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# Exploring and Measuring the Benefits of Hunting

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# EXPLORING AND MEASURING THE BENEFITS OF HUNTING

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A Dissertation  
Presented to  
the Graduate School of  
Clemson University

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In Partial Fulfillment  
of the Requirements for the Degree  
Doctor of Philosophy  
Wildlife and Fisheries Biology

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by  
Susan Talley Guynn  
May 2015

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Accepted by:  
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## ABSTRACT

The purpose of this study was to develop a survey instrument to measure the psychological benefits related to hunting. Maslow's Hierarchy of Needs was used as a theoretical framework which includes five levels: Physiological, Safety, Love/Belonging, Self-Esteem and Self-Actualization. Simple yes/no questions were developed to measure physiological and safety levels while existing scales were used to measure love/belonging and self-esteem. However, it was necessary to develop a scale to measure self-actualization. A pilot study was conducted to develop a scale to measure self-actualization. The 44-question survey was mailed to South Carolina (SC) resident hunting license holders ( $n = 300$ ; 28% response rate). We developed a reliable scale to measure Awe experiences, representing self-actualization (S-B  $\chi^2 = 409.31$ ; CFI = 0.956; RMSEA = 0.05). A second survey was conducted to develop the full model measuring Maslow's Hierarchy of Needs that incorporated the scale for measuring self-actualization along with measures for the four remaining levels. The survey was administered by mail to SC resident hunting license holders ( $n = 995$ ; 20% response rate) and online to participants of the Quality Deer Management Association's Deer Steward program ( $n = 871$ ; 46.5% response rate). The survey contained 51 measures of hunter needs and 10 sociodemographic questions. A valid and reliable instrument was developed, the Benefits of Hunting Assessment Scale (BoHAS), to gauge benefits received through hunting (S-B  $\chi^2 = 1998.1$ ; CFI = 0.953; RMSEA = 0.057; Rho = 0.975;  $\alpha = 0.965$ ). The final model included one higher order factor, BoHAS, 3 primary sub-factors (Love/Belonging, Self-Esteem and Self-Actualization, as measured by Awe) and 6 sub-

factors of Awe. There were no difference in the BoHAS scores by gender ( $B = 0.01732$ ;  $\beta = 0.01268$ ;  $Z = 0.08814$ ;  $p = 0.2$ ). This finding implies that women and men receive the same benefits through hunting.

## DEDICATION

To my husband and best friend, Dave. Thank you for your unconditional love, never ending patience, emotional support and advice. I love you. I also dedicate this work to my nieces, Megan and Jill. I hope this work serves as an inspiration for you to know anything is possible.

## ACKNOWLEDGMENTS

This project would not have been possible without the support of Mr. Derrell Shipes and the South Carolina Department of Natural Resources and Mr. Matt Ross and the Quality Deer Management Association. I would also like to thank the countless number of hunters that took the time to participate in the survey.

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## CHAPTER ONE

### INTRODUCTION

There has been extensive research that attempts to determine the motivations and benefits for hunting in order to develop hunter recruitment and retention programs (i.e. Adams & Steen, 1997; Decker, Provencher, & Brown, 1984; Driver & Knopf, 1977; Duda, Jones, & Criscione, 2010; Purdy & Decker, 1986). Much of the research on hunting has focused on descriptive motives for hunting that can be easily articulated, such as hunting for meat or to be with family and friends (i.e. Adams & Steen, 1997; American Sportfishing Association, Responsive Management, Oregon Department of Fish & Wildlife, & Southwick Associates, 2013; Duda et al., 2010). More abstract works have presented psychological, sociological or sociopsychological typologies of hunters but none provide an empirical basis to describe deeper reasons for hunting (Benson & Decker, 2001; Decker et al., 1984; Jackson, 1988).

Thus, there is a void in the literature in understanding the psychological benefits of hunting. The purpose of this study was to develop a reliable and valid survey instrument to provide a comprehensive framework to measure the psychological benefits related to hunting.

#### Study Objectives

The objectives of this study were:

1. To develop and test factors measuring the psychological benefits of hunting.
2. To provide evidence of the validity and reliability of the instrument.

3. To determine if men and women are experiencing the benefits of hunting differently.

### Definition of Terms

In order to better prepare the reader to understand the research presented in this dissertation, I have listed below a list of terms that will be utilized throughout the paper. I do not claim that this list is exhaustive but it does cover the major concepts that will be presented and discussed.

- Awe – this is a two part definition that includes: 1) a need for perceptual vastness (i.e. immense in size, complexity, etc.) and 2) a need for altering a person's understanding of the world while immersed within the vastness, or a need for accommodation
- Game species – an animal that is hunted for food or sport, such as white-tailed deer, rabbit, or grouse.
- Harvested or harvesting – this term is used when referring to an individual that has either killed or is attempting to kill a game species.
- Locavore – a person that desires to eat food that is grown and obtained locally, such as fresh fruits, vegetables and meat.
- Maslow's Hierarchy of Needs – Abraham Maslow (1987) introduced a theory of human motivation that discussed basic hierarchy of needs as a description of human needs and functioning that usually occur in a specific order. The hierarchy

has five levels: 1) Physiology, 2) Safety, 3) Belonging and Love; 4) Self-Esteem and 5) Self-Actualization.

### Theoretical Framework

Decker et al. (1984) considered the social-psychological aspects of hunting and identified three primary types of hunters: achievement, affiliative and appreciative.

Achievement motivated hunters hunt in order “...to meet a self-determined standard of performance...” (Decker et al., 1984, p. ES-21). Affiliative hunters primarily hunt to “accompany another person in the field, and strengthen or reaffirm the personal relationship...” (Decker et al., 1984, p. ES-21). Finally, appreciative hunters tend to be individuals who hunt primarily to obtain a “...sense of peace, belonging and familiarity that they have learned to associate with hunting” (Decker et al., 1984, p. ES-21).

Benson and Decker (2001) expanded on the psychological basis of the benefits of hunting by proposing a framework that described activities related to hunting within Maslow’s Hierarch of Needs (Maslow, 1970). Benson and Decker (2001) related the activities of hunting directly to the 5 basic levels of human needs as described by Maslow (1970, 1987). The 5 basic levels on Maslow’s Hierarchy of Needs are physiology, safety, love and belonging, self-esteem and self-actualization. Physiology is the most basic need and simply refers to a person’s need for food, water, shelter, clothing and other basic needs. This level as outlined by Benson and Decker (2001) is hunting for survival in order to obtain meat. While many of the basic human needs of today can be satisfied through a trip to the local grocer, some people still prefer to consume wild game for the

nutritional benefits it provides as well as the satisfaction of consuming that which they killed (Adams & Steen, 1997; Benson & Decker, 2001; Decker et al., 1984). This is further exemplified through the locavore movement, primarily comprised of urbanites that prefer killing their own food through hunting due to the local, free-ranging aspects of the food (Decker, Stedman, Larson, & Siemer, 2015).

Safety is focused on enjoying an environment in which physical threats are minimal to an individual and an individual's property, such as predator or pest reduction, termed Risk Avoidance by Benson and Decker (2001). Even in urban settings, wildlife may still pose a threat to human safety through diseases such as rabies or through deer/vehicle collisions. This safety concern is growing in momentum and starting to be viewed as an ecological or "civic-purpose" activity, thus expanding the need for hunting as a management tool (Decker et al., 2015, p. 29).

Love and belonging, the third level, is concerned with the need to give and to receive love as well as the need to belong to a group in order to share common interests and goals. Belongingness is an innate human need to flock together and strive toward a common goal (Maslow, 1970). Affiliation as described by Benson and Decker (2001) corresponds with love and belonging in Maslow's Hierarchy of Needs. This level deals with companionship and belonging to a group consisting of like-minded persons. The tendency to belong and to love was described by Ardrey (1966) in *The Territorial Imperative* and was reiterated by Maslow (1970) as being a vital part of human life. The satisfaction of this need can be achieved by hunting through hunt camps, hunting trips and other hunting focused activities such as watching hunting shows on television or



attending hunting events. The need to love and belong is also evident through membership in various hunting and conservation organizations such as the Quality Deer Management Association, National Wild Turkey Federation or the Rocky Mountain Elk Foundation. There are many aspects to hunting that are not directly related to the actual act of hunting that contribute to the love and belonging category on Maslow's Hierarchy of Needs.

The fourth level is self-esteem and has two components as described by Maslow (1970) which includes a person's perceptions of their own skills and abilities, and the perceived recognition and worth of those skills and abilities by others. One way to satisfy this level of need is through hunting using a particular method, such as a primitive weapon or only shooting mature animals (Benson & Decker, 2001).

Finally, self-actualization is the highest level and can best be described as an individual having the need to grow and develop in order to achieve their full potential as a human being (Benson & Decker, 2001; Maslow, 1987). Benson and Decker (2001) defined self-actualization as an appreciation of nature and culture and described this level of hunting as "...more abstract, spiritual, emotional and pluralistic" (p. 147). Maslow (1970) also described self-actualizing experiences as peak experiences that have varying degrees of intensity. He surmised that self-actualizing moments may be mild in nature or may be so profound that a person is transformed in their views and beliefs as a consequence of the experience.

### Significance of the Study

This study is novel in that it attempts to synthesize the complexities surrounding hunting as an activity from psychological, sociological, and sociopsychological viewpoints. At present the research into hunting may consider these three viewpoints but only in as far as they can be articulated by hunters (e.g. Decker et al., 1984; Duda et al. 2010; Purdy & Decker, 1986). We postulate that there may be innate needs that drive hunters that they do not necessarily recognize. And, if they do recognize these needs, they may not be able to communicate the essence of the need. This inability to clearly state and demarcate certain life experiences, such as those related to awe, are also impediments to fully understanding the drive and need to hunt. Therefore, a measure that encompasses psychological, sociological, sociopsychological, and sociodemographic considerations along with more abstract concepts such as awe would prove beneficial to the scientific community as well as federal and state agencies charged with natural resources management. It is estimated that 80% of state wildlife agencies annual budgets are funded by excise taxes and hunting license sales (Congressional Sportsmen's Foundation, n.d.). Thus, the decline or loss of hunting would have direct, negative and devastating impacts on a state's ability to manage natural resources and provide outdoor recreational opportunities for both hunters and non-hunters.

### Methods

A pilot study was conducted in 2013 to develop a scale that would measure the highest level on Maslow's Hierarchy of Needs, self-actualization. This 44 item survey

was mailed to 300 South Carolina resident hunting license holders (28% response rate). We were able to develop a reliable scale to measure Awe experiences representing self-actualization. A detailed description of this portion of the study is presented in Chapter 2.

The final survey, conducted in early 2014, incorporated the results of the pilot study for measuring self-actualization along with measures for the four remaining levels of Maslow's Hierarchy of Needs. This survey was administered through the mail to SC resident hunting license holders ( $n = 995$ ; 20% response rate) and administered online to participants of the Quality Deer Management Association's Deer Steward program ( $n = 871$ ; 46.5% response rate). The online and paper surveys mimicked each other in terms of questions and question order. The survey contained 51 measures of hunter needs, 30 questions to measure personality traits, and 10 sociodemographic questions for a total of 91 questions.

### Study Limitations

This study was limited in that the pilot study to develop a quantitative measure of awe was only tested once. It would have been ideal to have tested the scale a second time with modifications and with a different sample group. However, due to funding limitations this was not possible.

The second limitation of this study was that it was tested with only adults. The benefits of hunting derived by adults are likely different than those derived by children or youth. Therefore, recruitment programs aimed at youth should not be based on results of this study.

Lastly, the final survey instrument was delivered by using internet based and paper based mail surveys. Due to issues with mailing the paper survey, the calculated response rate may have been less than the actual response rate. Some of the mail surveys were not posted due to mechanical errors and it is not known exactly how many were lost in the mail and not returned due to insufficient postage. While a response rate was calculated it was based on the known number of undelivered surveys that were returned which likely was less than the actual number of undelivered surveys. For the internet surveys, we were unable to determine how many survey letters/links were filtered into spam/junk email folders and not truly delivered. While the response rate is based on the number of emails that did not bounce back as undeliverable, the true number of emails that were in spam/junk folders could not be determined.

### Chapter Structures

This dissertation is comprised of five chapters followed by an appendices and references. Chapter 1 is the introduction that contains the theoretical framework, problem statement and research objectives. Chapter 2, formatted as a journal manuscript, focuses on a pilot project conducted to develop and test a quantitative scale to measure the concept of awe, which was then used to measure self-actualization. Chapter 3, also written as a journal manuscript, presents the results of the final measurement instrument assessing the benefits of hunting. Chapter 4 delves into answering the question if men and women receive and experience benefits of hunting differently. Chapters 2-4 are self-contained documents that will each contain a brief literature review, problem statement,

methodology, results and discussion section. Chapter 5 will provide a brief synopsis of the results and conclusions of chapters 2-4. The appendices contain Clemson University Institutional Review Board (IRB) compliance emails for both the awe scale development survey and the hunter values and experiences survey development. Also included in the appendix are additional personality trait results and other sociodemographic indicators as related to the BoHAS scale. These results will be explored and prepared for publication at a later time.

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## CHAPTER TWO

### MEASURING AWE EXPERIENCES WHILE HUNTING

#### Introduction

Contemporary research has sought to explore the motivations and benefits associated with hunting to determine why we continue to hunt today. Most of the research to date has revealed primarily conscious reasons such as for meat, to be close to nature, or social benefits such as to be with family or friends, and other similar answers (i.e. Adams & Steen, 1997; Decker, Provencher, & Brown, 1984; Duda, Jones, & Criscione, 2010). While this research provides insight into some of the potential motivations for hunting, there may be additional reasons as to why humans continue to hunt in modern society, such as experiencing awe or a spiritual connection with nature (Benson & Decker, 2001; Kellert, 1996). In order to explore the full range of potential benefits of hunting, this paper focuses on the development of a scale to measure awe in the context of hunting. This also allowed for an exploration of the relationships between awe and hunter characteristics such as age, gender and similar sociodemographic indicators.

#### Conceptual framework

The concept of awe is found in the religious and psychological sector but has been studied only qualitatively (Keltner & Haidt, 2003) and has not been applied in a hunting context. Otto (1958) argued that awe can provide experiences that challenge the mind and



move an individual to achieve and do more than they thought possible. Research has attempted to better define the concept of awe, but a universally accepted definition has yet to emerge. One definition of awe comes from Keltner and Haidt (2003) as “...perceived vastness, and a need for accommodation, defined as an inability to assimilate an experience into current mental constructs” (p. 297). Finally, Halstead and Halstead (2004) summarized awe as “...a response to something that inspires both wonder and fear, admiration and terror, at the same time” (p. 168) Despite differing definitions, most agree that awe requires a sense of insignificance, difficulty in comprehension, confusion, surprise and wonder (Keltner & Haidt, 2003).

The concept of mysticism as presented by Stace (1960) is very similar to the description of awe. Stace (1960) described a mystical experience as one that instills an acceptance of a state of unity of all living and non-living entities that transcends ordinary consciousness or intellect. Stace (1960) pointed out that a mystical experience cannot be measured or described but instead must be accepted without physical evidence or logical reasoning. Keltner and Haidt (2003) alluded to this fact in relation to awe but did not delve into the religious literature. Stace (1960) stated that the exploration of a mystical experience is an exploration of a personal nature and not one of a “...publicly observable phenomena” (p. 55). A mystical state cannot be clearly demarcated, much like an awe experience as described by other authors (i.e. Agate, 2010; Keltner & Haidt, 2003; Powell, Kellert, & Ham, 2010; Rudd, Vohs, & Aaker, 2012; Shiota, Keltner, & Mossman, 2007). Stace (1960) postulated that there are common characteristics of all mystical experiences but that not all of these characteristics must be present. Although

Stace looked at mystical experiences in religious contexts, he in no way implied that a religious context or creed is necessary for a mystical experience. Furthermore, he found that a person can have a mystical experience outside of a religious context such as in natural landscapes.

Another term closely related to awe is peak experience, which occurs when a person has reached a level of self-actualization (Maslow, 1964, 1968). A peak experience, like an awe experience, is a brief moment in an individual's life that produces a mystical illumination that is both emotive and cognitive in nature (e.g. Agate, 2010; Halstead & Halstead, 2004; Keltner & Haidt, 2003; Otto, 1958; Stace, 1960). Maslow (1964, 1968) noted that peak experiences typically occur when a person is living up to their full potential as a human being (self-actualization) and are in a specific setting, such as nature. So the concept of peak experiences and related terms and constructs (i.e. awe, mysticism) imply that a person is in a self-actualizing state and this suggests that awe may in fact be a surrogate or a central component of self-actualization.

In considering the concept of awe, a two part definition that allows for measurement clarity is: 1) a need for perceptual vastness (i.e. immense in size, complexity, etc.) and 2) a need for altering a person's understanding of the world while immersed within the vastness, or a need for accommodation (Keltner & Haidt, 2003; Powell et al., 2010; Rudd et al., 2012). To date awe has been studied using only qualitative methods in disciplines such as tourism and religion and has not been considered in the human dimensions of wildlife arena. However, research indicates that awe is experienced particularly in nature (Shiota et al., 2007). Powell et al. (2010)

examined awe experiences of tourists in Antarctica and an open-ended question yielded results suggesting that over 20% of respondents reported some type of an awe experience. Other studies measuring wilderness experiences have also reported outcomes associated with awe (e.g. Atlis, Leon, Sanda, & Infante, 2004; Shiota et al., 2007), however, currently there are no studies of awe specifically in a hunting context.

### Operationalization and Scale Development for Awe

Powell et al. (2010) presented 5 potential outcomes or sub-dimensions resulting from an awe experience which included: 1) a spiritual connection, 2) transformative experience, 3) goal clarification, 4) refinement of the nature-human relationship, and 5) a sense of feeling humbled. Using this as a theoretical basis for developing and measuring awe quantitatively, these 5 categories were refined and clarified, resulting in 3 sub-dimensions of awe, or constructs, that eliminated conceptual overlap. The three constructs are: 1) spiritual connection, 2) perceptions of life, and 3) nature-human relationships. As will be described below, each category captures the two parts of the definition of awe, perceptual vastness and need for altering a persons' understanding of the world. The three categories intertwine these two aspects of awe to capture the underlying constructs. Operational definitions of each conceptual construct were developed to guide the selection and development of the measurement instrument. Existing measures of related constructs were first explored and where none were found, new items based on the operational definition of the construct of interest were developed. Scale development procedures followed recommendations by DeVellis (2012), Noar

(2003), and Menor and Roth (2007). The premise and final description for each of the three constructs along with the measures of each construct will be described in detail.

### Spiritual Connection

This category captures the spiritual experiences of individuals during an awe experience that transcend religious beliefs and affiliations. Research has revealed that experiences in natural settings, especially experiences in unique, vast, aesthetic, and physically challenging environments tend to elicit feelings of spirituality (Frederickson & Anderson, 1999; Keltner & Haidt, 2003; Powell et al., 2010). Kamitsis and Francis (2013) also found that spirituality was a mediating effect between an individuals' tie to the natural world and their psychological well-being.

It is possible that an individual can have an awe experience without deeply held religious beliefs (Stace, 1960) but they will describe the awe experience as having a “force” or “presence” of which the person cannot explain. In a religious context this “force” or “presence” may be described as a “Holy Spirit” or as “God.” However, those who do not hold the same religious beliefs may describe the force or presence in less spiritual terms.

For the Spiritual Connection construct an existing measure, the Hood Mysticism Scale (Hood, 1975), was modified for inclusion in the survey. The Hood Mysticism Scale (Hood, 1975) is based off mystical phenomenological characteristics as articulated by Stace (1960). Hood (1975) included four items for each of the 8 categories of mysticism as described by Stace (Hood, 1975) and represented in two factors (Factor 1- General Mysticism Factor and Factor 2 - Religious Interpretative Factor). In subsequent studies,

however, the two-factor model as initially proposed by Hood (1975) was proven to be inferior to a three-factor model (Caird, 1988; Chen, Hood, Yang, & Watson, 2011; Hood, Morris, & Watson, 1993; Hood et al., 2001; Reinert & Stifler, 1993). This three factor model included the “General Mystical Experience” factor and suggested that the Hood’s Religious Interpretative factor split into Noetic and Religious factors.

Two modifications were made to the Hood Mysticism Scale (HMS) for this research. First, negatively worded items were rewritten to reflect a positive statement. Marsh (1996) found that negatively worded items can lead to method effects, thereby making the results of the analysis difficult to interpret. Additional research has also demonstrated that an extra factor may be produced due to the use of negatively worded items (DiStefano & Motl, 2006; Schweizer & Rauch, 2008). The second revision to the Hood Mysticism Scale was that all questions were prefaced with the statement “While hunting I ....” For example, an item would read “While hunting I reflect on my life.” The response categories were “definitely not true, mostly not true, somewhat not true, neutral, somewhat true, mostly true, and definitely true.”

