hand gliding, sky diving, mountain biking, military activities, field trials, compass courses, trapping, catching frogs, flying, and relic hunting.

Table 3.8 Percentage of resident female hunters (n = 137) by age who reported acceptable substitute activities for hunting for the Survey of Mississippi Resident Hunters conducted from October to December 2009.

Activity	Age category (in years)									
	n	18-26	n	27-36	n	37-46	n	47-56	n	57-68
Fishing (All types)	11	8.0	17	12.4	26	19.0	22	16.1	18	13.1
Camping	7	5.1	10	7.3	12	8.8	11	8.0	9	6.6
Water activities	5	3.6	6	4.4	7	5.1	4	2.9	1	0.7
Hiking	1	0.7	3	2.2	5	3.6	6	4.4	6	4.4
All-terrain vehicle riding	4	2.9	5	3.6	3	2.2	3	2.2	1	0.7
Other motorized activities	0	0.0	2	1.5	2	1.5	0	0.0	0	0.0
Equestrian activities	2	1.5	6	4.4	3	2.2	3	2.2	1	0.7
Exercise, running, walking	2	1.5	4	2.9	4	2.9	1	0.7	2	1.5
Sports	0	0.0	4	2.9	2	1.5	4	2.9	1	0.7
Yard work/Gardening	0	0.0	2	1.5	6	4.4	1	0.7	2	1.5
Photography	0	0.0	1	0.7	4	2.9	3	2.2	3	2.2
Property and farm management	0	0.0	1	0.7	1	0.7	2	1.5	2	1.5
Firearms and archery activities	1	0.7	1	0.7	2	1.5	0	0.0	0	0.0
Travel activities	0	0.0	1	0.7	1	0.7	1	0.7	0	0.0
Being outside	1	0.7	0	0.0	0	0.0	0	0.0	0	0.0
Nature viewing	1	0.7	1	0.7	1	0.7	4	2.9	3	2.2
Social activities (Family and friends)	0	0.0	2	1.5	3	2.2	0	0.0	2	1.5
Routine and hobby related activities	1	0.7	0	0.0	1	0.7	3	2.2	1	0.7
Other outdoor activities	1	0.7	2	1.5	5	3.6	2	1.5	1	0.7

Table 3.9 Percentage of resident male hunters (n = 90) by age who reported acceptable substitute activities for hunting for the Survey of Mississippi Resident Hunters conducted from October to December 2009.

Activity	n	Age category (in years)									
		18-26	n	27-36	n	37-46	n	47-56	n	57-68	
Fishing (All types)	7	7.8	8	8.9	15	16.7	25	27.8	18	20.0	
Camping	1	1.1	6	6.7	4	4.4	11	12.2	6	6.7	
Water activities	0	0.0	2	2.2	3	3.3	7	7.8	1	1.1	
Hiking	0	0.0	2	2.2	3	3.3	1	1.1	2	2.2	
All-terrain vehicle riding	0	0.0	3	3.3	2	2.2	1	1.1	0	0.0	
Other motorized activities	1	1.1	0	0.0	0	0.0	1	1.1	1	1.1	
Equestrian activities	0	0.0	0	0.0	1	1.1	2	2.2	1	1.1	
Exercise, running, walking	0	0.0	0	0.0	0	0.0	1	1.1	1	1.1	
Sports	6	6.7	1	1.1	7	7.8	5	5.6	5	5.6	
Yard work/Gardening	0	0.0	0	0.0	2	2.2	1	1.1	1	1.1	
Photography	0	0.0	0	0.0	1	1.1	1	1.1	2	2.2	
Property and farm management	0	0.0	1	1.1	1	1.1	2	2.2	0	0.0	
Firearms and archery activities	1	1.1	0	0.0	0	0.0	1	1.1	1	1.1	
Travel activities	0	0.0	0	0.0	1	1.1	2	2.2	1	1.1	
Being outside	0	0.0	0	0.0	1	1.1	1	1.1	1	1.1	
Nature viewing	0	0.0	0	0.0	0	0.0	0	0.0	2	2.2	
Social activities (Family and friends)	1	1.1	0	0.0	2	2.2	2	2.2	1	1.1	
Routine and hobby related activities	1	1.1	0	0.0	0	0.0	0	0.0	0	0.0	
Other outdoor activities	2	2.2	1	1.1	1	1.1	2	2.2	3	3.3	

Table 3.10 Percentage of resident female hunters (n = 137) who reported acceptable substitute activities for hunting for the Survey of Mississippi Resident Hunters conducted from October to December 2009; by importance of hunting as an outdoor activity.