### Perceptions of Life

It is documented that time spent in a natural environment can lead to transformative personal experiences that alter attitudes and values (Davis & Gatersleben, 2013; Howell, Passmore, & Buro, 2013; Kamitsis & Francis, 2013; Wolsko & Lindberg, 2013). Powell et al. (2010) described 2 sub-categories of awe, “Transformative Experiences” and “Goal Clarification,” as experiences that are “life changing” (p. 148) due to an individual’s sense of personal renewal and transformation in attitudes and

values that alter their behavior. The authors argued that an awe experience may also “fall short of transformative” (p. 148) but leads to an individual’s reassessment of their priorities. Under the sub-category of “Goal Clarification” the authors contend that an awe experience allows time for reflection on life and that these moments of reflection can lead to “new meanings for life” (p.148). Life altering moments within an awe experience is further supported by Keltner and Haidt (2003) who also reported that awe can “...transform people and reorient their lives, goals and values” (p. 312). In this study, “life changing” and “new meanings for life” cannot be adequately discriminated to justify two separate categories. Therefore, “Transformative Experience” and “Goal Clarification” as outlined by Powell et al. (2010) are combined and labeled as Perceptions of Life. This category is a reassessment of life and life’s priorities as experienced during an awe moment while hunting.

A search for relevant measures for the Perceptions of Life category was unsuccessful and therefore new measures were developed and refined. The Perceptions of Life items were developed using specific word qualifiers as presented by Agate (2010) who identified common words used to describe awe experiences. These key words were incorporated into items to measure the specifically operationalized categories of Perceptions of Life as it related to hunting settings. The questions were worded for response of answer choices to match those of the Hood Mysticism Scale in order to simplify the survey and ease the burden on the respondents.

## Nature-Human Relationship

Human beings evolved with, and continue to have, a dependence on the natural world for not only food, shelter and other resources, but for overall mental health and happiness (Ardrey, 1966; Shipman, 2010; Wilson, 1984). Encounters with wildlife elicit a strong sense of connection to all aspects of nature, thereby strengthening the nature-human relationship (Kellert, 1996; Skibins, Hallo, Sharp, & Manning, 2012; Wilson, 1984; Zelenski & Nisbet, 2014). Powell et al. (2010) described a category termed “Refinement of the nature-human relationship” in which wildlife encounters “produce feelings of being ‘at one’ with wildlife or nature...” (p 148). This description is related to the definition of awe through the alteration of a person’s understanding of the world. Interactions with wildlife provide new insights into how reliant humankind is on ecosystem services, and perhaps, altering their perception of humankind’s relationship with nature. Hunting provides an opportunity to return to, and become immersed in, a natural environment and feel this connection to nature.

Powell et al. (2010) also described how feelings of insignificance or humility are associated with natural settings, particularly within a landscape or seascape as well as with wildlife (a category termed ‘A sense of feeling humbled’). Experiences under the conditions as described by Powell et al. (2010) are directly related to nature-human relationships. To simplify this category, Nature-Human Relationships, we combined the categories Powell et al. (2010) termed as “A sense of feeling humbled” and “Refinement of the nature-human relationship” and it exemplifies a feeling of being connected to nature and the understanding of the co-dependence between humans and nature.

As was the case for the Perceptions of Life category, a search for relevant measures was unsuccessful; therefore, it was necessary to develop items for this category. The question response categories also matched those used for Perceptions of Life that were “definitely not true, mostly not true, somewhat not true, neutral, somewhat true, mostly true and definitely true.”

### Sample and Data Collection Procedures

The names and addresses of South Carolina residents who purchased a hunting license between July 1, 2012 and June 30, 2013 were obtained through the South Carolina Department of Natural Resources. License holders were separated into male and female groups, then the random number generator function in Excel (RND) was used to select 150 males and 150 females ( $n=300$ ). Next, a mail questionnaire was sent to each hunter that contained 44 measures of awe as well as sociodemographic data, which was approved by the Clemson University Institutional Review Board (IRB2013-035). A follow up reminder notice was mailed to non-respondents 14 and 28 days after the initial survey to increase response rates (Dillman, Smyth, & Christian, 2009). A total of 80 surveys were returned with one being excluded due to incomplete survey response. Eleven surveys were returned as undeliverable for a response rate of 28%.

### Results

Confirmatory factor analysis (CFA) using EQS 6.2 (Multivariate Software Inc.) was used to test the hypothesized model for evaluating an awe experience. Satorra-



Bentler Scaled Chi-Square ( $S-B\chi^2$ ), which corrects for non-normality in the data (Byrne, 2008), Robust Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA) were used to evaluate model fit as recommended by Hu and Bentler (1998, 1999). Relationships between awe and sociodemographic data were tested using SPSS Statistics 18 (IBM, Inc.).

The survey included 45 female (57%) and 34 male (43%) respondents for a response rate of 28% (see Table 2.1 for description of sociodemographic data). The survey instrument included a total of 44 items (6 for Nature-Human Relationships; 6 for Perceptions of Life; 32 for Spiritual Connection). The initial CFA revealed nine items with low reliability and/or multidimensionality issues or high Kurtosis (Byrne, 2008; Tabachnick & Fidell, 2007) and were dropped from further analysis. While the sample size may be considered small, MacCallum, Browne, and Sugawara (1996) pointed out that if the items are proven to be reliable measures then small sample sizes produce less biased data, although results should still be interpreted cautiously.

### CFA Results

In the measurement model, which specifies the indicator variables and underlying constructs, convergent validity can be seen in the factor loadings for each item (Table 2.2). The squared loading of a single item yields the reliability of that item. In examining the factor loadings, all of the items have fairly high reliabilities and also demonstrate unidimensionality.

For the structural model, the initial model hypothesized 5 first-order factors to reflect the *Awe* construct (see Figure 2.1). The 5 first-order factors included the

Perceptions of Life, the Nature-Human Relationship and three-factors reflecting Spiritual Connection (measured by the Hood Mysticism Scale) as described previously. This model displayed minimally acceptable fit indices (See Table 2.3 – Hypothesized Model, for goodness-of-fit indices) and potential sources of misfit were examined (Hu & Bentler, 1999; MacCallum et al., 1996).

The Hood Mysticism Scale, measuring the Spiritual Connection factor, appeared to be a source of misfit in the initial model ( $S-B\chi^2 = 581.52$ ; CFI = 0.912; RMSEA = 0.07). A separate analysis was conducted on only the Hood Mysticism Scale and results indicated a five-factor solution ( $S-B\chi^2 = 181.15$ ; CFI = 0.974; RMSEA = 0.057).

Literature supports a five-factor solution as well as two, three, and four-factor solutions (Caird, 1988; Chen et al., 2011; Hood, 1975; Hood et al., 1993; Hood et al., 2001; Lazar & Kravetz, 2005; Mclean, Leoutsakos, Johnson, & Griffiths, 2012; Reinert & Stifler, 1993) making the results of re-specified model plausible. Therefore, the revised Hood Mysticism Scale model specified 5 first order factors.

The revised Awe model, which included 7 first order factors (5 Spiritual factors, Perceptions of Life and Nature-Human Relationships), improved the fit over the hypothesized model (See Table 2.3 – Revised Model, for goodness-of-fit indices). While the revised Awe model did show improvement, there still appeared to be a source of misfit with the Hood Mysticism Scale. First, the item ‘language’ showed signs of being multidimensional as well as the fact that it did not fit conceptually into the new five-factor structure so it was dropped from the final model. Additionally, a second-order factor for the Hood Mysticism Scale was added to the final model. Therefore, the final

model (Figure 2.2) included 3 endogenous factors reflecting the *Awe* construct that included Perceptions of Life, Nature-Human Relationships and Spiritual Connection. The Spiritual Connection factor was measured using Hood Mysticism Scale and included 5 endogenous factors (Connectedness, Inner Subjective, Temporal-Spatial, Noetic and Religious Quality). The final model showed excellent fit and was accepted (see Table 2.3 – Final Model, for goodness-of-fit indices) (Hu & Bentler, 1999; MacCallum et al., 1996).

#### Validity and Reliability

In following recommendations by Fornell and Larcker (1981), a test of the validity and reliability for the final *Awe* model and the Hood Mysticism Scale was conducted. Composite reliability was calculated for each *Awe* factor which indicates how consistent the measures are in representing the theoretical construct (Table 2.4). Correlations amongst the constructs as well as the Average Variance Extracted (AVE) were also calculated, which is an indicator of convergent validity (Fornell & Larcker, 1981). While these two estimates individually (construct correlations and AVE) demonstrate convergent validity, together they offer a measure of discriminant validity, which is a measure of how much constructs differ (Cohen, Cohen, West, & Aiken, 2003; Tabachnick & Fidell, 2007). Table 2.5 and Table 2.6 indicate the AVE and correlations between constructs. It is suggested that if the AVE is  $>0.5$  then this indicates convergent validity (Fornell & Larcker, 1981). Discriminant validity measures how much a construct is different from other constructs and is assessed by comparing the square root of AVE to the correlations (taking the square root equates the scale to the correlations). If the

$\sqrt{AVE}$  is greater than the construct correlations, then the constructs demonstrate discriminant validity (Fornell & Larcker, 1981).

In examining the AVE for the Hood Mysticism Scale, the correlation between the two factors of Connectedness and Noetic was high (0.925) while the  $\sqrt{AVE}$  for Connectedness and Noetic were 0.886 and 0.817, respectively. To investigate this evidence of poor discriminant validity, an alternative model was tested with only the two factors in question (Connectedness and Noetic). The baseline model specified that Connectedness and Noetic be allowed to covary, making them two separate factors (S-B  $\chi^2 = 35.77$ ; CFI = 0.990). The alternative model set the covariance to 1, making it a single factor (S-B  $\chi^2 = 39.39$ ; CFI = 0.994). The  $\Delta S-B\chi^2$  and  $\Delta CFI$  were calculated to determine if the factors of Connectedness and Noetic are two factors or one factor (Attenweiler & Moore, 2006; Byrne, 2008). There is inconsistent evidence in support of one or two factors. The  $\Delta S-B\chi^2$  was significant ( $\Delta S-B\chi^2 = 9.4919$ ,  $p = 0.002$ ) indicating they are two separate factors (Attenweiler & Moore, 2006; Byrne, 2008). However, the  $\Delta CFI$  indicated they are a single factor ( $\Delta CFI = 0.004$ ) (Attenweiler & Moore, 2006; Byrne, 2008).

With conflicting statistical evidence of single or separate factors, an alternative full *Awe* model was tested specifying Connectedness and Noetic as one factor. The alternative *Awe* model with the Hood Mysticism Scale as 4 factors (Connectedness and Noetic combined) did not harm the model fit over the original full model which specified the Hood Mysticism Scale as 5 factors ( $\Delta S-B\chi^2 = 3.436$ ;  $\Delta CFI = 0.004$ ;  $p = 0.064$ ). Therefore, based on this evidence, the Hood Mysticism Scale may be specified as either 4

or 5 factors. For the remainder of this paper, the *Awe* model specified 5 factors for the Hood Mysticism Scale.

#### Sociodemographic Predictors of Awe

Once the measurement model was finalized, sociodemographic data were analyzed as predictors of awe. The sociodemographic indicators collected were gender, age, number of years hunting experience (HE), religious values, community, game species harvested and number of hunts per year (see Table 2.1).

The only significant indicator of *Awe* was age. Specifically, when age is squared, this produces a quadratic term of age, which was a significant sociodemographic predictor of awe ( $t_{age^2} = -3.695$ ;  $p = <0.001$ ;  $B = -0.004$ ;  $\beta = -0.433$ ). The relationship between Awe and age indicated an inverse u-shaped curvilinear relationship. This means that at younger ages, as age increased so did the awe experience level. However, as a person enters their late 30's and into their early 40's the awe experience flattens out. Finally, at approximately age 43 there is a negative relationship between awe and age (See Figure 2.3).

The Religious Values indicator was not significant in predicting Awe ( $t_{rv} = -0.462$ ;  $p = 0.646$ ;  $B = -0.071$ ;  $\beta = -0.054$ ), which may not be surprising since it proved to be highly skewed with 95% of the respondents answering between Devoutly Religious and Somewhat Religious (1 = Devoutly Religious, 2 = Deeply Religious, 3 = Strongly Religious, 4 = Somewhat Religious, 5 = Not Very Religious, 6 = Not At All Religious). Since most of the respondents responded with 3 categories, it essentially became a 3 point scale. The question indicating if a person had ever harvested a game species also

proved to be not significant. Once again this is not surprising since over 96% of respondents had in fact harvested a game species.

## Discussion

### The Awe Scale

Awe is a difficult concept to articulate, define and measure. This research is the first attempt to develop a quantitative measure of awe in any context, to our knowledge, and thus, is an important step toward this goal. Results of the analysis demonstrate validity and reliability for the *Awe* scale. The results of the CFA indicate that *Awe* is multidimensional with three factors (Perceptions of Life, Nature-Human Relationships and Spiritual Connection). It is also apparent from the results that the Hood Mysticism Scale, used to measure the Spiritual Connection aspect of *Awe*, may be either a four or five-factor model.

One of the current limitations to research measuring awe is that it has only utilized qualitative tools. While qualitative research is informative and provides rich data to define the conceptual breadth of a phenomenon such as awe, generally small samples used in qualitative research limit the ability to generalize to a larger population. This research described and tested central themes and components of awe and suggests it is possible to capture awe experiences in a quantitative scale, thus allowing for the ability to use larger representative samples in research.

### Sociodemographic Indicators

The only sociodemographic factor that related to *Awe* was age. This inverse curvilinear relationship may be due to the fact that the novelty of the initial hunting experiences wears off with age. However, if this is the sole reason for the decline after age 43 then it would seem that the number of years of hunting experience would have some influence on the curve. These data appear to support the notion that even if someone enters hunting after age 43 (asymptote of the curve) the feeling of awe associated with hunting will continue to decline with age. Perhaps another explanation for this relationship is due to the fact that as hunters age, their focus and priorities shift away from hunting to other life factors. Research has identified other priorities during the mid-40s such as family obligations, work, and declining health (e.g. Burnette-Wolle & Godbey, 2007; Duda et al., 2010). Regardless of the explanation for the decline, it is an interesting question to pose if this relationship between awe and age is true for only hunters or would it apply to other recreational activities? However, since awe has only been studied qualitatively to this point, future research should test for this quadratic effect.

Community attributes (urban-rural) did not have a relationship to *Awe*. Research has shown that where a person spends their childhood (rural vs. urban) is closely tied to the likelihood of that person hunts and continues to hunt (Duda et al., 2010). For families in a rural community, the hunting tradition is more likely to continue because of increased access to hunting land, increased comfort with firearms, and the social support to hunt (Duda et al., 2010) but it is unclear whether awe experiences decrease with

increased hunting frequency or living in close proximity to natural settings (rural communities). The lack of a relationship between current community and *Awe* may not have been detected due to the question asking where someone lives now instead of where someone lived during childhood. Other possibilities of a community question may be where they spent their childhood or where they spent the most time living, or the community that had the most impact on them. It may be important to distinguish the community for each individual so that people are not lumped into the same category (i.e., someone who had lived on a rural farm for 6 months vs. someone who has lived on a rural farm their entire life). Future research should examine these relationships in more depth.

### Study Limitations

One of the limitations of this study was the small sample size, and thus, low power, potentially leading to a Type II error, which is not finding an effect that exists (Cohen et al., 2003). Despite a small sample size, an effect was found between increased *Awe* and age, however, other effects may exist that were not detected due to low power.

The second limitation was that only South Carolina resident hunters were surveyed. While this is not a problem for drawing inferences within the South Carolina hunting population, the results cannot be extrapolated to other regions of the country, and not even necessarily to other states with the southeastern US. Finally, the instrument and the items may not fully reflect whether, and the degree to which, the respondents have



had an awe experience. Due to the personal nature of these concepts, measurement error may have occurred.

#### Future Research

This scale requires cross validation with a larger sample size and from populations outside of South Carolina. While South Carolina is similar to other states in terms of hunting culture (i.e. seasons, game limits, methods, etc.), it is not reasonable to assume these results may be applied to hunters in other states within the southeastern United States or in other regions of the country. The results of the *Awe* quantitative scale may prove to vary by state or region.

**Table 2.1. Sociodemographic Description of Sample Population**

	<b>Females (<i>n</i> = 45)</b>			<b>Males (<i>n</i> = 34)</b>		
	<b>Mean (SD)</b>	<b>Skewness</b>	<b>Kurtosis</b>	<b>Mean (SD)</b>	<b>Skewness</b>	<b>Kurtosis</b>
Age	40.9 (13.9)	0.01	-1.18	44.0 (12.4)	-0.30	-1.06
Years hunting experience	14.2 (11.2)	0.95	-0.03	30.2 (14.1)	-0.31	-0.51
Number of hunts per year	14.8 (3.7)	0.20	-1.50	16.6 (3.4)	0.16	-1.50
Religious Devotion	3.2 (1.1) (between Strongly Religious & Somewhat Religious)	-0.22	0.22	3.0 (0.9) (Strongly Religious)	-0.24	-0.15

**Table 2.2. Item statements and loadings for the final Awe model**

	<b>Perceptions of Life</b>	<b>Nature- Human Relationship</b>	<b>HMS*</b>
While hunting I have moments of clarity about what is important to me.	0.74		
While hunting I reflect on my life.	0.69		
While hunting I have had a moment that changed my perspective on life.	0.84		
While hunting I have had encounters with things in nature that lead to a reassessment of my life's goals.	0.83		
While hunting I experienced a moment that changed my life.	0.75		
While hunting I have a heightened sense of right and wrong.	0.76		
While hunting I transcend from everyday life to the natural world.		0.65	
While hunting I feel that the woods are vast.		0.69	
While hunting I sometimes feel overwhelmed with emotion.		0.77	
<i>Connect</i>			
While hunting I have had an experience in which I felt myself to be absorbed as one with all things.			0.88
While hunting I have had an experience in which my own self seemed to merge into something greater.			0.89
While hunting I have had an experience in which I realized the oneness of myself with all things.			0.92
While hunting I have had an experience in which I became aware of a unity to all things.			0.82
While hunting I have had an experience in which all things seemed to be unified into a single whole.			0.91
<i>Inner-Subjective</i>			
While hunting I have had an experience in which I felt as if all things were alive.			0.89
While hunting I have had an experience in which all things seemed to be conscious.			0.94
<i>Temporal-Spatial</i>			
While hunting I have had an experience in which I felt nothing is ever really dead.			0.79
While hunting I have had an experience which was both timeless and spaceless.			0.85
While hunting I have had an experience in which I had no sense of time or space.			0.86
While hunting I have had an experience in which time and space were non-existent.			0.88
<i>Noetic</i>			
While hunting I have had an experience in which something greater than myself seemed to absorb me.			0.77
While hunting I have had an experience in which a new view of reality was revealed to me.			0.84
While hunting I have had an experience in which ultimate reality was revealed to me.			0.88
While hunting I have had an experience in which deeper aspects of reality were revealed to me.			0.86
While hunting I have had an experience which left me with a feeling of wonder.			0.72

**Table 2.2. Item statements and loadings for the final model (continued)**

*Religious Quality*

While hunting I have had an experience which seemed holy to me.

**HMS\***

0.96

While hunting I have experienced something that is divine.

0.94

While hunting I have had an experience which I knew to be sacred.

0.82

**\*HMS = Hood Mysticism Scale used to measure the Spirituality Construct**

**Table 2.3. Goodness of Fit Indices with Model Comparisons**

	Model	$\chi^2$ (df)	S-B $\chi^2$	CFI	RMSEA (90 % CI)	$\Delta$ S-B $\chi^2$ ( $\Delta$ df)	<i>p</i>
1	Hypothesized Model	744.03 (417)	581.52	0.912	0.07 (0.058, 0.086)	-	-
2	Revised Model	561.95 (352)	433.47	0.952	0.06 (0.035, 0.072)	153.30 (65) (Model 1 vs. Model 2)	<0.001
3	Final Model	533.43 (338)	409.31	0.956	0.05 (0.031, 0.070)	25.21 (14) (Model 2 vs. Model 3)	0.03

**Table 2.4. Composite Reliability for Awe construct**

Factor	Composite Reliability ( <i>rho</i> )
Nature-Human	0.749
Perceptions of Life	0.897
Spiritual Connection	0.983

**Table 2.5. Hood Mysticism Scale endogenous factor correlation matrix and Average Variance Extracted (AVE) and Construct Reliability**

	Connectedness	Inner Subjective	Temporal-Spatial	Noetic	Religious Quality
Connectedness	<b>0.8857<sup>a</sup></b>				
Inner Subjective	0.72303 <sup>b</sup>	<b>0.91538</b>			
Temporal-Spatial	0.66259	0.67067	<b>0.8466</b>		
Noetic	0.92477	0.73096	0.76951	<b>0.817</b>	
Religious Quality	0.62288	0.4963	0.57025	0.7926	<b>0.9066</b>
Construct Reliability	0.94785	0.911747	0.90995	0.9087	0.93236

a. Diagonal elements are the square root of the Average Variance Extracted

b. The off-diagonal elements are the correlations between the factors.

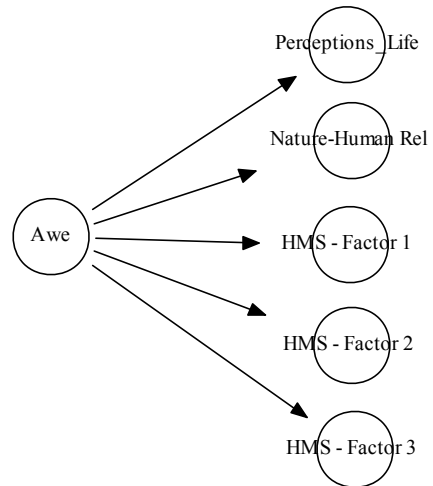
**Table 2.6. Awe endogenous factor correlation matrix and Average Variance Extracted (AVE)**

	Perceptions of Life	Nature-Human Rel.	Spiritual Connection
Perceptions of Life	<b>0.7710<sup>a</sup></b>		
Nature-Human Rel.	0.78526 <sup>b</sup>	<b>0.7067</b>	
Spiritual Connection <sup>c</sup>	0.62985	0.74606	<b>0.8664</b>

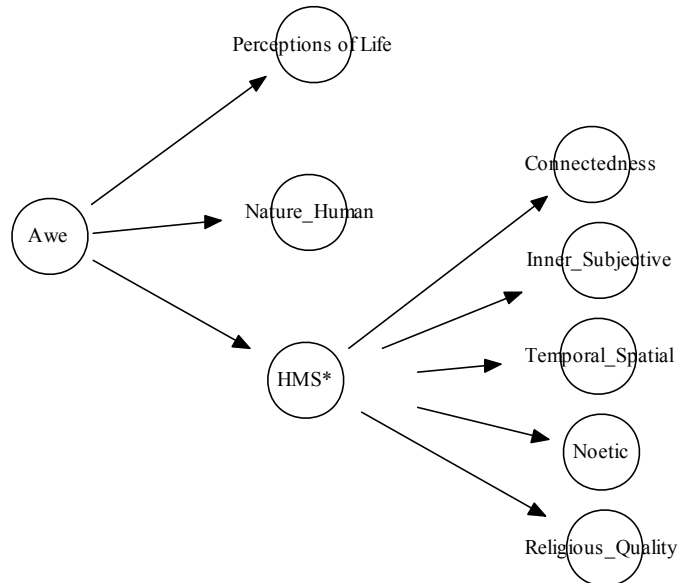
a. Diagonal elements are the square root of the Average Variance Extracted

b. The off-diagonal elements are the correlations between the factors.

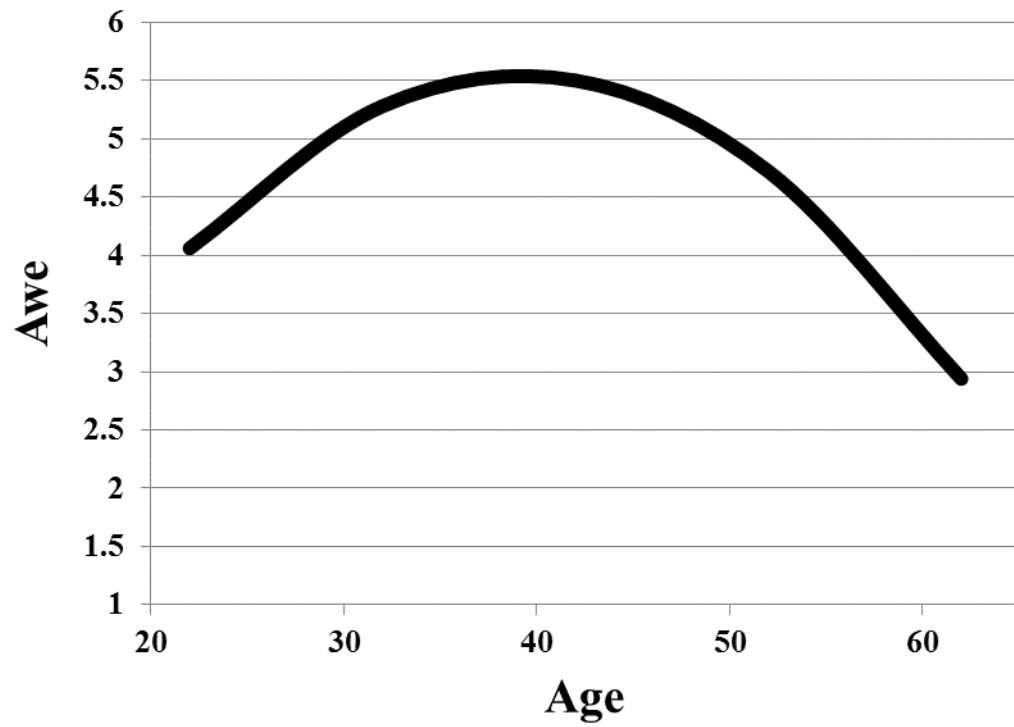
c. Spiritual Connection is the measured using the Hood Mysticism Scale.



**Figure 2.1 Initial Model for Awe Construct.**



**Figure 2.2. Final Model for Awe Construct. \*HMS = Hood Mysticism Scale as used to measure the Spirituality Factor**



**Figure 2.3. Quadratic Relationship Between Awe and Age**

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## CHAPTER THREE

### DEVELOPMENT OF A SCALE TO MEASURE THE BENEFITS OF HUNTING

#### Introduction

Many facets of hunting have been explored to explain why humans continue to hunt in modern society. Early works described either motivations for hunting (e.g. Decker, Provencher, & Brown, 1984; Jackson, 1988; Purdy & Decker, 1986) or used psychometrics to describe hunters (e.g. Driver & Knopf, 1977; Moss, Shackelford, & Stokes, 1969; Petchenik, 1986; Voracek et al., 2010). Contemporary research has continued to explore the motivations and benefits associated with hunting. However, most research to date has revealed primarily instrumental reasons such as for meat, to be with family or friends, to be close to nature, and other similar factors (e.g. Adams & Steen, 1997; Decker et al., 1984; Duda, Jones, & Criscione, 2010).

While these works provide insight into some of the potential motivations for hunting, the question remains does hunting satisfy basic as well as higher level psychological needs, and can these benefits be measured and quantified? To answer these questions, this study develops and tests a scale that measures the psychological benefits related to hunting using Maslow's Hierarchy of Needs as a framework. The development of such an instrument may help to fill voids in current research by examining the breadth of potential benefits received from hunting. It may also assist natural resource agencies to develop effective hunter recruitment and retention strategies.

### Conceptual framework and literature review

Early research on hunting has primarily focused on hunter satisfaction. Satisfaction was initially conceptualized and measured by whether an individual harvested a game species (Hendee, 1974). Later, Crissey (1971) proposed that hunting may provide additional benefits outside of successfully harvesting an animal and the number of days afield was used as a measure of hunter satisfaction. These approaches were called into question by Hendee (1974) who introduced a multiple-satisfaction approach, which measured a range of benefits beyond bagging an animal or the number of days afield. Some of the considerations Hendee (1974) outlined included social aspects of hunting, hunting methods (e.g., archery vs. firearm), appreciation of nature, and other variables. While Hendee (1974) investigated various aspects of hunting and their associated benefits, he primarily focused on benefits that may influence the management of game species, such as the chance of killing an animal, or hunter overcrowding and overharvesting.

Subsequent work stemming from the multiple-satisfaction approach has continued to focus on attitudes toward the management of hunting and on variables such as species abundance, season limits, hunting methods (e.g. archery vs. firearm), access to hunting land, and bag limits (e.g. Brown, Hautaluoma, & McPhail, 1977; Decker, Brown, & Gutierrez, 1980; Hammitt, McDonald, & Patterson, 1990; McCullough & Carmen, 1982). While this work has added to our understanding of the benefits of hunting, a comprehensive understanding and measure of the benefits of hunting has yet to be developed (Benson & Decker, 2001).

One body of research focusing on a more holistic approach to leisure and the derived benefits is that by Driver (e.g., Driver, 1976; Driver & Brown, 1986). Driver developed the concept of the benefits of leisure to attempt to provide a meaningful measure that would assist managers in deciding the best way to allocate expenditures for recreational programs. The benefits of leisure concept encompasses a range of physiological, psychological, social and economic benefits derived from outdoor recreation and other leisure activities and from this work emerged the Recreation Experience Preference (REP) Scale (Driver, 1976; Driver, Tinsley, & Manfredi, 1991; Driver, Manfredi, & Tarrant, 1996). However, the REP scale lacked a theoretical basis and used an indirect approach to measuring the benefits, meaning that the assessment of the benefits were measured indirectly using the motivation for engaging in the activity and therefore, the benefits were implied.

Decker, Provencher and Brown (1984) considered the social-psychological aspects of hunting and identified three primary types of hunters: achievement, affiliative and appreciative. Achievement motivated hunters hunt in order "...to meet a self-determined standard of performance..." (Decker et al., 1984, p. ES-21). Affiliative hunters primarily hunt to "accompany another person in the field, and strengthen or reaffirm the personal relationship..." (Decker et al., 1984, p. ES-21). Finally, appreciative hunters tend to be individuals who hunt primarily to obtain a "...sense of peace, belonging and familiarity that they have learned to associate with hunting" (Decker et al., 1984, p. ES-21).

Later, Benson and Decker (2001) proposed that the range of benefits associated with hunting can be conceptualized and organized using Maslow's Hierarchy of Needs. Maslow outlined a hierarchical framework that described 5 levels of human needs (physiological, safety, love and belonging, self-esteem, and self-actualization) (Maslow, 1987). Maslow argues that a person must satisfy the lower level needs before achieving (or satisfying) the next subsequent level. Benson and Decker (2001) extended Maslow's Hierarchy of Needs to hunting and proposed a typology to include: 1) necessity, 2) risk avoidance and reduction, 3) affiliation, 4) identity recognition and achievement, and 5) appreciation of nature and culture. Each of these 5 categories corresponds with particular levels contained in Maslow's Hierarchy of Needs. The authors presented evidence from existing studies as well as theoretical arguments to support this new typology. However, this typology has not been directly operationalized and tested; consequently this study seeks to fill this gap.

## Methods

### Construct Development

#### *Physiological Needs and Safety Needs*

Physiological needs are the most basic level of Maslow's Hierarchy of Needs, also termed necessity by Benson and Decker (2001). Necessity is defined as "...hunting for meat for human consumption – a most basic utilitarian reason to harvest wild animals" (Benson & Decker, 2001, p. 145). Physiological needs address the basic human requirement for food, water, shelter, clothing, etc. and can be provided through hunting



activities. While today many of the basic human needs can be satisfied through a trip to the local grocer, some people still prefer to consume wild game for the nutritional benefits it provides as well as the satisfaction of consuming that which they killed (Adams & Steen, 1997; Benson & Decker, 2001; Decker et al., 1984).

Safety is the second level on Maslow's Hierarchy of Needs and pertains to physical, emotional, as well as property/economic threats from wildlife, humans or other sources. The feeling of safety provides an environment in which a person feels they can not only survive, but thrive without constant worry. However, even in urban areas, wildlife may pose a threat to human safety through diseases and attacks, which is why Benson and Decker (2001) classified this level as risk avoidance and reduction. For example, rabid raccoons (*Procyon lotor*), fox (*Vulpes spp.*) and other species can threaten the safety and health of humans, even in urban areas. Another example of a safety issue is deer overpopulation causing deer/vehicle collisions. Reduction of species populations that pose human health risks, impose property damage or crop/livestock depredation, may still be a motivation for hunting (Benson & Decker, 2001; Koval & Mertig, 2004; Triezenberg, Gore, Riley, & Lapinski, 2014).

While the satisfaction of physiological and safety needs may not be a simple task for humans to achieve overall, these concepts when applied to hunting were deemed sufficiently simple that we combined the first two levels on Maslow's Hierarchy of Needs into one factor for testing (Physiological and Safety). We developed several items pertaining to these concepts. The most obvious physiological need in relation to hunting is providing food. There are additional uses of an animal carcass such as clothing from

the hide, but these benefits were not documented in the literature as being a primary reason for hunting so they were not addressed in the survey. The second level on Maslow's Hierarchy of Needs, safety, asked questions related to the hunting of predators for personal safety and disease reduction. The question related to disease reduction stemmed primarily from evidence that the spread of diseases, particularly rabies (*Lyssavirus* spp.), has increased corresponding to increasing coyote (*Canis latrans*) populations in the southeastern United States (Wang et al., 2010). Therefore, wildlife may be an issue for not only personal safety but for safety of livestock and other domestic animals. The Physiological and Safety questions had response categories of "Yes" and "No."

#### *Love and Belonging*

Love and Belonging on Maslow's Hierarchy of Needs is focused on humankind's need to not only give and receive love, but to belong to a group, or a unit (Maslow, 1970). The tendency to belong, to love and to be loved was described by Ardrey (1966) in *The Territorial Imperative* and was reiterated by Maslow (1970) as being a vital part of human life. Affiliation as described by Benson and Decker (2001) corresponds with love and belonging on Maslow's Hierarchy of Needs.

A great deal of research has been focused on the social and psychological benefits received from participating in leisure (Mannell & Stynes, 1991). Studies measuring love and belonging include the Self-Reported Experiences of Activity Settings (King et al., 2014), the Perceived Social Competence Scale (Anderson-Butcher et al., 2013), the 5-item Belonging Scale (Anderson-Butcher & Conroy, 2002) and work on the sense of

belonging in landscapes (Jones, Patterson, & Hammitt, 2000). One scale that measures love and belonging benefits in relation to recreational activities is the Serious Leisure Inventory and Measure (SLIM) developed by Gould (2005). The SLIM scale is intended to measure serious leisure which was defined by Stebbins (1992) as being “the systematic pursuit of an amateur, hobbyist, or volunteer activity sufficiently substantial and interesting in nature for the participant to find a career there in the acquisition and expression of a combination of its special skills and knowledge” (p. 3). In developing the SLIM scale Gould (2005) formulated that serious leisure has 18 distinct components, one of which is the benefit of love and belonging through the pursuit of a recreational activity such as hunting.

The SLIM scale was designed so that a particular recreational activity of interest, in this case hunting, could be inserted into the measurement items without changing the wording or meaning of the question. Therefore, no changes were necessary to the SLIM scale to measure Love/Belonging except to denote the hunting context. The response categories used a 9-point Likert scale ranging from ‘Completely Disagree’ to ‘Completely Agree’.

### *Self-Esteem*

Self-esteem is addressed as the fourth level on Maslow’s Hierarchy of Needs and is referred to by Benson and Decker (2001) as identity recognition and achievement. Benson and Decker (2001) discussed this category as “...skill development and demonstration” (p. 146). Maslow (1970) pointed out that there are two components to self-esteem which include a person’s perceptions of their own skills and abilities and the

perceived recognition and worth of those skills and abilities by others. Research has shown self-esteem can be improved through participation in recreational activities (Pohl, Borrie, & Patterson, 2000; Ransdell, Dratt, Kennedy, O'Neill, & DeVoe, 2001). While scales exist to measure this phenomenon such as Marsh's Physical Self-Description Questionnaire (Marsh & Redmayne, 1994), Satisfaction with Life Scale (Joseph, Royse, Benitez, & Pekmezi, 2014), or the Exercise and Self-Esteem Model (Sonstroem, Harlow, & Josephs, 1994), many of these scales focus on the relationship between the physiological aspects of leisure and self-esteem. However, the SLIM scale contained a subscale that measured the recreational benefits of enhancing self-esteem, not attributed to the physiological aspects of leisure, which included self-expression of abilities, individuality, and image through the undertaking of leisure activities (Gould, 2005). The SLIM scale also has the benefit of measuring both aspects of self-esteem as outlined by Maslow (1970), which are perception of self and perception by others.

As with the case of the Love/Belonging category, the SLIM (Gould, 2005) scale was used for self-esteem without changes except to denote the hunting context. The response categories were once again a 9-point Likert scale ranging from 'Completely Disagree' to 'Completely Agree'.

### *Self-Actualization*

Finally, self-actualization sits atop the pyramid of Maslow's Hierarchy of Needs. This level is related to a person's desire to grow, develop, and improve as a person who is able to find a deeper meaning in life, and is more of a "state of being" as opposed to an actual satisfaction of a need (Benson & Decker, 2001, p. 147; Maslow, 1987). Benson

and Decker (2001) defined self-actualization as an appreciation of nature and culture and described this level of hunting as “...more abstract, spiritual, emotional and pluralistic” (p. 147). Maslow (1970) also described self-actualizing moments as peak experiences that have varying degrees of intensity. He surmised that self-actualizing moments may be mild in nature or may be so profound that a person is transformed in their views and beliefs as a consequence of the experience. Maslow (1964, 1968) proposed that when a person is in a state of self-actualization then a peak experience occurs. A peak experience is a brief moment in an individual’s life that produces a mystical illumination that is both emotive and cognitive in nature (e.g. Agate, 2010; Halstead & Halstead, 2004; Keltner & Haidt, 2003; Maslow, 1964, 1968; Otto, 1958, Stace, 1960). Maslow (1964, 1968) also noted that peak experiences typically occur in specific settings, particularly natural settings.

Another term for describing the benefits/outcome associated with peak experiences is awe (e.g., Powell et. al., 2012). Awe has been described as challenging the mind and moving an individual to do more than they thought possible (Otto, 1958), and as an experience that is confusing, surprising, and inspires wonder (Keltner & Haidt, 2003). While there is not yet a universally accepted definition of awe, a two part definition has been proposed that allows for measurement clarity which is: 1) perceptual vastness (i.e. immense in size, complexity, etc.), and 2) altering a person’s understanding of the world (Keltner & Haidt, 2003; Powell et. al., 2010; Rudd, Vohs, & Aaker, 2012).

The concepts of peak experience, self-actualization, mysticism, and other similar concepts all mimic and share common experiences and themes that can be encompassed

by awe (Powell et al., 2010; Rudd et al., 2012). In Guynn (Dissertation Chapter 2) a scale was developed to measure the benefits associated with self-actualization using the concept of awe as a basis. While we do not contend that awe captures or fully encompasses the concept of self-actualization, we do propose that awe is likely a major component of self-actualization. Therefore, awe will be used to measure self-actualization.

The Awe scale has three underlying factors that are used to measure it. These three factors are Perceptions of Life, Nature-Human Relationships and Spirituality. The Perceptions of Life factor captures transformative personal experiences and is defined as a reassessment of life and life's priorities as experienced during an awe moment while hunting. The Nature-Human Relationship factor pertains to feeling connected to nature as opposed to being separate from nature. The Spirituality factor reflects spiritual experiences during an awe experience.

One modification in the original *Awe* scale (see Dissertation Chapter 2), the Inner Subjective factor, which is a sub-factor of the Spiritual Connection factor as measured by the Hood Mysticism Scale, revealed only two reliable measurement items, thus causing an underidentification issue. Therefore, two additional measurement items were developed for this factor and included in the survey. A 7-point Likert scale was used for the *Awe* scale which ranged from 'Definitely Not True' to 'Definitely True'.

The questions for the Perceptions of Life and Nature-Human Relationship factors were worded for response of answer choices of "definitely not true , mostly not true, somewhat not true, neutral, somewhat true, mostly true, and definitely true." These

response categories matched those of the Hood Mysticism Scale in order to simplify the survey and ease the burden on the respondents.

There were two modifications made to the Hood Mysticism Scale (HMS), which measures the Spirituality factor. First, all negatively worded items were changed to be a positively worded item (Marsh, 1996). Second, each item was prefaced with the statement “While hunting I...” in order to remind the participant of the context for the question.

For a full description of these factors, please see Guynn – Dissertation Chapter 2. For a brief definition of each construct, please see Table 3.1. The final factors and sub-factors that correspond to each level on Maslow’s Hierarchy of Needs can be found in Table 3.1.