Activity	Importance of hunting as an outdoor activity <sup>a</sup>							
	n	1	n	2	n	3	n	4
Fishing (All types)	21	15.3	41	29.9	22	16.1	11	8.0
Camping	7	5.1	23	16.8	15	10.9	5	3.6
Water activities	3	2.2	10	7.3	7	5.1	6	4.4
Hiking	4	2.9	8	5.8	5	3.6	4	2.9
All-terrain vehicle riding	2	1.5	6	4.4	7	5.1	1	0.7
Other motorized activities	3	2.2	1	0.7	0	0.0	0	0.0
Equestrian activities	1	0.7	9	6.6	5	3.6	0	0.0
Exercise, running, walking	2	1.5	4	2.9	4	2.9	4	2.9
Sports	1	0.7	4	2.9	7	5.1	0	0.0
Yard work/Gardening	3	2.2	2	1.5	5	3.6	2	1.5
Photography	3	2.2	1	0.7	2	1.5	5	3.6
Social activities (Family and friends)	0	0.0	3	2.2	2	1.5	2	1.5
Property/Farm management	2	1.5	1	0.7	3	2.2	0	0.0
Firearms and archery activities	2	1.5	2	1.5	0	0.0	2	1.5
Travel activities	0	0.0	1	0.7	1	0.7	1	1.5
Being outside	2	1.5	0	0.0	0	0.0	0	0.0
Nature viewing	3	2.2	1	0.7	2	1.5	4	2.9
Other outdoor activities	4	2.9	4	2.9	2	1.5	2	1.5

<sup>a</sup> Measured on a four-point scale with the following response categories: 1 = most important outdoor activity, 2 = second most important outdoor activity, 3 = third most important outdoor activity, and 4 = none of the above.

Table 3.11 Percentage of resident male hunters (n = 90) who reported acceptable substitute activities for hunting for the Survey of Mississippi Resident Hunters conducted from October to December 2009; by importance of hunting as an outdoor activity.

Activity	Importance of hunting as an outdoor activity <sup>a</sup>							
	n	1	n	2	n	3	n	4
Fishing (All types)	22	24.4	28	31.1	18	20.0	5	5.6
Camping	8	8.9	10	11.1	9	10.0	1	1.1
Water activities	3	3.3	6	6.7	4	4.4	0	0.0
Hiking	2	2.2	2	2.2	3	3.3	1	1.1
All-terrain vehicle riding	2	2.2	2	2.2	2	2.2	0	0.0
Other motorized activities	1	1.1	1	1.1	1	1.1	0	0.0
Equestrian activities	3	3.3	0	0.0	1	1.1	0	0.0
Exercise, running, walking	0	0.0	0	0.0	2	2.2	0	0.0
Sports	5	5.6	10	11.1	9	10.0	3	3.3
Yard work/Gardening	1	1.1	2	2.2	1	1.1	0	0.0
Photography	3	3.3	0	0.0	1	1.1	0	0.0
Social activities (Family and friends)	3	3.3	2	2.2	1	1.1	0	0.0
Property/Farm management	2	2.2	0	0.0	1	1.1	1	1.1
Firearms and archery activities	1	1.1	2	2.2	0	0.0	0	0.0
Travel activities	0	0.0	3	3.3	0	0.0	1	1.1
Being outside	2	2.2	1	1.1	0	0.0	0	0.0
Nature viewing	1	1.1	0	0.0	1	1.1	0	0.0
Other outdoor activities	2	2.2	4	4.4	3	3.3	0	0.0

<sup>a</sup> Measured on a four-point scale with the following response categories: 1 = most important outdoor activity, 2 = second most important outdoor activity, 3 = third most important outdoor activity, and 4 = none of the above.