#### Sample and data collection procedures

Two sampling frames were used to develop the Benefits of Hunting Assessment Scale (BoHAS). First, names and addresses of South Carolina residents who purchased a hunting license between July 1, 2012 and June 30, 2013 were obtained through the South Carolina Department of Natural Resources. The second group was participants in a program administered through the Quality Deer Management Association (QDMA) called the Deer Steward program. QDMA is an organization with over 60,000 members residing primarily throughout North America. The mission of the QDMA is to espouse the benefits of having deer populations with a balanced sex and age structure, and herd densities in balance with the surrounding habitat. The Deer Steward program is designed for hunters, landowners, and land managers to learn techniques for managing white-tailed

deer (*Odocoileus virginianus*) populations and habitats. It is an intensive educational program that covers herd management, herd monitoring, habitat management and hunter management.

For South Carolina resident hunters (SCH), license holders were separated into male and female groups, then the random number generator function in Microsoft Excel® (RND) was used to select 500 males and 500 females ( $n = 1000$ ). Next, a paper questionnaire was mailed to each hunter. For the QDMA Deer Steward participants (DS), a link to an online survey was emailed to each person ( $n = 922$ ). The online survey mimicked the paper survey in terms of question order and presentation. The Clemson University Institutional Review Board (IRB) approved the protocol for data collection for paper and online surveys (IRB2013-373). A follow-up reminder was sent either via mail (SCH) or via email (DS) to non-respondents approximately 14 and 28 days after the initial survey in an attempt to maximize response rates (Dillman, Smyth, & Christian, 2009).

Due to mailing errors, only 995 paper surveys were mailed to the SCH group. Of those 995 paper surveys, 5 were returned as non-deliverable. A total of 199 paper surveys were returned for a response rate of 20%. For the DS group, 922 emails were sent with the survey link and 51 bounced back as undeliverable, leaving 871 surveys delivered. A total of 405 responses were received for a minimum response rate of 46.5%. The response rate for the DS group may be higher since there is no way to determine if emails were blocked due to spam filters, thus reducing the number of emails that were actually delivered.



The SCH group information was entered manually into SPSS Statistics 22 (IBM, Inc.). Twelve percent of the surveys ( $n=24$ ) were double-entered to check for data accuracy and yielded a data entry error rate of 0.3%. Data collected online from the DS group were downloaded directly into an SPSS database.

### Data Analysis

To develop the Benefits of Hunting Assessment Scale, we used confirmatory factor analysis (CFA) which is a technique that can test a hypothesized model and alternative models, and provides measures of reliability of the items comprising a scale (Anderson & Gerbing, 1988; Little, Lindenberger, & Nesselroade, 1999; Noar, 2003). We evaluated the structure of this scale using a variety of absolute and relative indices (Hu & Bentler, 1998, 1999). Absolute fit indices provide an approximation between the observed variance/covariance and implied variance/covariance and were reported in the forms of  $\chi^2$  and the root mean square error of approximation (RMSEA). The  $\chi^2$  statistic indexes the discrepancy between the observed variances/covariances and the model implied variances/covariances (Fornell & Larcker, 1981). However, the  $\chi^2$  test is calculated with a variety of assumptions, one of which is that the data are normally distributed, and a violation of this assumption may lead to misinterpretation of results. Therefore, we used the Satorra-Bentler  $\chi^2$  statistic, which accounts for non-normality (Byrne, 2008; Kline, 2011). The robust RMSEA provides evidence of parsimony in the model and the smaller the value the better the model fit (Byrne, 2008; Kline, 2011). Relative fit indices provided a measurement of how a specified model differs from a null

model, which assumes all covariances are zero (Kline, 2011) and is reflected in the robust comparative fit index (CFI) (Bentler, 1990).

Finally, we used the Lagrange Multiplier (LM) test to identify sources of misfit, typically items with shared variance beyond the factor, reflected in cross-loadings or error covariance (Kline, 2011). When using the LM test, Byrne (2008) suggests that there should be a meaningful and noticeable improvement in fit before re-specifying a model.

The concepts of reliability and validity are also important indicators in new scale development. We used Cronbach's  $\alpha$  and rho to measure the composite reliability, (internal item/factor loadings and item cross-loadings), which demonstrates how consistent an instrument is performing (DeVellis, 2012; Kline, 2011). We used construct correlations and average variance extracted (AVE) as indicators of convergent and discriminant validity (Fornell & Larcker, 1981). Convergent validity is evidence of the similarity between measures and discriminant validity is a measure of how much constructs differ (Cohen, Cohen, West, & Aiken, 2003; DeVellis, 2012; Fornell & Larcker, 1981; Tabachnick & Fidell, 2007).

## Results

One hundred and fifteen male and 75 female adults responded to the SCH survey. Six surveys were returned without a response to the gender question. One survey returned as a male respondent was excluded due to the self-reported age being less than 18 years of age. The DS group included 373 males, 7 females and 2 with non-responses to gender.

The DS group was comprised primarily of males and reflected the percentage of male members of QDMA. Table 3.2 provides a complete description of each sample group.

#### Missing Data and Outliers

An analysis was conducted to identify cases with >50% missing data for any one construct on the returned survey (Tabachnick & Fidell, 2007). For the DS group, a total of 19 cases were excluded due to incomplete data and 5 cases were excluded from the SCH dataset. Next, we identified multivariate outliers, which yielded the exclusion of 2 cases in the SCH dataset and 3 in the DS group. All 5 cases were excluded based on Mahalanobis Distance that exceeded the critical  $\chi^2$  value (Tabachnick & Fidell, 2007).

A missing completely at random (MCAR) test was conducted on both datasets (Little & Rubin, 1987). Results indicate that while the SCH were missing completely at random (36 missing data points, 13.7% cases missing data; 0.324% missing data points;  $\chi^2 = 1349.22$ ,  $df = 1348$ ;  $p=0.485$ ), the DS group MCAR test was significant (51 missing data points, 17% cases missing data; 0.323% missing data points;  $\chi^2 = 4337.164$ ,  $df = 4170$ ;  $p=0.035$ ) and, therefore, was considered to be not missing completely at random or missing at random (MAR). When data are not missing completely at random it indicates that the missing data are related to issues of instrumentation. However, since MCAR tests are sensitive to sample sizes and the DS group has a relatively large sample size ( $n=382$ ) combined with the fact that the MCAR test was not highly significant ( $>.01$ ), we continued with analyses (Parent, 2013; Wolf, Harrington, Clark, & Miller, 2013). Missing data were imputed using the Expectation Maximization (EM) technique, which is a two-step maximum likelihood process for imputing missing data involving

prediction of missing values and adjustment to maintain unbiased variance estimates (Allison, 2003; Schafer & Graham, 2002).

#### Confirmatory Factor Analysis Results for Initial Model

We used confirmatory factor analysis (CFA) to test the specified model for assessing the benefits of hunting using only the DS ( $n=383$ ) group initially. We used robust fit indices, which corrects for non-normality in the data (Byrne, 2008), robust Comparative Fit Index (CFI), and the robust Root Mean Square Error of Approximation (RMSEA), as suggested by Hu and Bentler (1998, 1999). We also utilized Mardia's coefficient to identify outliers in the dataset (Byrne, 2008). In the initial model (see Figure 3.2) we specified 4 higher order factors (Physiological-Safety, Love-Belonging, Self-Esteem and Self-Actualization as measured by *Awe*), 3 lower order factors: Perceptions of Life, Nature-Human Relationships, Spirituality (as measured by the Hood Mysticism Scale), and 4 lower order factors of the Hood Mysticism Scale: Transcendental, Inner Subjective, Temporal-Spatial and Religious across 50 measurement items. The results of the CFA indicated 13 items be dropped from the initially hypothesized model ( $S-B \chi^2=3877.55$ ;  $CFI = 0.77$ ) due to low factor loadings and/or multidimensionality issues (correlated error) (Table 3.3 - Hypothesized Model) (Byrne, 2008; Tabachnick & Fidell, 2007). The Nature-Human Relationship factor was initially specified with 3 items. However, during analysis one item was dropped due to a low loading of 0.284, (Fornell & Larcker, 1981) leaving only two items measuring the Nature-Human Relationship factor. A second question in the Nature-Human Relationship factor proved suspicious in terms of multidimensionality. Removing this item would have

left the Nature-Human Relationship with only one single measurement item, thus completely eliminating this factor. It was decided that the Nature-Human Relationship should remain in the model for conceptual reasons so the 2 items with the highest factor loadings remained in the model and were "...transcend from everyday life..." = 0.492 (Q28) and "...I sometimes feel overwhelmed..." = 0.467 (Q30). The items measuring the Physiology/Safety factor proved to all have low loadings ("Do you hunt for meat" = 0.052 (Q1); "Do you hunt predators" = 0.482 (Q2); "...hunt to reduce spread of disease..." = 0.267 (Q3)), which means that the items did not effectively reflect the construct, thus resulting in the complete loss of the Physiological/Safety factor. Additional measurement indicators include the small standard deviations for each of the items (Q1 = 0.322, Q2 = 0.406, Q3 = 0.463), indicating, in effect, a 1 or 2 point response scale.

The revised model included 3 higher order factors, Love-Belonging, Self-Esteem and Self-Actualization as measured by *Awe* that included 7 lower order factors. The results for this model yielded improved fit over the Hypothesized Model but further sources of misfit were identified (Table 3.3 - Revised Model). An additional five items revealed evidence of multidimensionality issues (correlated errors) and were eliminated.

The Lagrange Multiplier (LM) test was also used to identify misfit within the model (error covariances). A total of 8 error covariances were added to the model for testing. It is interesting to note that 7 of the 8 error covariances appeared in the Hood Mysticism Scale, which was a source of misfit in the original development of the *Awe* factor scale (see Guynn-Dissertation Chapter 2). While error covariances contributed to

misfit because of shared variance beyond the factor, inspection of the items revealed that in most cases the wording of the items appeared to be very close in nature and may have created additional shared variance beyond the factor (Dillman et al., 2009). Once the error covariances were included, the third model demonstrated excellent model fit and was accepted (Table 3.3 - Third Model) (Hu & Bentler, 1999; MacCallum, Browne, & Sugawara, 1996).

While the model was accepted, a remaining source of concern was the Hood Mysticism Scale (HMS), used to measure the Spirituality sub-factor of Awe. In a pilot study conducted to develop the *Awe* scale, which in the BoHAS measures self-Actualization, there was evidence of the HMS being either a 4 or 5 factor construct (see Dissertation Chapter 2). However, in considering sources of misfit in the BoHAS model, it became apparent that the HMS was a source of misfit. In analyzing results of the average variance extracted (AVE) for the HMS, there was evidence in the factor correlation between the Inner Subjective and Noetic-Connected factors that there was potential misspecification in the model ( $r = 1.0$ ). To test for misfit in the HMS, a separate analysis was conducted to determine if the HMS was 3, 4 or 5 factors. The results of the test indicated that a 3 or 5 factor solution was best (see Table 3.4 for Goodness-of-fit indices), although there was conflicting support for both the 3 and 5 factor solution. Therefore, in the interest of parsimony, the final model for the HMS included 3 factors. It is not surprising that the 3-factor solution was almost equivalent to the 4-factor solution since the two factors that were combined, Noetic-Connected and Inner Subjectivity, were almost perfectly correlated. The combined category of Noetic-Connected and Inner

Subjectivity was named Transcendental, reflecting the nature of the category. The average variance extracted and factor correlations for the 3 factor solution provided further evidence of better model specification (see Table 3.5). Even though the S-B  $\chi^2$  was slightly harmed in the full model (see Table 3.3 – Final Model), the CFI and RMSEA improved over the originally specified model due to greater parsimony, providing additional evidence of a properly specified model (Attenweiler & Moore, 2006; Byrne, 2008; Kline, 2011). Therefore, the final model included only 3 factors for the HMS and demonstrated excellent fit (Table 3.3 – Final Model).

The final model's factor loading also provided evidence of convergent validity (Table 3.5). Convergent validity is an assessment of how well the items are collectively measuring the construct of interest and demonstrates reliability of the items. In examining the factor loadings and the squared factor loadings, which provide a measure of reliability, all items exhibit high reliability. To measure the internal reliability of the factors we used Cronbach's Alpha ( $\alpha$ ) and Rho, which indicates the homogeneity of the items within the factor (DeVellis, 2012; Fornell & Larcker, 1981) (Table 3.6) which ranged from 0.968-0.504. A diagram of the final Benefits of Hunting Assessment Scale can be seen in Figure 3.3.

### Measurement Invariance

#### *Measurement Invariance between Sample Groups*

It was necessary to ensure that the survey instrument (paper survey vs. online survey) was equivalent across groups and not confounded by data collection methods. To assess the degree of configural and metric invariance, a combination of indicators should

be evaluated (Vandenberg & Lance, 2000). Configural invariance simply means that the overall factor structures fit the data equally across two independent groups as hypothesized in the model. For configural invariance the goodness-of-fit indices should be similar when each group is tested individually as well as when tested as one single group. This means that the model was tested against both SCH and DS datasets individually and then tested as one combined multi-group with no constraints. In doing so, the goodness-of-fit indices for the combined group should still be acceptable, which indicates configural invariance. Additionally, in evaluating configural invariance Byrne (2008) recommended that in addition to the goodness-of-fit for each dataset being similar, when the two individual S-B  $\chi^2$  are added together it should be close to the results of the combined configural model. Configural invariance must first be established in order to proceed to metric invariance testing (Vandenberg & Lance, 2000). Results of this process indicate that there is configural invariance between the SCH and DS groups (Table 3.7).

To test for metric invariance, which looks at the factor loadings between groups to ensure consistency when loadings are constrained to be equal, the  $\Delta$ S-B  $\chi^2$  should be  $p > 0.05$  (Byrne, 2008; Vandenberg & Lance, 2000). However, Byrne (2008) pointed out that the  $\Delta$ S-B  $\chi^2$  is sensitive to sample size and should not be the sole indicator of invariance. Therefore, Byrne (2008) suggested that the  $\Delta$ CFI is a stronger indicator of invariance over the  $\Delta$ S-B  $\chi^2$  and that the value should not exceed 0.01. Kline (2011) also suggests that goodness-of-fit indices should be acceptable for the configural and metric models, independently.



The results of the metric invariance analysis, constraining only the first order loadings, showed that the  $\Delta S-B \chi^2$  was significant ( $p=0.02$ ; Metric Invariance – 1<sup>st</sup> order loadings vs. Configural Model; see Table 3.7), but the  $\Delta CFI$  was  $<0.0001$ . Results indicated that one item, Q51, had a lower loading for the DS group ( $\lambda = 0.6544$ ) than the loading for the SCH group ( $\lambda = 0.7762$ ). In examining the question it is not apparent why there was a discrepancy in responses between the two groups. In continuing the analysis, as pointed out by Byrne (2008), the  $\Delta CFI$  is a more reliable indicator of invariance and is therefore accepted as an indicator of metric invariance in this study. Therefore in continuing the analysis, constraining error variances did not harm the fit ( $\Delta S-B \chi^2 =$  almost 1;  $\Delta CFI < .0001$ ), indicating equal error variance across groups, which indicated scalar invariance. The combination of no correlated errors, equality of item loadings and as well as error variance indicated the parallel test model assumptions had been met (Raykov 1997, 2001). Finally, when the higher order factor loadings were constrained, the  $\Delta S-B \chi^2$  (6.7;  $p = 0.152$ ) and  $\Delta CFI$  ( $<0.0001$ ) both indicated invariance (Scalar Invariance vs. Metric Invariance for Higher Order factors). Therefore, there is evidence of metric and scalar invariance between the SCH and DS groups.

#### *Measurement Invariance within the SCH Group*

To validate the structure and measurement of the BoHAS, we used two versions of the paper questionnaire that was administered to the SCH group. The two versions served to test the validity and psychometric properties of the BoHAS by using multi-group tests of measurement invariance. The difference between the surveys was only in the question order for the BoHAS items. Changing the question order was done to ensure

there were no item order effects within the survey. Comparison of the two samples based on order effect showed that the  $\Delta S-B \chi^2$  was significant ( $p=0.007$ ), while the  $\Delta CFI$  was only 0.004, which is almost negligible and not a substantive change in model fit (Table 3.8). The item that was not equal across groups was "...a moment that changed my life" (Q26), with Group A having a loading of 0.8277 and Group B loading equal to 0.8802. We are unsure as to why this item was not equal across groups. Nonetheless, as outlined previously, the  $\Delta CFI$  is a better indicator of invariance and, for the order effect, was inconsequential. Additional tests progressively constraining the loadings and error variances across the two samples demonstrated the  $\Delta S-B \chi^2$  (Error Variance/Covariances Constraints vs. 2<sup>nd</sup> order loadings) were not significant (5.81;  $p = 0.213$ ) and the  $\Delta CFI$  ( $<0.0001$ ) was also trivial, indicating measurement and scalar invariance across the different survey versions.

### Discussion

The goal of this scale development was to provide researchers and wildlife professionals with a tool to determine and evaluate the psychological benefits derived through hunting. There is strong evidence from this study to suggest that the BoHAS scale provides a meaningful measure of the benefits of hunting as evidenced by the goodness of fit as well as the metric and structural invariance of the scale. The results also suggest that BoHAS may be used as an additive scale to gauge benefits derived from hunting in light of a single higher order factor with good fit. However, it may be more informative to look at the scores across the first order factors (Love/Belonging, Self-

Esteem and *Awe*). These scores may provide more insight into personal motivations for hunting, which can be used to design recruitment and retention programs tailored to various motivations. The results of this study also support earlier work by Decker et al. (1984) in which they described three primary motivations for hunting: affiliative, achievement, and appreciative.

The Love/Belonging scale is reflective of the social aspects of hunting. Scoring higher on this factor indicates the importance of hunting as a social outlet and that the actual act of hunting, or killing, may be less important, which is in line with Decker et al. (1984) affiliative hunter. This may be a key consideration for state and federal agencies in designing hunting opportunities where the social aspect is emphasized rather than the abundance of game species. In this case, access to areas for hunting with a “hunt camp” design in mind may be more important than actual species densities.

A higher score for the Self-Esteem factor may be indicative of personal motivations focused on developing skills and achieving personal goals, such as killing a trophy animal. Decker et al. (1984) described this category of hunter as achievement oriented. In this case, the actual act of hunting may be of paramount importance, indicating a need for areas managed for high densities of game species and opportunities to hunt those species.

Finally, self-actualization, as measured by the *Awe* factor, may indicate that the actual act of hunting and being in the natural environment is important in establishing the renewal of self and establishing relationships to nature. While this factor may be partially related to the category that Decker et al. (1984) describe as an appreciative hunter, it does

not appear to be exactly aligned. The *Awe* factor is designed to measure self-actualization on Maslow's Hierarchy of Needs, however, the appreciative hunter as described by Decker et al. (1984) focuses more on "obtaining a sense of peace, belonging, and familiarity..." Decker et al. (1984) did not discuss transformation or achieving full potential for individuals, as is the case with the *Awe* factor. In fact, the *Awe* factor may yield the most intriguing information. While there are likely a myriad of interpretations for this category, we suggest that someone who scores high in this category may potentially seek benefits from hunting through a different pathway than the direct act of hunting or killing an animal, such as mentoring other hunters. Further exploration of this benefit through qualitative research appears critical before any reliable conclusion can be made about how to manage this group.

While we successfully developed the BoHAS, there are some limitations that should be addressed. First, dropping the Physiological/Safety factor from the model does not imply that hunting does not satisfy physiological or safety needs, it may simply be an indication that the items used to measure this factor were ineffective and there are alternative measures for this factor. However another explanation seems more plausible and is grounded in Maslow's Hierarchy of Needs. The lack of variability in the Physiological/Safety items may reflect that currently in the US, hunting is not necessary for providing food or safety, instead hunting may be seen as a luxury that can be used to achieve higher levels on Maslow's Hierarchy of Needs such as Love/Belonging, Self-Esteem, and Self Actualization.

Another consideration for the BoHAS is that the Nature-Human Relationship factor was retained in the model for conceptual reasons, despite having only one strong and one weaker item. There is evidence that the relationship people have with nature is very important in a variety of ways and, therefore, we felt should remain as a factor in the BoHAS (e.g. Adams & Steen, 1997; Davis & Gatersleben, 2013; Decker et al., 1984; Shiota, Keltner, & Mossman, 2007). Additional questions to measure the Nature-Human Relationships factor should be developed for inclusion in future surveys.

The Hood Mysticism Scale, measuring the Spirituality factor, was a source of concern in the model. Previous research has shown that the HMS could be a two, three, four or five factor solution (Caird, 1988; Chen, Hood, Yang, & Watson, 2011; Hood, 1975; Hood, Morris, & Watson, 1993; Hood et al., 2001; Lazar & Kravetz, 2005; Mclean, Leoutsakos, Johnson, & Griffiths, 2012; Reinert & Stifler, 1993). While earlier research (Guynn – Dissertation Chapter 2) suggested a 4 factor solution, the final results of this study indicated a 3 factor solution. Given that the sample size for this study was much larger than for the previous research ( $n_{\text{pilot study}} = 80$ ;  $n_{\text{BoHAS}} = 578$ ), we suggest that these results and 3 factor solution is much more reliable.

### Conclusion

We developed an empirical based scale that quantifies the psychological benefits of hunting. The data produced from the use of BoHAS may assist federal and state agencies in developing effective recruitment and retention programs. Additionally, retailers and advocacy groups may find the results from the use of the BoHAS helpful in designing

marketing strategies to hunters. The scale may also provide a theoretical framework for assessing the psychological benefits of other outdoor recreational activities, such as fishing or kayaking.

**Table 3.1. Benefits of Hunting Assessment Scale Dimensions and Definitions**

<b>Dimension</b>	<b>Definition</b>
Physiological	Basic human requirement for food, water, shelter, clothing, etc.
Safety	Pertains to physical, emotional, economic threats from wildlife, human or other sources.
Love and Belonging	The need to give and receive love as well as belong to a group or unit.
Self-Esteem	A person's perception of their own skills and abilities as well as the perceived recognition and worth of those skills and abilities by others.
Self Actualization	A person's desire to grow individually and is a state of being, rather than a need that must be fulfilled.

**Table 3.2. Means for Sociodemographic Descriptors of South Carolina Hunters and Deer Steward Study Participants**

<b>South Carolina Hunters</b>	<b>Mean (SD)</b>	<b>Skewness</b>	<b>Kurtosis</b>
Age	43.3 (13.2)	-0.04	-1.06
Years hunting experience	24.5 (16.1)	0.24	-1.12
Education	2.4 years of college (1.0)	0.09	-0.54
Annual Income	\$56,000 ( $\pm$ \$6,000)	1.05	0.59
Number of Hunts Per Year	26 (5.6)	0.2	-1.34
Community When A Youth	2.5 (1.36) (between Rural Non-farm & Small Town, Under 10,000)	0.54	-0.5
Religious Devotion	5.5 (1.8) (between Strongly Religious and Earnestly Religious)	0.097	-0.64
<hr/>			
<b>Deer Steward Participants</b>	<b>Mean (SD)</b>	<b>Skewness</b>	<b>Kurtosis</b>
Age	45.2 (13.1)	0.076	-0.817
Years hunting experience	32.6 (13.8)	0.2	-0.58
Education	3.6 years of college (0.93)	-0.34	-0.65
Annual Income	\$86,000 ( $\pm$ \$7,000)	0.23	-1.24
Number of Hunts Per Year	33.4 (4.9)	-0.37	-1.17
Community When A Youth	2.7 (1.57) (between Rural Non-farm & Small Town, Under 10,000)	0.62	-0.62
Religious Devotion	5.5 (2.19) (between Strongly Religious and Earnestly Religious)	-0.38	-0.73



**Table 3.3. Model Comparisons for the Benefits of Hunting Assessment Scale using the DS Group**

<b>Model (HMS with 4 Factors)</b>	<b><math>\chi^2</math> (df)</b>	<b>S-B <math>\chi^2</math></b>	<b>Robust CFI</b>	<b>Robust RMSEA (90% CI)</b>	<b><math>\Delta</math> S-B <math>\chi^2</math> (<math>\Delta</math> df)</b>	<b><i>p</i></b>	<b><math>\Delta</math> CFI</b>
Hypothesized Model	5148.21 (1164)	3877.55	0.77	0.083 (0.080;0.085)	-	-	-
Revised Model	1658.972 (546)	1198.4415	0.929	0.058 (0.054;0.063)	2730.9 (618) <sup>1</sup>	<0.001	0.159
Third Model	1450.54 (513)	1060.597	0.939	0.055 (0.050;0.060)	126.8 (33) <sup>2</sup>	<0.001	0.01
Final Model with HMS 3 Factors	1634.03 (510)	1209.23	0.953	0.049 (0.045;0.052)	N/A since not a nested model		

1. Hypothesized Model vs. Revised Model

2. Revised Model vs. Third Model

**Table 3.4. Comparison of models using only the Hood Mysticism Scale as 3, 4 or 5 factors**

<b>Model</b>	<b><math>\chi^2</math> (df)</b>	<b>S-B <math>\chi^2</math></b>	<b>CFI</b>
3 Factors	789.89 (126)	512.7676	0.955
4 Factors	789.24 (124)	511.28	0.955
5 Factors	775.67 (123)	501.36	0.956

<b>Model Comparison</b>	<b><math>\Delta</math> S-B <math>\chi^2</math> (<math>\Delta</math> df)</b>	<b><i>p</i></b>	<b><math>\Delta</math> CFI</b>
4 Factors vs. 5 Factors	12.31 (1)	0.00	0.001
3 Factors vs. 4 Factors	0.5204 (2)	0.77	<0.001
3 Factors vs. 5 Factors	11.22 (3)	0.01	0.001

**Table 3.5. Hood Mysticism Scale endogenous factor correlation matrix and Average Variance Extracted (AVE)**

	<b>Transcendental (F6)</b>	<b>Temporal- Spatial (F8)</b>	<b>Religious Quality (F9)</b>
<b>Transcendental (F6)</b>	<b>0.84077<sup>a</sup></b>		
<b>Temporal-Spatial (F8)</b>	0.81821 <sup>b</sup>	<b>0.89109</b>	
<b>Religious Quality (F9)</b>	0.71838	0.66168	<b>0.87693</b>

a. Diagonal elements are the square root of the Average Variance Extracted

b. The off-diagonal elements are the correlations between the factors.

**Table 3.6. Item Statements and Factor Loadings**

<b>Factor</b>	<b>Item</b>	<b><math>\lambda</math> (Unstandardized Loading)</b>
<b>Hunter Needs (Rho = 0.975; <math>\alpha</math> = 0.965; AVE = 0.701)</b>		
<b>Love -Belonging (Rho = 0.934; <math>\alpha</math> = 0.932; AVE = 0.746)</b>		
	A sense of group accomplishment is important to me in hunting.(Q7)	.75 (.91004)
	I feel important when I am a part of my hunting group's accomplishments.(Q9)	.76 (.984)
	The development of my hunting group is important to me.(Q10)	.91 (1.097)
	I contribute to the unification of my hunting group.(Q11)	.94 (1.099)
	It is important that I perform duties which unify my hunting group.(Q12)	.92 (1.091)
<b>Self-Esteem (Rho = 0.945; <math>\alpha</math> = 0.936; AVE = 0.793)</b>		
	Hunting allows me to express who I am.(Q18)	.69 (.66888)
	My image of myself has improved since I began hunting.(Q19)	.94 (1.495)
	Hunting has enhanced my self image.(Q20)	.97 (1.553)
	Hunting has improved how I think about myself.(Q21)	.95 (1.5110)
<b>Awe (Rho = 0.968; <math>\alpha</math> = 0.968; AVE = 0.677)</b>		
<b>Perceptions of Life (Rho = 0.894; <math>\alpha</math> = 0.884; AVE = 0.643)</b>		
	While hunting I have moments of clarity about what is important to me.(Q22)	.64 (.50321)

**Table 3.6. Item Statements and Factor Loadings (continued)**

Factor	Item	$\lambda$ (Unstandardized Loading)
	While hunting I have had a moment that changed my perspective on life.(Q24)	.85 ( 1.704)
	While hunting I have had encounters with things in nature that lead to a reassessment of my life's goals.(Q25)	.82 (1.758)
	While hunting I experienced a moment that changed my life.(Q26)	.84 (1.988)
	While hunting I have a heightened sense of right and wrong.(Q27)	.75 (1.4951)
	<b>Nature Human Relationships (Rho = 0.504; <math>\alpha</math> = 0.504; AVE = 0.443)</b>	
	While hunting I transcend from everyday life to the natural world.(Q28)	.67 (.74243)
	While hunting I sometimes feel overwhelmed with emotion.(Q30)	.67 (1.348)
	<b>Spirituality (Rho = 0.977; <math>\alpha</math> = 0.968; AVE = 0.712)</b>	
	<b>Transcendental (Rho = 0.964; <math>\alpha</math> = 0.963; AVE = 0.707)</b>	
	While hunting I have had an experience in which I felt myself to be absorbed as one with all things.(Q32)	.87 (.96830)
	While hunting I have had an experience in which my own self seemed to merge into something greater.(Q33)	.90 (1.033)
	While hunting I have had an experience in which I realized the oneness of myself with all things.(Q34)	.94 (1.054)
	While hunting I have had an experience in which I became aware of a unity to all things.(Q35)	.91 (1.016)
	While hunting I have had an experience in which all things seemed to be unified into a single whole.(Q36)	.91 (1.024)
	While hunting I have had an experience in which a new view of reality was revealed to me.(Q43)	.78 (.9708)
	While hunting I have had an experience in which ultimate reality was revealed to me. (Q44)	.76 (.935)
	While hunting I have had an experience in which deeper aspects of reality were revealed to me.(Q45)	.77 (.936)
	While hunting I have had an experience in which I felt as if all things were alive.(Q37)	.84 (.956)
	While hunting I have had an experience in which all things seemed to be conscious.(Q38)	.83 (.981)
	While hunting I have had an experience in which I felt I was an intimate part of the natural world.(Q51)	.72 (.798)
	<b>Temporal-Spatial (Rho = 0.894; <math>\alpha</math> = 0.893; AVE = 0.685)</b>	
	While hunting I have had an experience in which I felt nothing is ever really dead.(Q39)	.77 (.85129)
	While hunting I have had an experience which was both timeless and spaceless.(Q40)	.91 (1.1747)
	While hunting I have had an experience in which I had no sense of time or space. (Q41)	.80 (1.041)
	While hunting I have had an experience in which time and space were non-existent.(Q42)	.81 (1.091)

**Table 3.6. Item Statements and Factor Loadings (continued)**

Factor	Item	$\lambda$ (Unstandardized Loading)
<b>Religious (Rho = 0.907; <math>\alpha</math> = 0.906; AVE = 0.769)</b>		
	While hunting I have had an experience which seemed holy to me.(Q47)	.83 (.86697)
	While hunting I have experienced something that is divine.(Q48)	.87 (1.047)
	While hunting I have had an experience which I knew to be sacred.(Q49)	.92 (1.153)

**Table 3.7. Measurement Invariance between SC Hunters and Deer Steward Participant datasets**

Model	$\chi^2$ (df)	S-B $\chi^2$	CFI	RMSEA	$\Delta$ S-B $\chi^2$ ( $\Delta$ df)	<i>p</i>	$\Delta$ CFI
Deer Steward Participants	1526.0 (513)	1117.6	0.936	0.056	-	-	-
South Carolina Resident Hunters	1069.2 (513)	871.0	0.930	0.060	-	-	-
Configural Model	2519.7 (1026)	1998.1	0.935	0.057	-	-	-
Metric invariance - 1st order loadings	2653.8 (1052)	2029.2	0.935	0.057	42.5 (26) <sup>1</sup>	0.02	<0.0001
Scalar invariance	2653.4 (1055)	2021.2	0.935	0.056	< 1 (3) <sup>2</sup>	almost 1	<0.0001
Metric invariance for higher order factors	2664.9 (1059)	2027.6	0.935	0.056	6.7 (4) <sup>3</sup>	0.152	<0.0001

1. Metric Invariance (Configural Model) vs. Metric Invariance (1<sup>st</sup> order loadings)

2. Metric Invariance (1<sup>st</sup> order loadings) vs. Scalar Invariance (Error variances/covariances)

3. Scalar Invariance (Error variances/covariances) vs. Metric Invariance (Higher order factor loadings)

**Table 3.8. Measurement Invariance between versions of the paper survey sent to SC Resident Hunters**

<b>Model</b>	<b><math>\chi^2</math> (df)</b>	<b>S-B <math>\chi^2</math></b>	<b>CFI</b>	<b>RMSEA (90% CI)</b>	<b><math>\Delta</math> S-B <math>\chi^2</math> (<math>\Delta</math> df)</b>	<b><i>p</i></b>	<b><math>\Delta</math> CFI</b>
Paper Version A	1006.65 (513)	773.95	0.905	0.070	-	-	-
Paper Version B	867.4 (513)	752.7	0.912	0.073	-	-	-
Configural model	1864.81 (1026)	1515.68	0.911	0.071	-	-	-
Metric Invariance	1912.2 (1052)	1561.1	0.907	0.071	46.88 (26) <sup>1</sup>	0.007	0.004
Scalar Invariance	1909.5 (1055)	1557.8	0.908	0.070	<1 (3) <sup>2</sup>	0.3	0.001
Metric Invariance	1917.4 (1059)	1563.6	0.908	0.070	5.81 (4) <sup>3</sup>	0.213	<0.0001

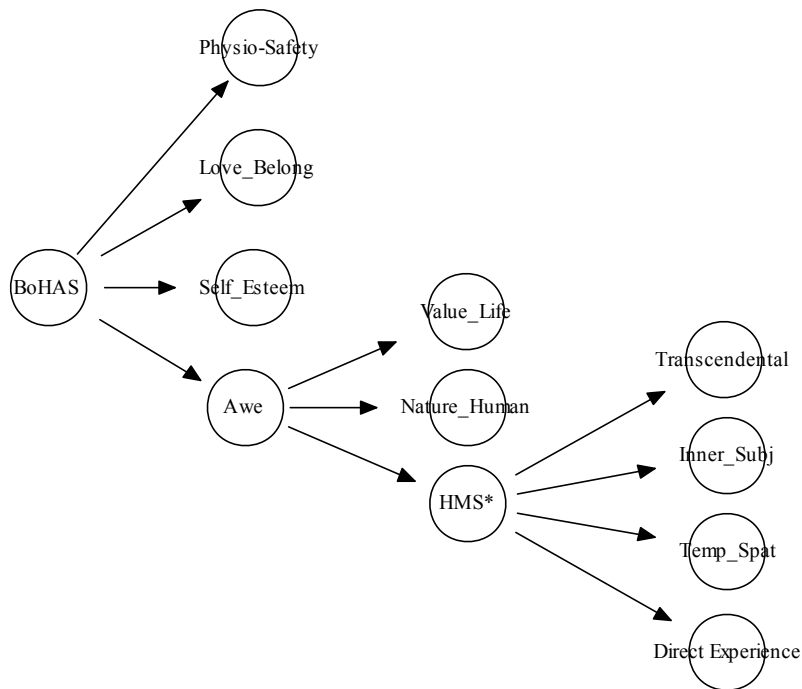
1. Metric Invariance (Configural Model) vs. Metric Invariance (1<sup>st</sup> order loadings)

2. Metric Invariance (1<sup>st</sup> order loadings) vs. Scalar Invariance (Error variances/covariances)

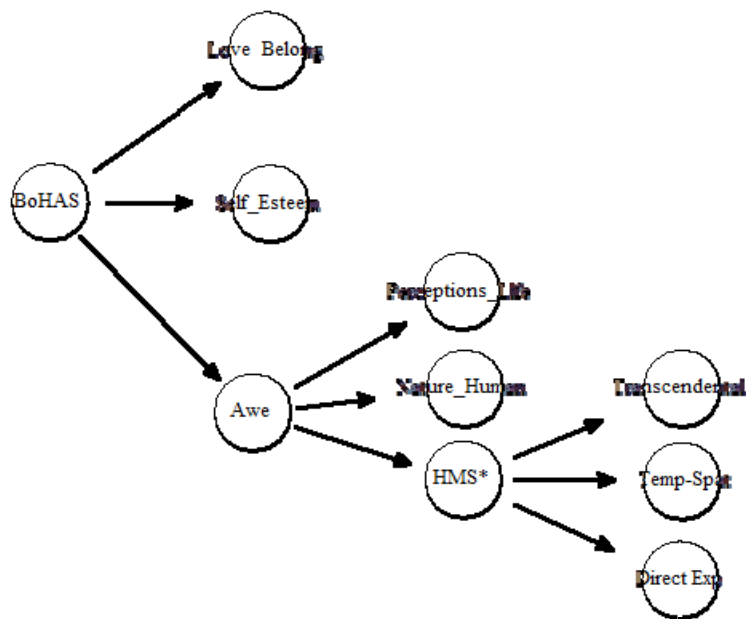
3. Scalar Invariance (Error variances/covariances) vs. Metric Invariance (Higher order factor loadings)

Maslow's Hierarchy of Needs	Benefits of Hunting Assessment Scale Factors
Love/Belonging	Love/Belonging
Self-Esteem	Self-Esteem
Self-Actualization	Awe Perceptions of Life Nature-Human Relationships Spirituality (measured by Hood Mysticism Scale) Transcendental Temporal-Spatial Direct Experience

**Figure 3.1. Maslow's Hierarchy of Needs and the Corresponding Factors of the Benefits of Hunting Assessment Scale**



**Figure 3.2 Initial Benefits of Hunting Assessment Scale Model.** \*HMS = Hood Mysticism Scale, measuring the Spirituality Factor



**Figure 3.3. Final Benefits of Hunting Assessment Scale Model.** \*HMS = Hood Mysticism Scale, measuring the Spirituality Factor

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## CHAPTER FOUR

### DIFFERENCES IN THE BENEFITS OF HUNTING BETWEEN WOMEN AND MEN

#### Introduction

Hunting has traditionally been a sport that is dominated by men (89% of hunters are males; US Department of the Interior, 2011). However the fastest growing group of hunters is women, representing 9% of the total number of hunters in 2006 vs. 11% in 2011 (US Department of the Interior, 2006, 2011). Despite the rise in the number of female hunters, there is little research that has investigated the differences and similarities of female and male hunters. It is known that women are similar to males in terms of average age, income, and residence (National Shooting Sports Foundation, 2003) yet other aspects of female hunters have not yet been explored such as the benefits received from hunting. This paper seeks insights into this question by comparing the benefits derived from hunting for males and females using the Benefits of Hunting Assessment Scale scores (BoHAS; Guynn – Dissertation Chapter 3).

#### Literature Review and Theoretical Background

Leisure research suggests that historically men and women had different levels of access to leisure, experienced leisure differently, and received different benefits from leisure (Henderson, Bialeschki, Shaw, & Freysinger, 1996). In the past women have tended to be more limited in their freedom to experience leisure with the belief that physical exertion by women would threaten a woman's ability to bear children



(Henderson et al., 1996). Additionally, in many cultures women were not allowed to work outside the home since it would interfere with their primary responsibility of child rearing and therefore, all of their time was viewed as leisure since they did not have paid work (Henderson et al., 1996).

Consequently, early research pertaining to leisure focused primarily on males, with the assumption that men and women experienced leisure the same (Henderson, 1994; Tetreault, 1985). Theories of leisure were developed by studying men, making generalizations based solely on men's behaviors and responses, and then applying those theories to women (Tetreault, 1985). These studies did not necessarily consider gender, culture, race, social class or other types of factors. Eventually research examined gender differences but at the exclusion of allowing for individual experiences and the meaning of the leisure (Tetreault, 1985). While research emerged that focused on women's experiences and meanings of leisure, the results were still measured against a typical male. If women's responses were not in line with theory that was developed using males as a baseline, then results were interpreted as "women [are] deficient" or "inferior" to men (Tetreault, 1985, p. 373). This type of research made broad generalizations relating to men and women based on gender alone, and subsequently have been shown to be inaccurate for both men and women (Henderson et al., 1996; Tetrault, 1985). While this research acknowledged differences between males and females, it did not necessarily explore or attempt to explain the differences. Finally, research shifted to focusing solely on women's experiences, thus, leading to the discovery that women experience and view

leisure differently than men (Henderson et al., 1996; Henderson, 2009; Shaw, 1994; Tetreault, 1985).