CHAPTER IV  
SYNTHESIS OF EFFECT OF GENDER ON HUNTING MOTIVATIONS AND  
SUBSTITUTABILITY OF HUNTING

**Synthesis**

Declining participation in hunting poses a threat to natural resource agencies that depend on funding for conservation from sales of licenses, firearms, and related equipment (Enck, Decker, & Brown, 2000). With demographic changes, increased constraints, and inadequacies in recruitment and retention practices, it is important to attract participants from under-represented groups for recruitment into hunting to conserve wildlife. Women serve as the largest pool of clientele to recruit into hunting. To attract more women into hunting, it is vital to investigate their motivations for hunting and other outdoor activities they participate in. I examined effect of gender on motivations to hunt and substitutability of hunting in Mississippi in 2 separate studies of resident licensed hunters in the state. I measured hunting motivations using achievement, affiliative, and appreciative constructs from Decker, Provencher, and Brown (1984) that were operationalized using their activity-specific items and Driver's (1977) activity-general items from his recreation experience preference scales. I used results of motivations to hunt along with other independent variables to determine probability of resident hunters reporting acceptable substitute activities and to determine spectrum of substitute activities reported. Additionally, I determined if gender had a significant effect on substitutability of hunting. I reported if hunting motivations and substitutability of



hunting was consistent with what I would expect from previous research in gender and leisure.

In my first study, I intended to measure each of the achievement, affiliative, and appreciative motivations as individual constructs as per Decker and associates (1984). However, initial exploratory factor analyses indicated the achievement-oriented factored into 3 separate constructs (“reinforcing self-image”, “social recognition”, and “seeking stimulation”), and the affiliative-oriented constructs factored into 2 separate constructs (“family togetherness” and “being with people: social contact”) which paralleled Driver (1977) domains from his recreation experience preference scales. Based on previous gender, leisure, and motivation research, I expected to find differences between resident males and females on achievement and affiliative constructs and no differences between groups on the appreciative construct. However, I still expected to find differences between resident males and females on the multiple constructs factored from the achievement and affiliative constructs from Decker and associates (1984) because each of the factored constructs measured achievement or affiliative motivations.

Controlling for other variables (years hunted, age, income level, and education level), I found differences between resident males and females on “social recognition”, “seeking stimulation”, and “family togetherness” motivations to hunt and no differences on other motivational constructs. Younger resident females placed lesser importance on “social recognition” and “seeking stimulation” motivations than younger resident males. Females of all ages placed greater importance on “family togetherness” motivations than resident males of all ages. Previous research indicated females placed lesser importance on achievement-oriented motivations to hunt and greater importance on family-related

motivations (Decker, et al., 1984; Purdy & Decker, 1986; Manning, 1999; Wearing & Wearing, 1988). I found this to be the case for females of younger ages.

Younger males placing greater importance on “social recognition” and “seeking stimulation” motivations but placed lesser importance on them as they got older coincides with theory of hunter behavior and development, particularly the stages of hunting an individual goes through over time. Male hunters at younger ages may be in the beginning developmental stages of being a hunter in which they seek to test and show others their abilities and seek stimulating rewards through bagging game and progress to stages in which they place more importance on the actual hunting experience (Norton, 2007). However, resident females did not fit Norton’s (2007) hunting stage model. Females placed greater importance on “reinforcing self-image”, “social recognition”, and “seeking stimulation” as they got older. This may suggest some resistance of resident females to perceived traditional and historical gender roles in society by possessing sufficient knowledge and skills to participate in a male-dominated activity (Wearing, 1991), and that gender stereotyping of hunting may not be as prominent as it once was. Additionally, resident males and females ranked appreciative motivations first, affiliative-oriented motivations second, and achievement-oriented motivations third. This suggested resident males and females in Mississippi are motivated to hunt for a wide variety of reasons, but place greater importance on motivations related to appreciation of nature and being with other individuals rather than motivations related to achieving a particular goal.