While leisure activities are now more accessible to women, some leisure activities still exclude women based solely on gender. The exclusion of women from certain leisure activities was based on perceptions of what is appropriate leisure for women (Henderson et al., 1996; Samdahl, 2013). These constraints dealt primarily with a woman's ability to bear and raise children and activities that were considered strenuous were prohibited (Henderson et al., 1996). While these constraints have been overcome throughout time and women now enjoy more freedom in leisure choices, some leisure activities are still not being explored by women (Covelli, 2011; Henderson & Hickerson, 2007). Outdoor based recreation is one area in which women are clearly underrepresented. It is well-documented that women are much less likely to participate in an outdoor recreational activity than men for a variety of reasons. Literature suggests that women may feel unwelcome or awkward due to the gendered nature of outdoor recreation, or they may feel intimidated, ill-prepared or physically incapable of participating in outdoor leisure (Auster, 2001; Bialeschki & Henderson, 1993; Culp, 1998; Humberstone, 2000; Little, 2002; McDermott, 2004; Samdahl, 2013). Activities such as canoeing, climbing, mountaineering, snowboarding, skydiving, motorcycle riding, and hunting are just a few examples of outdoor based recreational activities that have typically displayed a lack of female participation (Dilley & Scraton, 2010; Evans, 2014; Laurendeau & Sharara, 2008; McDermott, 2004; Smalley, 2005).

While some work has examined gender differences in hunting, research has focused primarily on the motivations for hunting such as killing an animal or being close to nature (Decker, Provencher, & Brown, 1984), as well as negotiating constraints to participation (Adams & Steen, 1997; Anderson, Clark, Evans, & Schmalz, 2014; Covelli, 2011; Duda, Jones, & Criscione, 2010; Metcalf, Graefe, Trauntvein, & Burns, 2015). For example, research has indicated that women experience different constraints to leisure than men, such as financial resources, family obligations, and home duties (Henderson et al., 1996; Little, 2002; Metcalf et al., 2015; Schroeder, Fulton, Lawrence, & Cordts, 2012; Shaw & Henderson, 2005).

Constraints to leisure are typically thought of as obstacles to participation in a preferred leisure activity and were modeled by Crawford and Godbey (1987) using three types of constraints: 1) intrapersonal, 2) interpersonal and 3) structural. Intrapersonal constraints can be thought of as primarily psychological states of individuals that may preclude them from even considering a particular activity, such as a physical body condition, ethic of care, and gender (Crawford & Godbey, 1987; Crawford, Jackson, & Godbey, 1991). Interpersonal constraints involve relationships with other people, such as spouses or children (Crawford & Godbey, 1987; Crawford et al., 1991). These relationships may dictate a woman's choice of leisure because of the nature of the relationship, such as if a woman is in a subservient role. Structural constraints are issues that interfere with participation in an activity, such as time, family obligations or work obligations (Crawford & Godbey, 1987; Crawford et al., 1991). The desire of an individual to participate in an activity exists but structural barriers prevent participation.

One constraint to leisure that is somewhat unique to women is an ethic of care (Bedini, 2013; Dilley & Scraton, 2010; Henderson, 1990; Henderson et al. 1996; Shaw & Henderson, 2005; Sullivan, 2013). An ethic of care is a tendency by women to place the needs and care of others above their own needs, thereby feeling as if they do not deserve leisure since it would be putting themselves first. The ethic of care is probably most evident in a woman's responsibility as a mother since she typically bears most of the childrearing duties (Sullivan, 2013). Many women feel guilty about participating in leisure because it is time not devoted to being a mother or wife (Miller & Brown, 2005; Sullivan, 2013). While some women have overcome or do not succumb to the ethic of care in their leisure pursuits (Covelli, 2011; Dilley & Scraton, 2010; Little, 2002; Roster, 2013), research suggests that women's ethic of care continues to be a major impediment to leisure participation (Dilley & Scraton, 2010; Metcalf et al., 2015).

Once constraints to leisure have been overcome, the next issue to consider is motivation for participation in an activity and potential gender related differences. Decker et al. (1984) identified three primary types of hunters: achievement, affiliative and appreciative. Achievement motivated hunters are "individuals who hunt primarily to net a self-determined standard of performance such as bagging a quota of game" (Decker et al., 1984, p. ES-21). Affiliative hunters are "individuals who hunt primarily to accompany others afield, thereby maintaining or strengthening personal relationships" (Decker et al., 1984, p. ES-21). Finally, appreciative hunters tend to be "individuals who hunt primarily to obtain a sense of peace, belonging and familiarity that they have learned to associate with hunting" (Decker et al., 1984, p. ES-21). Decker et al. (1984) found that women

were more affiliative oriented than achievement oriented hunters (Decker et al. 1984) and the authors hypothesized that “the greater the degree to which hunting is portrayed or perceived as an achievement-oriented activity, the more it will discourage female participation” (p. iii). However, Adams and Steen (1997) found that women (81.9%) were as achievement-oriented as male (74.1%) counterparts. They noted, however, that “...competition with other hunters and trophies were of little importance to [women]” (Adams & Steen, 1997, p. 800). Securing additional meat was the most cited reason to hunt by women and was classified as achievement oriented, although “... being with husband and family, observing wildlife, and experiencing nature” (p. 800) were also important to women.

In considering additional differences between females and males, there are conflicting reports about the participation rates of women in outdoor based recreation (Cordell, 2012; Henderson et al., 1996). The most recent Outdoor Recreation Trends and Futures (Cordell, 2012) suggests that females comprise only 43% of all outdoor/nature-based recreational participation. While there appears to be some activities that women are equally likely to participate in as men (e.g., nature-based photography, equestrian, backpacking), there are still a number of activities where women are underrepresented, such as hunting, fishing, kayaking, etc. (Cordell, 2012). Despite women only representing 11% of the total hunting population in 2011, the actual number of female hunters increased 9% from 2006 to 2011 (US Department of the Interior, 2011). It has also been argued that women are facing fewer constraints to participation in male-dominated sports (Covelli, 2011; Roster, 2013), and that women are more likely to participate in a

“masculine” sport as opposed to men participating in “feminine” sports (Schmalz, 2013).

While these trends suggest participation and engagement of outdoor recreational opportunities by females is increasing, it still does not address underlying questions, such as are the benefits experienced by female and male hunters the same or different?

## Methods

### Sample and data collection procedures

Two sampling frames were used to investigate the differences that males and females derive from hunting. First, names and addresses of South Carolina residents who purchased a hunting license between July 1, 2012 and June 30, 2013 were obtained through the South Carolina Department of Natural Resources. The second group was participants of the Deer Steward program, a program administered through the Quality Deer Management Association (QDMA). QDMA is an organization with over 60,000 members residing primarily throughout North America. The mission of the QDMA is to espouse the benefits of having deer populations with a balanced sex and age structure, and herd densities in balance with the surrounding habitat. The Deer Steward program is designed for hunters, landowners and land managers to learn techniques for managing white-tailed deer (*Odocoileus virginianus*) populations and habitats. It is an intensive learning program that covers herd management, herd monitoring, habitat management and hunter management.

For South Carolina resident hunters (SCH), license holders were separated into male and female groups, then the random number generator function in Microsoft Excel®

(RND) was used to select 500 males and 500 females ( $n = 1000$ ). Next, a paper questionnaire was mailed to each hunter that contained 51 measures of hunter needs in addition to sociodemographic data and personality measures. For the QDMA Deer Steward participants (DS), a link to an online survey was emailed to each person ( $n = 922$ ). The online survey mimicked the paper survey in terms of question order and presentation. The Clemson University Institutional Review Board (IRB) approved the protocol for data collection for paper and online surveys (IRB2013-373). A follow-up reminder was sent either via mail (SCH) or via email (DS) to non-respondents approximately 14 and 28 days after the initial survey was mailed in an attempt to maximize response rates (Dillman, Smyth, & Christian, 2009).

Due to mailing errors, only 995 paper surveys were mailed to the SCH group. Of those 995 paper surveys, 5 were returned as non-deliverable. A total of 199 paper surveys were returned for a response rate of 20%. For the DS group, 922 emails were sent with the survey link and 51 bounced back as undeliverable, leaving 871 surveys delivered. A total of 405 responses were received for a minimum response rate of 46.5%. The response rate for the DS group may be higher since there is no way to determine if emails were blocked due to spam filters, thus reducing the number of emails that were actually delivered.

The SCH group information was entered manually into SPSS Statistics 22 (IBM, Inc.). Twenty-four surveys were double-entered to check for data accuracy (12% verification rate) and yielded a data entry error rate of 0.3%. Data collected online from the DS group were downloaded directly into an SPSS database.

### Survey Construction

As a foundation to answer our research question investigating the differences in benefits that females and males receive from hunting, it is first important to address the measurement properties of the instrument that was utilized.

The BoHAS provides a hierarchical measure of the benefits received through hunting and was based on Maslow's Hierarchy of Needs (Guynn – Dissertation Chapter 3). Maslow outlined a hierarchical framework that described 5 levels of human needs (physiological, safety, love and belonging, self-esteem, and self-actualization) (Maslow, 1987). Maslow argued that a person must satisfy the lower level needs before achieving (or satisfying) the next subsequent level. Benson and Decker (2001) extended Maslow's Hierarchy of Needs to hunting and proposed a typology to include: 1) necessity, 2) risk avoidance and reduction, 3) affiliation, 4) identity recognition and achievement, and 5) appreciation of nature and culture. Each of these 5 categories corresponds with particular levels contained in Maslow's Hierarchy of Needs but has not been empirically tested. The BoHAS was developed to serve as a tool for natural resource managers to understand and manage the various benefits that hunter's experience while hunting. Developed by Guynn (Dissertation Chapter 3) using Confirmatory Factor Analysis, the BoHAS measures benefits associated with Maslow's hierarchy of needs (see Figure 4.1 and Table 4.1). First, benefits associated with Love and Belonging are measured using 9 items ( $\text{Rho} = 0.934$ ;  $\alpha = 0.932$ ;  $\text{AVE} = 0.746$ ), and is reflective of the social aspects of hunting (e.g. Anderson-Butcher & Conroy, 2002; Anderson-Butcher et al., 2013; Jones, Patterson, & Hammitt, 2000; King et al., 2014; Mannell & Stynes,



1991). BoHAS also measures Self-Esteem using 9 items ( $\text{Rho} = 0.945$ ;  $\alpha = 0.936$ ;  $\text{AVE} = 0.793$ ), which is indicative of personal motivations for hunting and is focused on achieving personal goals, such as killing a trophy animal. This subscale is not only concerned with self-perceptions of skills and abilities, but also with the perceptions that other members of society place on these skills (Maslow, 1970). Other research has found that the act of participation in leisure improved self-esteem, irrespective of physiological or therapeutic benefits (e.g. Danes, 1998; Iwasaki, 2007). Love/Belonging and Self-Esteem items were measured on a 9 point scale ranging from ‘completely disagree, mostly disagree, moderately disagree, slightly disagree, slightly disagree, neither agree nor disagree, slightly agree, moderately agree, mostly agree, completely agree.’

The last primary sub-scale, *Self-Actualization*, focuses on measuring the concept of Awe ( $\text{Rho} = 0.968$ ;  $\alpha = 0.968$ ;  $\text{AVE} = 0.643$ ). Self-actualization is related to a person’s desire to grow, develop, and improve as a person who is able to find a deeper meaning in life, and is more of a “state of being” (Benson & Decker, 2001, p. 147) as opposed to an actual satisfaction of a need (Maslow, 1987). Maslow (1970) surmised that self-actualizing moments may be mild in nature or may be so profound that a person is transformed in their views and beliefs as a consequence of the experience. There are an array of terms described in the literature that attempts to synthesize self-actualizing moments, such as peak experiences, mysticism and awe (Powell, Kellert, & Ham, 2010; Rudd, Vohs, & Aaker, 2012), yet there is not a universally accepted definition of awe. However, a two part definition has been proposed that allows for measurement clarity which is: 1) perceptual vastness (i.e. immense in size, complexity, etc.), and 2) altering a

person's understanding of the world (Keltner & Haidt, 2003; Powell et. al., 2010; Rudd et al., 2012). The concepts of peak experience, self-actualization, mysticism, and other similar concepts all mimic and share common experiences and themes that can be encompassed by awe (Powell et al., 2010; Rudd et al., 2012). In Guynn (Dissertation Chapter 2) a scale was developed to measure the benefits associated with self-actualization using the concept of awe as a basis. While we acknowledge that awe does not fully encompass self-actualization, it does represent some important aspects and is likely a major component of self-actualization and, therefore, provides some indication of benefits surrounding this level. For a full discussion on Self-Actualization and Awe, please see Guynn, Dissertation Chapter 3. Self-actualization, or awe, is composed of 3 sub-factors (see Figure 4.1) that include the Perceptions of Life, Nature-Human Relationships and Spirituality, as measured by the Hood Mysticism Scale (HMS). The Hood Mysticism Scale (Hood, 1975) has an additional 3 sub-factors, Transcendental, Temporal/Spatial, and Direct Experience. Awe was measured using a 7 point Likert type scale that included 'definitely not true, mostly not true, somewhat not true, neutral, somewhat true, mostly true, definitely true.'

## Results

The SCH survey had 115 male respondents, 75 female respondents and 6 surveys without a response to the gender question. One survey returned as a male respondent was excluded due to the self-reported age being less than 18 years of age. The DS respondents

included 373 males, 7 females and 2 with non-responses to gender. A description of each sample group is provided in Table 4.2.

Using the BoHAS, a test of measurement invariance, or measurement equivalence, was performed for the two datasets (DS and SCH). This test provided evidence that the BoHAS performed consistently across both sample groups and provided evidence that the two datasets can be combined and analyzed as one sample. Results of this test indicate that there was measurement equivalence across the groups ( $S-B\chi^2 = 2519.7$ ;  $df = 1026$ ;  $CFI = 0.935$ ;  $RMSEA = 0.057$ ), and, therefore, the two datasets were combined for analysis.

#### *Gender differences*

Our primary research question was to determine if men and women receive different benefits from hunting using the BoHAS. In order to answer this question, we tested the latent mean differences between men and women on their respective BoHAS scores as well as the scores related to the lower order factors of the BoHAS. In order to test for differences in scores for men and women, a reference group was chosen, in our case we chose females. We tested for a change in latent means from female BoHAS scores to male BoHAS scores using a large sample t-test, or a z-test. (Tabachnick & Fidell, 2007; Tsaousis & Kazi, 2013). Results indicated that there was not a significant difference between female and male BoHAS scores, and therefore, there was not a difference in the benefits received by male and female hunters (Table 4.3). In considering the sub-factors, or lower order factors, of the BoHAS, there was a significant difference between females and males on one sub-factor, Nature-Human Relationship ( $B = -$

0.19312;  $\beta = -0.08261$ ;  $Z = -2.04$ ;  $p < 0.05$ ). This result indicated that the Nature-Human Relationship factor scores were higher for women than men. The results for gender and lower order BoHAS sub-factors are summarized in Table 4.3.

### Interpretation of BoHAS Scores

While the BoHAS may be used as an additive scale to gauge benefits derived from hunting, it may be more informative to look at individual scores across the first order sub-factors (Love/Belonging, Self-Esteem and Awe). The individual scores may provide insight into personal motivations for hunting, which can be used to design recruitment and retention programs tailored to various needs. The results of this study are similar to the findings of Decker et al. (1984) who described three motivations for the continuance of hunting as achievement, affiliative and appreciative.

The Love/Belonging scale is reflective of the social aspects of hunting. Scoring higher on this factor may be indicative of the fact that hunting is a social outlet and that the actual act of hunting, or killing, may be less important, which is in line with Decker et al.'s (1984) description of an affiliative hunter. This may be a key consideration for state and federal agencies in designing hunting opportunities where the social aspect is emphasized rather than the abundance of game species available. In this case, access to areas for hunting with a "hunt camp" experience design may be more important than actual species densities. There may also be aspects to hunting that are not directly related to the actual act of hunting that contribute to love and belonging, such as belonging to

hunting or conservation organizations (i.e. Quality Deer Management Association, National Wild Turkey Federation, Rocky Mountain Elk Foundation, etc.).

A higher score for the Self-Esteem factor may be indicative of personal motivations for hunting and is focused on achieving personal goals, such as killing a trophy animal. Decker et al. (1984) described this category of hunter as achievement oriented. In this case, the actual act of hunting may be of paramount importance, indicating a need for areas managed for high densities of game species and opportunities to hunt those species.

Finally, the Awe factor may indicate that the actual act of hunting, or of being in the natural environment, is important in establishing the renewal of self and other intrinsic benefits. While the Awe factor may be partially related to the category that Decker et al. (1984) describe as an appreciative hunter, it does not appear to be exactly aligned. The Awe factor is designed to be a partial measure self-actualization on Maslow's Hierarchy of Needs, however, the appreciative hunter as described by Decker et al. (1984) is more about "obtaining a sense of peace, belonging, and familiarity..." Decker et al. (1984) did not discuss personal growth or achieving full potential as an individual, as is the case with the Awe factor. The Awe factor is the least understood category, but may yield the most important information. While there are likely a myriad of interpretations for this category, there is evidence that someone who scores high in this category may seek benefits from hunting through a different pathway than the direct act of hunting or killing. Further exploration and understanding of this factor is critical before any reliable conclusion can be made about how to manage this group. It may be

necessary for state and federal agencies to provide hunting related opportunities for this group that are not focused on actually hunting or killing, but on other aspects such as mentoring or related activities that contribute to a sense of personal growth such as advocacy or education.

### Discussion

Our results suggest that men and women are receiving the same benefits from hunting. This appears to be an important finding as previous research has indicated that men and women experience leisure differently and receive different benefits (Henderson et al., 1996; Tetreault, 1985). The only significant difference between men and women was in their scores on the Nature-Human Relationship sub-factor, which is a third order factor. This difference may be due to the ethic of care that women tend to demonstrate at a higher level than (Henderson, 1990; Henderson et al., 1996). Though the questions for the Nature-Human Relationship did not specifically measure the ethic of care, this may be a potential avenue of exploration for strengthening this factor. Even though the ethic of care originally referred to the care of others, it perhaps can also be extended to the care of nature. This raises an important question surrounding leisure and gender that does a particular leisure activity, such as hunting, tend to provide the same benefits regardless of gender? For example, are all consumptive or highly physically demanding recreational activities “gender neutral” vs. less demanding or passive leisure activities such as bird watching? Our findings both confirms and contradicts current research.

Recent research into women's participation in male-dominated activities seems to indicate that women may not be very different from men in their enjoyment or desire to continue in a chosen activity. Studies focused on women in male-dominated outdoor activities have shown that once women are comfortable with their skill set and knowledge of an activity, that they are likely to continue pursuing their leisure activities on their own or with male companions (Anderson et al., 2014; Auster, 2001; Evans, 2014; Metcalf et al., 2015). While not specifically linked to gender roles in hunting, Chitwood, Peterson and Deperno (2011) found that hunting in rural counties in the Southeast was a form of community identity and was imperative in family, community, and nature relationship roles.

A point of interest that may indicate the breaking down of barriers and constraints to women in hunting is the increase in hunting equipment and apparel for women. For example, at least four gun manufacturers have developed and are now marketing shotguns and rifles made exclusively for women. These guns differ from other models in that they consider a woman's body dimensions and as such, increase the fit, comfort, and proficiency of the guns for use by women. Clothing manufacturers are also now starting to design clothing specifically for a women. This allows women to find suitable clothing for a variety of hunting conditions that allows her to be comfortable and well-prepared for an outdoor adventure.

While the gun industry is just now starting to recognize the importance of women, other industries that are traditionally male-dominated have already capitalized on the women's market. For example, Harley-Davidson expanded their line of clothing and

accessories, and more importantly, introduced a line of motorcycles designed specifically for women (Roster, 2013). Trends in catering to the specific needs of women in traditionally male-dominated industries provide a means to overcome constraints and may send a message that women are welcome in these activities.

While our results are confirmed in some areas, research focused in other areas contradict our findings. For example, women in the Southeast tend to be more sedentary in nature, more likely to feel overloaded due to obligations, have more fear of being in the outdoors, and are not deserving of their own leisure (Lee, Scott, & Floyd, 2001; Pearson, 2008; Wesely & Gaarder, 2004; Wilcox, Castro, King, Housemann, & Brownson, 2000). Women are also less likely to visit wildland areas of southeastern national forests than men (Bowker, English, Johnson, & Worthen, 1998). While these are important issues, constraints still appear to be a limiting factor for women across all outdoor based activities, yet our sample of women seemed to have found ways to overcome, or at least negotiate, the constraints (e.g. Lee et al., 2007).

### Conclusion

Our results imply that men and women experience the same benefits from hunting. While there was one significant difference in scores on the Nature-Human Relationship factor, all other factors and scores were similar. While our findings can be extended to only resident, South Carolina female hunters, it appears that gender differences in male-dominated sports may not be as extensive as previous studies have found.