Because I found differences between resident males and females in their “social recognition”, “seeking stimulation”, and “family togetherness” motivations to hunt, I expected to find a difference between groups on probability of reporting acceptable

substitute activities for hunting in my second study. Additionally, I expected each group to report different substitute activities. I did not find a statistically significant effect of gender on probability of reporting an acceptable substitute activity. Instead, I found a statistically significant effect of age and importance of hunting as an outdoor activity on probability of reporting an acceptable substitute activity. This suggested the probability of reporting acceptable substitute activities for resident males and females depended on their age and how important hunting was compared to other outdoor activities.

According to odds ratio estimates, the probability of resident males and females reporting acceptable substitute activities increased as they aged. This can be problematic for retention practices of agencies because older individuals may be more likely to drop out of hunting due to them being at a particular stage of their life cycle where they engage in other outdoor activities (Yoesting & Christensen, 1981). Additionally, the probability of resident males and females reporting acceptable substitute activities increased as they placed lesser importance on hunting as an outdoor activity.

Although gender had no significant effect on probability of reporting acceptable substitute activities, they still differed in activities they reported as substitutes for hunting. Females reported more activities than males, suggesting they would enjoy many outdoor activities to meet their needs. Females also reported traditionally feminine activities, such as gardening and equestrian activities. Differences between resident males and females may be more evident for outdoor activities that are considered to be masculine or feminine (Manning, 1999). However, fishing was the most reported substitute activity by each group, suggesting male and female hunters in Mississippi prefer to substitute within consumptive-type activities. Other outdoor activities such as camping, all-terrain vehicle riding, hiking, water activities, sports and social activities

were reported commonly by resident males and females, but this does not mean those activities are perceived to be similar to hunting (Vaske, Donnelly, & Tweed, 1983), and it does not mean reported activities lead to actual hunting substitution behavior (Brunson & Shelby, 1993; Manfredo & Anderson, 1987).

To better understand female hunter behavior, future research should focus on the interaction effects of the covariates years hunted, age, income level, and education level on hunting motivations. Running an ANCOVA can determine these variables to be insignificant covariates if they do not have a linear relationship with the dependent variable. However, regression lines for some covariates on motivational constructs illustrated interactions. Therefore, research should investigate why such interactions occur. Additionally, future research efforts should focus on Driver's (1977) 19 psychological domains of his recreation experience preference scales and substitute activities in the context of each of those 19 domains. Factor analyses should continue to be conducted to verify item groupings. Further research also should examine constraints, other dimensions of substitution (Shelby & Vaske, 1991; Baumgartner & Heberlein, 1981), social meaning of substitution (Baumgartner & Heberlein, 1981; Choi, Loomis, & Ditton, 1994; Snow, 1980), and effect of gender on leisure in the context of women's lives (Green, Hebron, & Woodard, 1990; Henderson, 1994) and contrasted within ethnic and racial groups (Barnett, 2006).

Differences found between resident males and females in "social recognition", "seeking stimulation", and "family togetherness" motivations as well as differences in substitute activities reported by resident males and females suggested that hunters in Mississippi need to be served in different ways to optimize their desired benefits and experiences (Daigle, Hrubes, & Ajzen, 2002). Natural resource managers in Mississippi

may be best suited to continue to provide a wide variety of opportunities while still maintaining a healthy natural environment and a productive hunting environment (Vaske, Donnelly, & Shelby, 1990). This can be accomplished by better understanding how use patterns shift as hunters choose substitute activities and how pressure is applied to other resources as a result of those substitution decisions (Vaske, et al., 1990). For hunters, if suitable alternative activities, settings, and other resources are not available, this could result in a reduced hunter clientele base, reduced hunting license sales, and reduced financial support for natural resources management. Because females reported more substitute activities than males, women should continue to be seen as a potential target group for recruitment into hunting in an effort to sustain the hunting population and for financial support for wildlife management.

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