**Table 4.1. Item Statements and Factor Loadings**

Factor	Item	$\lambda$ (Unstandardized Loading)
<b>Hunter Needs (Rho = 0.975; <math>\alpha</math> = 0.965; AVE = 0.701; <math>\bar{x}</math> = 5.46; SD = 1.205)</b>		
<b>Love -Belonging (Rho = 0.934; <math>\alpha</math> = 0.932; AVE = 0.746; <math>\bar{x}</math> = 7.25; SD = 1.634)</b>		
	A sense of group accomplishment is important to me in hunting.(Q7)	.75 (.91004)
	I feel important when I am a part of my hunting group's accomplishments.(Q9)	.76 (.984)
	The development of my hunting group is important to me.(Q10)	.91 (1.097)
	I contribute to the unification of my hunting group.(Q11)	.94 (1.099)
	It is important that I perform duties which unify my hunting group.(Q12)	.92 (1.091)
<b>Self-Esteem (Rho = 0.945; <math>\alpha</math> = 0.936; AVE = 0.793; <math>\bar{x}</math> = 6.79; SD = 1.810 )</b>		
	Hunting allows me to express who I am.(Q18)	.69 (.66888)
	My image of myself has improved since I began hunting.(Q19)	.94 (1.495)
	Hunting has enhanced my self image.(Q20)	.97 (1.553)
	Hunting has improved how I think about myself.(Q21)	.95 (1.5110)
<b>Awe (Rho = 0.968; <math>\alpha</math> = 0.968; AVE = 0.677; <math>\bar{x}</math> = 4.886; SD = 1.289)</b>		
<b>Perceptions of Life (Rho = 0.894; <math>\alpha</math> = 0.884; AVE = 0.643; <math>\bar{x}</math> = 5.616; SD = 1.158)</b>		
	While hunting I have moments of clarity about what is important to me.(Q22)	.64 (.50321)
	While hunting I have had a moment that changed my perspective on life.(Q24)	.85 ( 1.704)
	While hunting I have had encounters with things in nature that lead to a reassessment of my life's goals.(Q25)	.82 (1.758)
	While hunting I experienced a moment that changed my life.(Q26)	.84 (1.988)
	While hunting I have a heightened sense of right and wrong.(Q27)	.75 (1.4951)
<b>Nature Human Relationships (Rho = 0.504; <math>\alpha</math> = 0.504; AVE = 0.443; <math>\bar{x}</math> = 5.257; SD = 1.222)</b>		
	While hunting I transcend from everyday life to the natural world.(Q28)	.67 (.74243)
	While hunting I sometimes feel overwhelmed with emotion.(Q30)	.67 (1.348)
<b>Spirituality (Rho = 0.977; <math>\alpha</math> = 0.968; AVE = 0.712; <math>\bar{x}</math> = 4.641; SD = 1.461)</b>		
<b>Transcendental (Rho = 0.964; <math>\alpha</math> = 0.963; AVE = 0.707; <math>\bar{x}</math> = 4.734; SD = 1.501 )</b>		
	While hunting I have had an experience in which I felt myself to be absorbed as one with all things.(Q32)	.87 (.96830)
	While hunting I have had an experience in which my own self seemed to merge into something greater. (Q33)	.90 (1.033)
	While hunting I have had an experience in which I realized the oneness of myself with all things.(Q34)	.94 (1.054)
	While hunting I have had an experience in which I became aware of a unity to all things.(Q35)	.91 (1.016)

**Table 4.1. Item Statements and Factor Loadings (continued)**

<b>Factor</b>	<b>Item</b>	<b><math>\lambda</math> (Unstandardized Loading)</b>
	While hunting I have had an experience in which all things seemed to be unified into a single whole.(Q36)	.91 (1.024)
	While hunting I have had an experience in which a new view of reality was revealed to me.(Q43)	.78 (.9708)
	While hunting I have had an experience in which ultimate reality was revealed to me. (Q44)	.76 (.935)
	While hunting I have had an experience in which deeper aspects of reality were revealed to me.(Q45)	.77 (.936)
	While hunting I have had an experience in which I felt as if all things were alive.(Q37)	.84 (.956)
	While hunting I have had an experience in which all things seemed to be conscious.(Q38)	.83 (.981)
	While hunting I have had an experience in which I felt I was an intimate part of the natural world.(Q51)	.72 (.798)
<b>Temporal-Spatial (Rho = 0.894; <math>\alpha</math> = 0.893; AVE = 0.685; <math>\bar{x}</math> = 4.088; SD = 1.707)</b>		
	While hunting I have had an experience in which I felt nothing is ever really dead.(Q39)	.77 (.85129)
	While hunting I have had an experience which was both timeless and spaceless.(Q40)	.91 (1.1747)
	While hunting I have had an experience in which I had no sense of time or space. (Q41)	.80 (1.041)
	While hunting I have had an experience in which time and space were non-existent.(Q42)	.81 (1.091)
<b>Direct Experience (Rho = 0.907; <math>\alpha</math> = 0.906; AVE = 0.769; <math>\bar{x}</math> = 5.043; SD = 1.788 )</b>		
	While hunting I have had an experience which seemed holy to me.(Q47)	.83 (.86697)
	While hunting I have experienced something that is divine.(Q48)	.87 (1.047)
	While hunting I have had an experience which I knew to be sacred.(Q49)	.92 (1.153)

**Table 4.2. Means for Sociodemographic Descriptors of South Carolina Hunters and Deer Steward Study Participants**

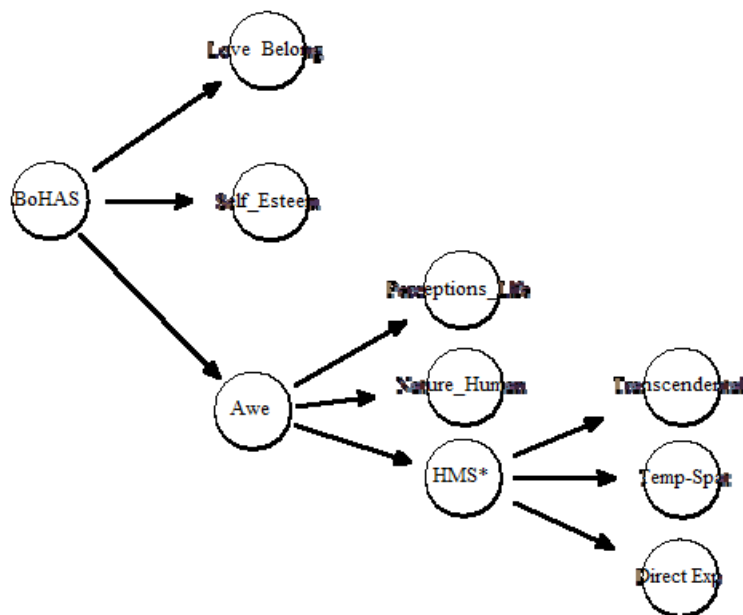
<b>South Carolina Hunters</b>	<b>Mean (SD)</b>	<b>Skewness</b>	<b>Kurtosis</b>
Age	43.3 (13.2)	-0.04	-1.06
Years hunting experience	24.5 (16.1)	0.24	-1.12
Education	2.4 years of college (1.0)	0.09	-0.54
Annual Income	\$56,000 ( $\pm$ \$6,000)	1.05	0.59
Number of Hunts Per Year	26 (5.6)	0.2	-1.34
Community When A Youth	2.5 (1.36)	0.54	-0.5
	(between Rural Non-farm & Small Town, Under 10,000)		
Religious Devotion	5.5 (1.8)	0.097	-0.64
	(between Strongly Religious and Earnestly Religious)		
<b>Deer Steward Participants</b>	<b>Mean (SD)</b>	<b>Skewness</b>	<b>Kurtosis</b>
Age	45.2 (13.1)	0.076	-0.817
Years hunting experience	32.6 (13.8)	0.2	-0.58
Education	3.6 years of college (0.93)	-0.34	-0.65
Annual Income	\$86,000 ( $\pm$ \$7,000)	0.23	-1.24
Number of Hunts Per Year	33.4 (4.9)	-0.37	-1.17
Community When A Youth	2.7 (1.57)	0.62	-0.62
	(between Rural Non-farm & Small Town, Under 10,000)		
Religious Devotion	5.5 (2.19)	-0.38	-0.73
	(between Strongly Religious and Earnestly Religious)		

**Table 4.3. Test of mean gender differences using latent variables.**

<b>Factor</b>	<b><math>\beta</math></b>	<b>B</b>	<b>Standard Error</b>	<b>Z</b>
Love and Belonging	0.29587	0.07115	0.18287	1.617
Self Esteem	-0.27772	-0.08049	0.19553	-1.420
Awe	-0.17053	-0.1013	0.11757	-1.450
Value of Life	0.10756	0.0545	0.11182	1.594
Nature-Human Relationships	-0.19312	-0.08261	0.09476	-2.038*
Hood Mysticism Scale**	-0.00166	-0.00040	0.14142	-0.013
Transcendental	-0.25112	-0.3623	0.18981	-1.323
Temporal-Spatial	0.19635	0.04706	0.11299	1.738
Direct Experience	-0.00905	-0.00202	0.16761	-0.054

\* Significant at the 0.05 level

\*\* Hood Mysticism Scale, measuring the Spirituality Factor



**Figure 4.1 Final Benefits of Hunting Assessment Scale Model**

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## CHAPTER FIVE

### RESEARCH SYNOPSIS AND CONCLUSIONS

#### Overview

The focus of this research was the development and validation of an instrument for measuring the psychological benefits of hunting using Maslow's Hierarchy of Needs as the theoretical framework. Furthermore, gender differences in the Benefits of Hunting Assessment Scale (BoHAS) scores was investigated. The results, implications and limitations of the study will be discussed in the subsequent sections of this chapter.

#### Study Results

The first step to the development of a scale to measure the satisfaction of psychological needs through hunting was to develop and test a scale for measuring awe (*Awe* Scale), which was assumed to be a central component of self-actualization. Results of the analysis confirmed a scale that measured awe and provided evidence of validity and reliability of the scale. The *Awe* scale was then deployed in a subsequent study in which it was used to measure self-actualization as part of a test for all five levels of Maslow's Hierarchy of Needs called the Benefits of Hunting Assessment Scale (BoHAS). Once again, results from this study provided evidence of a scale that was both valid and reliable.

The BoHAS was tested for configural equivalence across two sample groups, SC resident hunting license holders and QDMA Deer Steward participants. The fact that

there was configural invariance provides further evidence of construct validity for the BoHAS. This finding is also important since the sample groups, SC Hunters and QDMA Deer Steward participants, were administered the survey instrument through different formats (paper and online, respectively). There have been arguments against online surveys; however, this study demonstrates that under specific circumstances that the deployment method may not influence the results (Dillman, Smyth, & Christian, 2009; Duda & Nobile, 2010).

One of the primary research questions was to determine if there was a difference in the benefits received between male and female hunters. Results indicated no significant relationships between gender and BoHAS scores, and therefore, no differences in the benefits received by male and female hunters.

### Implications

We assumed that the concept of awe can be used as a measure of self-actualization (Maslow, 1964, 1968; Guynn, Chapter 2 and 3). The similarities in the definitions of awe, peak experiences and mysticism, make it a plausible theory to extend the concept of awe to self-actualization. Self-actualization is described as fulfilling our potential as an individual and as a human and is based on a desire to want to grow and develop (Benson & Decker, 2001; Maslow, 1987) and is not driven by physical needs such as food and safety. The concept of self-actualization mimics and shares common experiences and themes that have been described in research related to concepts such as awe, mysticism and peak experiences (i.e. Agate, 2010; Keltner & Haidt, 2003; Maslow,

1968; McDonald, Wearing, & Ponting, 2009; Powell, Kellert, & Ham, 2010; Rudd, Vohs, & Aaker, 2012; Shiota, Keltner, & Mossman, 2007; Stace, 1960; Thorton, Privette, & Bundrick, 1999). The concept of awe and related terms and constructs (i.e. mysticism, peak experiences, self-actualization) seem to imply a self-actualization state. If in fact the concepts of awe and self-actualization are taken to be as similar, and awe “extends us beyond ourselves” (Otto, 1958, p. 42) as well as “...transform[s] people and reorient their lives, goals and values” (Keltner & Haidt, 2003, p. 312), then it is reasonable that awe may measure self-actualization. While we do not contend that awe fully encompasses the concept of self-actualization, we do argue that awe is likely an important and major component of self-actualization.

While the BoHAS score can be used as an additive scale to gauge benefits derived from hunting, it may be more informative to look at the individual scores across the first order factors (Love/Belonging, Self-Esteem and Awe). The individual scores may provide insight into personal motivations for hunting, which can be used to design recruitment and retention programs tailored to various needs. Each of the individual factors (Love/Belonging, Self-Esteem and Self-Actualization) reflects a different hunting environment necessary to satisfy needs. For example, scoring higher on the Love/Belonging factor may indicate a need to focus on hunting opportunities within a group environment rather than a high population of a species for increased chances of killing an animal. On the other hand, a higher self-actualization score may indicate a need for satisfaction that may not even be tied to the actual act of hunting, rather, they are in need of outlets surrounding hunting activities, such as mentoring opportunities.

### Limitations and Future Research

One of the primary limits to this research was that in the development of the Awe scale, only one sample group was utilized with a small size ( $n = 79$ ). This scale should be further tested using not only hunters from other states and regions, but other outdoor recreational participants, such as fishermen, hikers, etc. Results from non-hunting groups may prove different for other groups.

A primary concern of the BoHAS was that the Physiological/Safety factor was dropped due to low reliability and validity. Dropping the Physiological/Safety factor from the model does not imply that hunting does not satisfy physiological or safety needs, it may simply be an indication that the items used to measure this factor were incomplete and that there are alternative measures for this factor. It became apparent from handwritten comments on the paper surveys that one of the reasons people hunt is to reduce competition for prey species. An example of this scenario is the eastward spread of the coyote due to the loss of the red wolf (*Canis rufus*). There is a growing body of evidence that coyotes are causing a decline in white-tailed deer and wild turkey (*Meleagris gallopavo* spp.) populations at the local level across the eastern United States (Gregg, Bray, Kilbride, & Dunbar, 2001; Houchin, 2005; Kilgo, Ray, Ruth, & Miller, 2010; Wagner & Hill, 1994). Since the white-tailed deer is the most hunted species in the United States and the wild turkey is the second most hunted species (Responsive Management, 2005), it is apparent that coyotes pose not only a threat to local wildlife species, but pose a threat to hunting opportunities. This concept was not specifically

addressed on the survey but is likely an important question that should be included on future surveys.

As related to the Safety factor, an example of a safety concern is human conflict with large predators, such as the gray wolf (*Canis lupus*) and grizzly bear (*Ursus arctos horribilis*). Society will not tolerate extensive populations of large predators due to their threat to humans, domestic animals, and game species and may be hunted in order to control or reduce their populations (Carpenter, Decker, & Lipscomb, 2000; Decker & Purdy, 1988; Decker, Stedman, Larson, & Siemer, 2015). Therefore, future safety related items for the Physiological/Safety factor should most likely focus on these three aspects. Items for these three areas should be developed and tested in subsequent studies.

Another consideration for the BoHAS is that the Nature-Human Relationship factor was retained in the model for conceptual reasons, despite having only one strong measurement item. This factor is important as the initial work on the *Awe* scale was hypothesized based on *Awe* having 3 facets. There is evidence that the relationship people have with nature is very important in a variety of ways and therefore should remain as a factor (e.g. Adams & Steen, 1997; Davis & Gatersleben, 2013; Decker et al., 1984; Shiota, Keltner, & Mossman, 2007). One potential reason for the failure of the items is that perhaps the questions were too vague to capture the essence of the construct of interest. For example, one question included the word “transcend” when perhaps the question could have been reworded to include “connect” for improved question clarity. The Physiological/Safety and Nature-Human Relationships factors should be refined and retested in future studies.

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## APPENDICES

## Appendix A

### IRB Compliance Email for the Development of a Quantitative Scale for the Measurement of Awe Experiences (IRB2013-035)

Dear Dr. Powell,

The chair of the Clemson University Institutional Review Board (IRB) validated the protocol identified above using exempt review procedures and a determination was made on February 12, 2013, that the proposed activities involving human participants qualify as Exempt from continuing review under category B2, based on federal regulations 45 CFR 46. You may begin this study.

Please remember that the IRB will have to review all changes to this research protocol before initiation. You are obligated to report any unanticipated problems involving risks to subjects, complications, and/or any adverse events to the Office of Research Compliance (ORC) immediately. All team members are required to review the “Responsibilities of Principal Investigators” and the “Responsibilities of Research Team Members” available at <http://www.clemson.edu/research/compliance/irb/regulations.html>.

We also ask that you notify the ORC when your study is complete or if terminated. Please let us know if you have any questions and use the IRB number and title in all communications regarding this study.

Good luck with your study.

All the best,  
Nalinee

Nalinee D. Patin  
IRB Coordinator  
Clemson University  
Office of Research Compliance  
Institutional Review Board (IRB)  
Voice: (864) 656-0636  
Fax: (864) 656-4475  
E-mail: [npatin@clemson.edu](mailto:npatin@clemson.edu)  
Web site: <http://www.clemson.edu/research/compliance/irb/>  
IRB E-mail: [irb@clemson.edu](mailto:irb@clemson.edu)

Appendix B

Personal Experiences While Hunting Survey

# Personal Experiences While Hunting



All Responses Are Confidential.

**Please Complete This Survey. Thank You For Your Cooperation.**

Postage-Paid Return Envelope Provided.

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A Study Conducted Cooperatively By:

**CLEMSON**  
School of AGRICULTURAL, FOREST,  
AND ENVIRONMENTAL SCIENCES



**INSTRUCTIONS:** Please read each statement and then check the choice that most closely agrees with your answer. Each statement should be prefaced with, "While hunting I..."

"While hunting I..."	Definitely not true	Mostly not true	Somewhat not true	Neutral	Somewhat true	Mostly true	Definitely true
...feel connected to nature.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...transcend from everyday life to the natural world.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...feel small and insignificant when in a beautiful place.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...feel that the woods are vast.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...sometimes feel overwhelmed with emotion.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...see beauty in nature.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have moments of clarity about what is important to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...reflect on my life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had a moment that changed my perspective on life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had encounters with things in nature that lead to a reassessment of my life's goals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...experienced a moment that changed my life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PLEASE CONTINUE ON NEXT PAGE

"While hunting I..."	Definitely not true	Mostly not true	Somewhat not true	Neutral	Somewhat true	Mostly true	Definitely true
...have a heightened sense of right and wrong.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience in which something greater than myself seemed to absorb me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience in which everything seemed to disappear from my mind until I was conscious only of a void.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience in which I felt myself to be absorbed as one with all things.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience in which my own self seemed to merge into something greater.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience in which I realized the oneness of myself with all things.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience in which I felt everything in the world to be part of the same whole.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience in which I became aware of a unity to all things.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience in which all things seemed to be unified into a single whole.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PLEASE CONTINUE ON NEXT PAGE

"While hunting I..."	Definitely not true	Mostly not true	Somewhat not true	Neutral	Somewhat true	Mostly true	Definitely true
...have had an experience in which I felt as if all things were alive.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience in which all things seemed to be aware.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience in which all things seemed to be conscious.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience in which I felt nothing is ever really dead.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience which was both timeless and spaceless.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience in which I had no sense of time or space.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience in which time and space were non-existent.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience in which time, place, and distance were meaningless.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience in which a new view of reality was revealed to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have experienced anything that I could call ultimate reality.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience in which ultimate reality was revealed to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PLEASE CONTINUE ON NEXT PAGE

"While hunting I..."	Definitely not true	Mostly not true	Somewhat not true	Neutral	Somewhat true	Mostly true	Definitely true
...have had an experience in which deeper aspects of reality were revealed to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience which was incapable of being expressed in words.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience which I was unable to express adequately through language.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience that is impossible to communicate.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience that cannot be expressed in words.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have experienced profound joy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have experienced a perfectly peaceful state.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience in which I felt that all was perfection at that time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience which left me with a feeling of wonder.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience which seemed holy to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have experienced anything to be divine.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PLEASE CONTINUE ON NEXT PAGE

**"While hunting I..."**

...have had an experience which I knew to be sacred.

	Definitely not true	Mostly not true	Somewhat not true	Neutral	Somewhat true	Mostly true	Definitely true
...have had an experience which I knew to be sacred.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
...have had an experience which left me with a feeling of awe.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**INSTRUCTIONS: Please answer the following general questions.**

How old are you? \_\_\_\_\_ years

Are you female or male?  
(Please check your answer)

☐ Female ☐ Male

Do you live in the state of South Carolina?  
(Please check your answer)

☐ Yes ☐ No

How would you describe the community where you live now?  
(Please check your answer)

☐ Rural (Farm)  
☐ Rural (non-farm)  
☐ Small Town (under 10,000)  
☐ Suburb of a city  
☐ City (up to 100,000 people)  
☐ Large metropolitan area (over 100,000)

Approximately how many years have you hunted? \_\_\_\_\_ years

Have you ever killed a game animal?  
(Please check all that apply)

☐ Big Game  
(deer, turkey, bear, etc.)  
☐ Small Game  
(rabbit, squirrel, raccoon, etc.)  
☐ Waterfowl  
☐ Upland Birds  
(quail, doves, pheasants, etc.)

According to whatever standards are important to you personally, how religious would you say you are? (Please check one)

☐ Devoutly Religious  
☐ Deeply Religious  
☐ Strongly Religious  
☐ Somewhat Religious  
☐ Not Very Religious  
☐ Not at all

On average, about how many times do you hunt during a year (all species and all seasons)?  
(Please select one)

☐ 0 ☐ 16-18  
☐ 1-3 ☐ 19-21  
☐ 4-6 ☐ 22-24  
☐ 7-9 ☐ 25-27  
☐ 10-12 ☐ 28-30  
☐ 13-15 ☐ 31+

PLEASE CONTINUE ON NEXT PAGE

PLEASE CONTINUE ON NEXT PAGE



What is your primary reason for hunting?

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

125

## Appendix C

### IRB Compliance Email for Personal Values and Experiences in Hunting (IRB2013-373)

Dear Dr. Powell,

The chair of the Clemson University Institutional Review Board (IRB) validated the protocol identified above using exempt review procedures and a determination was made on November 25, 2013 that the proposed activities involving human participants qualify as Exempt under category B2, based on federal regulations 45 CFR 46. Your protocol will expire on August 31, 2015.

The expiration date indicated above was based on the completion date you entered on the IRB application. If an extension is necessary, the PI should submit an Exempt Protocol Extension Request form, <http://www.clemson.edu/research/compliance/irb/forms.html>, at least three weeks before the expiration date. Please refer to our website for more information on the extension procedures, <http://www.clemson.edu/research/compliance/irb/guidance/reviewprocess.html>.

No change in this approved research protocol can be initiated without the IRB's approval. This includes any proposed revisions or amendments to the protocol or consent form. Any unanticipated problems involving risk to subjects, any complications, and/or any adverse events must be reported to the Office of Research Compliance (ORC) immediately. All team members are required to review the "Responsibilities of Principal Investigators" and the "Responsibilities of Research Team Members" available at <http://www.clemson.edu/research/compliance/irb/regulations.html>.

The Clemson University IRB is committed to facilitating ethical research and protecting the rights of human subjects. Please contact us if you have any questions and use the IRB number and title in all communications regarding this study.

Good luck with your study.

All the best,  
Nalinee

Nalinee D. Patin  
IRB Coordinator  
Clemson University  
Office of Research Compliance  
Institutional Review Board (IRB)  
Voice: (864) 656-0636  
Fax: (864) 656-4475

Appendix D

Personal Values and Experiences in Hunting

# Personal Values and Experiences in Hunting



All Responses Are Confidential.  
**Please Complete This Survey. Thank You For Your Cooperation.**  
Postage-Paid Return Envelope Provided.

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A Study Conducted Cooperatively By:



**CLEMSON**  
School of AGRICULTURAL, FOREST,  
AND ENVIRONMENTAL SCIENCES



February 7, 2014

Dear SC Hunter,

Many individuals enjoy hunting in South Carolina and we strongly support the hunting heritage. For this reason, the South Carolina Department of Natural Resources, the Quality Deer Management Association (QDMA) and Clemson University are interested in understanding your hunting experiences.

Your response is very important and the information gained from this study will be used to better understand the overall hunting experience. The enclosed questionnaire is being distributed to only a small number of hunters so your participation is essential. The questionnaire should take approximately 30 minutes to complete. The final data for this study will be reported in broad statistical terms and your name will not be linked to your answers. Please complete the enclosed survey independently and when you are finished, place it in the enclosed postage-paid envelope and drop in any mailbox.

Upon receipt of your completed questionnaire you will be entered into a drawing to receive one of 3 prizes. The first place prize is a QDMA 25th Anniversary CVA muzzleloader with a 3-9x scope, thumb-hole stock, stainless steel barrel, Realtree camo finish and a soft case. The second place prize is a \$100 Wal-Mart gift card and there will be 10 1-year memberships to the Quality Deer Management Association awarded as a third place prize. Please keep in mind that this survey is being sent to only a small number of people so your chances of winning are good. Once the drawings are complete and the prizes are distributed your name will be removed from our mailing list.

If you have questions about this study please contact Susan Guynn at 864-656-0606, email [sguynn@clemson.edu](mailto:sguynn@clemson.edu). At any time, if you have any additional questions or concerns about your rights as a research participant, you may contact the Clemson University Office of Research Compliance toll free at (866) 297-3071 or via email at [irb@clemson.edu](mailto:irb@clemson.edu).

Thank you in advance for your participation.

Sincerely,

*Bob Powell*

Robert B. Powell, PhD  
Associate Professor  
Clemson University

*Susan Guynn*

Susan T. Guynn  
Extension Associate & PhD Candidate  
Clemson University

**INSTRUCTIONS:** Please read each statement and then check the choice that most closely agrees with your answer. Please note that answer choices may change.

1. Do you hunt only to provide meat for you and your family? ☐ Yes ☐ No
2. Do you hunt predators (i.e. coyotes, bears, etc.) to provide personal safety for yourself and your family? ☐ Yes ☐ No
3. Do you hunt so that you can reduce the number of wild animals that may spread diseases? ☐ Yes ☐ No

	Completely Disagree	Mostly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Moderately Agree	Mostly Agree	Completely Agree
4. I enjoy interacting with other hunting enthusiasts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I value interacting with others that are also involved in hunting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I prefer associating with others that are devoted to hunting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. A sense of group accomplishment is important to me in hunting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Having helped my hunting group accomplish something makes me feel important.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I feel important when I am a part of my hunting group's accomplishments.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PLEASE CONTINUE ON NEXT PAGE

**INSTRUCTIONS:**  
Please read each statement and then check the choice that most closely agrees with your answer.

	Completely Disagree	Mostly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Moderately Agree	Mostly Agree	Completely Agree
10. The development of my hunting group is important to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. I contribute to the unification of my hunting group.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. It is important that I perform duties which unify my hunting group.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Hunting is a way to display my skills and abilities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. I demonstrate my skills and abilities when hunting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. My knowledge of hunting is evident when participating.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Hunting for me is an expression of myself.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. My individuality is expressed in hunting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Hunting allows me to express who I am.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. My image of myself has improved since I began hunting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Hunting has enhanced my self image.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Hunting has improved how I think about myself.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PLEASE CONTINUE ON NEXT PAGE

**INSTRUCTIONS:**  
Please read each statement and then check the choice that reflects how true each statement is for your answer. Each statement should be prefaced with, "While hunting I..."

	Definitely not true	Mostly not true	Somewhat not true	Neutral	Somewhat true	Mostly true	Definitely true
22. ...have moments of clarity about what is important to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. ...reflect on my life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. ...have had a moment that changed my perspective on life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. ...have had encounters with things in nature that lead to a reassessment of my life's goals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. ...experienced a moment that changed my life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. ...have a heightened sense of right and wrong.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. ...transcend from everyday life to the natural world.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. ...feel that the woods are vast.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. ...sometimes feel overwhelmed with emotion.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. ...have had an experience in which something greater than myself seemed to absorb me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. ...have had an experience in which I felt myself to be absorbed as one with all things.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PLEASE CONTINUE ON NEXT PAGE

**INSTRUCTIONS:**  
Please read each statement  
and then check the choice that  
most closely agrees with your  
answer. Each statement should be  
prefaced with, "While hunting I..."

	Definitely not true	Mostly not true	Somewhat not true	Neutral	Somewhat true	Mostly true	Definitely true
33. ...have had an experience in which my own self seemed to merge into something greater.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. ...have had an experience in which I realized the oneness of myself with all things.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. ...have had an experience in which I became aware of a unity to all things.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. ...have had an experience in which all things seemed to be unified into a single whole.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. ...have had an experience in which I felt as if all things were alive.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. ...have had an experience in which all things seemed to be conscious.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. ...have had an experience in which I felt nothing is ever really dead.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. ...have had an experience which was both timeless and spaceless.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. ...have had an experience in which I had no sense of time or space.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PLEASE CONTINUE ON NEXT PAGE

**INSTRUCTIONS:**  
Please read each statement  
and then check the choice that  
most closely agrees with your  
answer. Each statement should be  
prefaced with, "While hunting I..."

	Definitely not true	Mostly not true	Somewhat not true	Neutral	Somewhat true	Mostly true	Definitely true
42. ...have had an experience in which time and space were non-existent.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. ...have had an experience in which a new view of reality was revealed to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. ...have had an experience in which ultimate reality was revealed to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. ...have had an experience in which deeper aspects of reality were revealed to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. ...have had an experience which left me with a feeling of wonder.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. ...have had an experience which seemed holy to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48. ...have experienced something that is divine.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. ...have had an experience which I knew to be sacred.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50. ...have had an experience in which I realized I was part of the circle of life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. ...have had an experience in which I felt I was an intimate part of the natural world.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PLEASE CONTINUE ON NEXT PAGE

**INSTRUCTIONS:**  
Please read each statement and then check the choice that most closely agrees with your answer.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
52. I feel comfortable around people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53. I make friends easily.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54. I am skilled in handling social situations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55. I am the life of the party.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
56. I know how to captivate people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
57. I have little to say.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
58. I keep in the background.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
59. I would describe my experiences as somewhat dull.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
60. I don't like to draw attention to myself.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
61. I don't talk a lot.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
62. I believe in the importance of art.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
63. I have a vivid imagination.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
64. I tend to vote for liberal political candidates.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
65. I carry the conversation to a higher level.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
66. I enjoy hearing new ideas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
67. I am not interested in abstract ideas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
68. I do not like art.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PLEASE CONTINUE ON NEXT PAGE

**INSTRUCTIONS:**  
Please read each statement and then check the choice that most closely agrees with your answer.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
69. I avoid philosophical discussions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
70. I do not enjoy going to art museums.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
71. I tend to vote for conservative political candidates.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
72. I often feel blue.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
73. I dislike myself.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
74. I am often down in the dumps.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
75. I have frequent mood swings.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
76. I panic easily.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
77. I rarely get irritated.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
78. I seldom feel blue.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
79. I feel comfortable with myself.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
80. I am not easily bothered by things.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
81. I am very pleased with myself.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PLEASE CONTINUE ON NEXT PAGE

**INSTRUCTIONS: Please answer the following general questions.**

82. How old are you? \_\_\_\_\_ years

83. Are you female or male? ☐ Female ☐ Male  
(Please check one)

84. Which state do you live in? \_\_\_\_\_

85. How would you describe the community where you **grew up**?  
(Please check one)

☐ Rural (Farm)  
☐ Rural (non-farm)  
☐ Small Town (under 10,000)  
☐ Suburb of a city  
☐ City (up to 100,000 people)  
☐ Large metropolitan area (over 100,000)

86. Approximately how many years have you hunted? \_\_\_\_\_ years

87. Have you ever killed a game animal?  
(Please check all that apply)

☐ Big Game (deer, turkey, bear, etc.)  
☐ Small Game (rabbit, squirrel, raccoon, etc.)  
☐ Waterfowl  
☐ Upland Birds (quail, doves, pheasants, etc.)

88. What is your highest level of education?  
(Please check one)

☐ 11 yrs of school or less  
☐ 12 yrs of school (High School Grad)  
☐ 1-3 yrs of college  
☐ 4 yrs of college (College Graduate)  
☐ 5 yrs or more of college (Grad School)

89. What is your level of income?  
(Please check one)

<input type="checkbox"/> \$24,999 or less	<input type="checkbox"/> \$90,001 - \$100,000
<input type="checkbox"/> \$25,000 - \$35,000	<input type="checkbox"/> \$100,001 - \$110,000
<input type="checkbox"/> \$35,001 - \$45,000	<input type="checkbox"/> \$110,001 - \$120,000
<input type="checkbox"/> \$45,001 - \$50,000	<input type="checkbox"/> \$120,001 - \$130,000
<input type="checkbox"/> \$50,001 - \$60,000	<input type="checkbox"/> \$130,001 - \$140,000
<input type="checkbox"/> \$60,001 - \$70,000	<input type="checkbox"/> \$140,001 - \$150,000
<input type="checkbox"/> \$70,001 - \$80,000	<input type="checkbox"/> over \$150,000
<input type="checkbox"/> \$80,001 - \$90,000	

90. According to whatever standards are important to you personally, how religious would you say you are?  
(Please check one)

☐ Devoutly Religious  
☐ Passionately Religious  
☐ Deeply Religious  
☐ Earnestly Religious  
☐ Strongly Religious  
☐ Fairly Religious  
☐ Somewhat Religious  
☐ Not very Religious  
☐ Not at all

91. On average, about how many times do you hunt during a year (all species and all seasons)?  
(Please check one)

<input type="checkbox"/> 0	<input type="checkbox"/> 16-18	<input type="checkbox"/> 35-37
<input type="checkbox"/> 1-3	<input type="checkbox"/> 19-21	<input type="checkbox"/> 38-40
<input type="checkbox"/> 4-6	<input type="checkbox"/> 22-24	<input type="checkbox"/> 41-43
<input type="checkbox"/> 7-9	<input type="checkbox"/> 25-27	<input type="checkbox"/> 44-46
<input type="checkbox"/> 10-12	<input type="checkbox"/> 28-30	<input type="checkbox"/> 47-49
<input type="checkbox"/> 13-15	<input type="checkbox"/> 31-34	<input type="checkbox"/> 50+

PLEASE CONTINUE ON NEXT PAGE

PLEASE CONTINUE ON NEXT PAGE



What is your primary reason for hunting?

[illegible]

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## Appendix D

### Direct Effects of Paths for Sociodemographic Indicators

<b>Direct Path (IV-DV) (c')</b>	<b>B (<math>\beta</math>) (c' path)</b>	<b>Standard Error</b>	<b>Z</b>
YE-LB	0.01203 (0.12553)	0.00414	2.90*
E-LB	0.39043 (0.08033)	0.20358	1.92
AG-PL	-0.00767 (-0.14499)	0.00273	-2.81*
YE-PL	0.00459 (0.09918)	0.00211	2.17*
N-PL	-0.16754 (-0.07260)	0.08297	-2.02*
AG-TRA	0.00892 (0.07831)	0.00516	1.73
OP-DE	0.38456 (0.06195)	0.21683	1.77
CNR-DE	-0.26835 (-0.06997)	0.12872	-2.08*
ED-DE	0.11329 (0.07137)	0.0551	2.06*
RD-DE	-0.13968 (-0.18586)	0.02562	-5.45*
AG-S	-0.00809 (-0.07195)	0.00628	-1.29
AQ-S	0.00055 (0.06816)	0.00023	2.35*
I-S	-0.01926 (-0.06019)	0.01046	-1.84
AG-AW	0.00201 (0.04443)	0.00258	0.78
N-AW	0.23195 (0.11774)	0.09225	2.51*
AQ-AW	-0.00038 (-0.11833)	0.00013	-2.90*
AG-BH	-0.01427 (-0.38274)	0.00434	-3.29*
YE-BH	0.00479 (0.14705)	0.00346	1.39
E-BH	0.00334 (0.00202)	0.08087	0.04
OP-BH	0.29660 (0.15369)	0.10198	2.90*
N-BH	-0.01452 (-0.00893)	0.08571	-0.17
AQ-HN	0.00023 (0.08694)	0.00014	1.61
CNR-BH	-0.10217 (-0.08569)	0.05937	-1.72
ED-BH	-0.04443 (-0.09003)	0.02605	-1.71
I-BH	0.00719 (0.06777)	0.00628	1.15
RD-BH	-0.01011 (-0.04328)	0.01099	-0.92

\*p<0.05; B = Unstandardized Estimates;  $\beta$  = Standardized Estimates

E=Extroversion; BH = Benefits of Hunting; LB = Love-Belonging; YE= Years Experience; CNR = Community: Non-Rural; AG = Age; AW = Awe; AQ = Age Quadratic; N=Neurotic; PL = Perceptions of Life; S = Spiritual – measured by Hood Mysticism Scale; I = Income; NHR = Nature-Human Relationships; OP = Openness to Experience; DE = Direct Experience; RD = Religious Devotion

## Appendix E

### Indirect Mediating Effects of Paths for Sociodemographic Indicators

Indirect Path (IV-M-DV)	a Path (Error)	b Path (Error)	c' Path (Error)	Mediating Effect (Error) (Not controlling for M) (a*b)	Z
<b>Two-path mediating effect</b>					
E-BH-LB	0.00334 (0.0809)	1.72806 (0.2358)	-	0.00577 (0.13975)	0.041
YE-BH-LB	0.00479 (0.0035)	1.72806 (0.2358)	-	0.00828 (0.0061)	1.35
CNR-BH-LB	-0.10217 (0.0594)	1.72806 (0.2357)	-	-0.17656 (0.1054)	-1.675
AG-BH-AW	-0.02466 (0.0072)	0.57919 (0.0790)	-	-0.014283 (0.0046)	-3.096*
AQ-BH-AW	0.00040 (0.0003)	0.57919 (0.0790)	-	0.000232 (0.00015)	1.56
N-BH-AW	-0.02516 (0.1481)	0.57919 (0.0790)	-	-0.015 (0.0858)	-0.1699
<b>Three-path mediating effect</b>				<b>(a*b*c')</b>	
AG-BH-AW-PL	-0.02467 (0.007)	0.57919 (0.790)	0.72287 (0.0740)	-0.0103 (0.0035)	-2.95*
YE-BN-AW-PL	0.00830 (0.006)	0.57919 (0.790)	0.72287 (0.0740)	0.0035 (0.0026)	1.35
N-BH-AW-PL	-0.02518 (0.1481)	0.57919 (0.790)	0.72287 (0.0740)	-0.0105 (0.0620)	-0.17
AG-BH-AW-S	-0.02466 (0.0072)	0.57919 (0.790)	2.11335 (0.1957)	-0.0302 (0.0101)	-2.98*
AQ-BH-AW-S	0.0004 (0.0003)	0.57919 (0.790)	2.11335 (0.1957)	0.0005 (0.0003)	1.55
I-BH-AW-S	0.01242 (0.0107)	0.57919 (0.790)	2.11335 (0.1957)	0.0152 (0.0134)	1.14

\* p<0.01

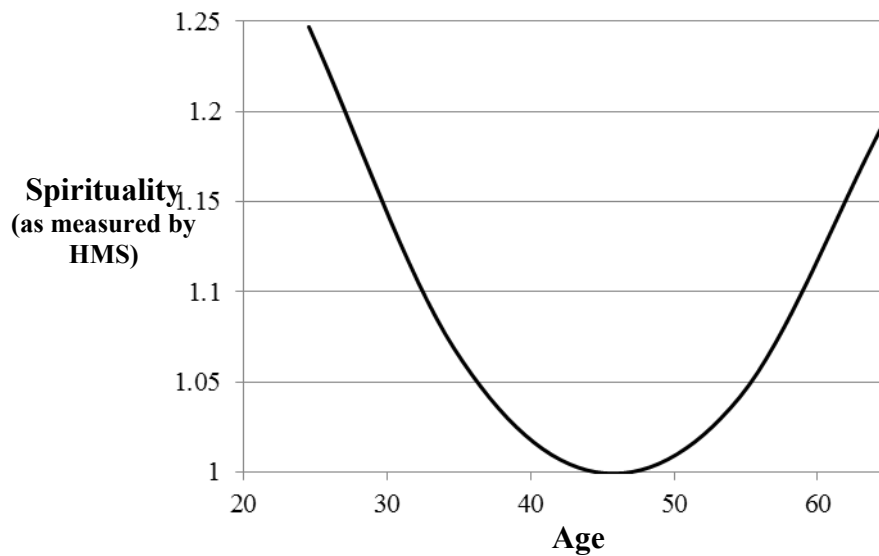
E=Extroversion; BH = Benefits of Hunting; LB = Love-Belonging; YE= Years Experience; CNR = Community: Non-Rural; AG = Age; AW = Awe; AQ = Age Quadratic; N=Neurotic; PL = Perceptions of Life; S = Spiritual; I = Income; NHR = Nature-Human Relationships; OP = Openness to Experience

## Appendix F

### Relationship of Age to Awe and Spirituality



**Figure F.1. Relationship between *Awe* and age quadratic**



**Figure F.2. Relationship between Spirituality and age quadratic**