

Assessing Hunting Participation Correlates in Ohio: An Examination of Influences and
Scholarship Related to the Pursuit of Wild Game

DISSERTATION

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Abstract

In a relatively short period of time, hunting has progressed from an activity vital to human survival to a form of outdoor recreation that represents a net monetary loss for most participants. Hunting participation in the United States is in long term decline, but with occasional spikes in popularity. With declining participation, the importance of hunting as an economic activity has waned, and wildlife professionals and social scientists have struggled to find viable, predictable, cost effective ways to influence hunting initiation and continuation (also referred to as "recruitment" and "retention"). While early literature concerning hunting participation has certainly advanced from hunter tallies and animal harvests trends, gaps exist in understanding what factors influence hunting participation. A preliminary step in understanding these gaps is to situate the existing body of research on hunting participation within the social science disciplines of sociology, psychology, and social psychology. The goal is to trace how theory from these disciplines has been used to understand hunting participation and thereby identify biases and blind spots in the existing literature. Once the field has been situated two questions that speak to long-term trends in hunting participation can be examined. Specifically, (a) how increasingly popular support for alternative food impacts hunting participation, as well as (b) how do economic characteristics influence shifting value orientations presumed to affect attitudes toward hunting and other forms of outdoor recreation. The increasing popularity of alternative food ideologies has

generated excitement among many wildlife professionals, who suspect alternative food supporters may be attracted to hunting due to perceived benefits of wild game meat, but little rigorous quantitative research exists on this subject. Similarly, though research on wildlife-related value orientations provided new avenues to examine hunting participation trends, tests are limited and concentrated in the western United States. Also, the methods and measurement employed in such studies have exhibited some inconsistency. The current work will clarify: the origins and current disciplinary affiliation of hunting participation literature, the relationship of alternative food support with pro hunting behaviors and attitudes, and the relationship between value orientations and socioeconomic characteristics of individuals in Ohio.

Dedication

Clare and Seth: Thank you.

Also, I would like to dedicate this work to
anyone who reads this document. Bless your heart!

Mention that you read my dissertation and I will buy you a coffee.

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I would like to thank my committee members; Jeremy Bruskotter, Jeff Sharp and Richard Moore for all the effort they put forth on this dissertation. Jeff was my first contact at OSU and encouraged me to apply to the school. Richard gave me the opportunity to start out my career at OSU on a NSF fellowship. Jeremy was my primary contact on this dissertation and was always available to offer suggestions. I would also like to thank the Ohio Division of Wildlife for funding the survey from which these data were drawn.

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My parents raised me on a hunting farm allowing me to see the interaction of hunters of various status levels pursuing various types of game. Explaining my observations from my youth has been the primary focus of my graduate career. Growing up talking about the intersection of social and ecological issues in that setting is an experience few in my field are afforded. Thank you.

Well I'm coming up on two pages so I will have to lump all the other people in my life who have helped together here. Thank you for your kindnesses of all sizes.

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Fields of Study

Major Field: Rural Sociology

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Chapter 1: Introduction

A general definition of leisure positions leisure as the antithesis of time spent at work (see Roberts, 1970). Sociological discourse on leisure privileges this reciprocal relationship between work and leisure within an individual's day in contrast to studying those aspects in a void lacking social constructs. Classical sociological theorists such as Marx, Weber, and Veblen discussed leisure (see Rojek, 1984, 1985; Veblen, 1934; Weber, 1930) as compensation for work day exertions and noted the role of leisure in status maintenance. In contrast, though much current hunting participation literature tends to ignore the connection to work. Early sociological researchers focused on several aspects of the reciprocal connection between work and leisure such as: compensatory leisure (Burch, 1969), leisure as interwoven with work (Clarke, 1956; Rojek, 1985; Wilensky, 1960), and class influences on hunting participation (Bryan, 1977; Klessig, 1970). These understandings of leisure underscore macro social and economic forces effecting the form and function of leisure.

Unfortunately, even among sociologists currently studying consumptive forms of outdoor recreation (e.g., hunting, trapping, and fishing) in the United States, often there is little reference to work, status, prestige, social hunting patterns or income other than as a cursory description of survey samples. Other social factors such as population density,

presence or absence of mentors, and sex are addressed (Enck, Decker, & Brown, 2000; Heberlein, Ericsson, & Wollschei, 2002; Stedman & Heberlein, 2001). However, many of these factors are either difficult or impossible to manipulate through policy interventions. Thus, while they provide important insight into why participation is changing, they are largely silent concerning what might be done about it. Of late macro-level sociological indicators in research have been overshadowed by investigations largely informed by individual-based, social psychological approaches (e.g. Fulton, Manfredo, & Lipscomb, 1996; Jacobs, Fehres, & Campbell, 2012; Vaske & Donnelly, 1999). Such approaches are appealing inasmuch as they provide data on internal mechanisms that may be more easily manipulated than socioeconomic factors such as social status or residency. New research reemphasizes more macro social and economic forces and their relation to cognitive factors for the purposes of predicting hunting participation (Manfredo, Teel, & Henry, 2009; Responsive Management, 2013b). This line of research attempts to bridge traditional sociological perspectives and those perspectives that focus on individual-level forces (e.g., psychology, behavioral economics).

A description of hunting participation research in the U.S. wouldn't be complete without a discussion of the impact of hunting worldwide. In the U.S. hunting has a meaning greater than the act of venturing into the wild to pursue game. Hunting is predominately a male activity and is a process that both molds young boys into men and signifies attainment of adult male status for those who participate. This is also true in European countries and particularly in less densely populated countries like Norway

where frequent hunting is a signal to others of social standing (Bye, 2009). Though trophy hunting takes place in the U.S., as evidenced by organizations such as the Boone and Crocket Club, other countries have more contentious and visible forms of trophy hunting such as hunting lions, rhinos, and elephants (Baker, 1997). U.S. Hunters are often lauded for the conservation role they play through harvest and funding related to hunting, but in other countries the conservation role appears to be secondary to other motivations (Dahles, 1993; R. Sharp & Wollscheid, 2009). U.S. hunting trends are also similar to other countries such as Japan where hunting participation peaked in the late 70s and early 80s and has since been in a steady decline (Ueda, Kanzaki, & Koganezawa, 2010).

One issue that differs between the U.S. and other countries is subsistence hunting. U.S. hunters are increasingly hunting for the meat (Responsive Management, 2013b) (Pearce et al., 2010; Pennisi, 2016, & Pm, 2016). But, true subsistence hunting is rare in the U.S. (Emery & Pierce, 2005). In other countries, particularly those in South America and Africa, subsistence hunting for bush meat poses a risk to threatened species (Bennett, 2000; Carrington, 2016; Milner-Gulland & Bennett, 2003; Ripple, Abernethy, et al., 2016; Ripple, Chapron, et al., 2016). Though hunting is proposed as a major risk factor for many species by organizations such as the International Union for Conservation of Nature (IUCN) (Ripple, Abernethy, et al., 2016) it is important to recognize that hunting may be a confounding variable in the causality of mass extinction events. Often hunting is the more proximal cause, but more distal causes such as industrial agriculture and population growth—factors that degrade or destroy wildlife habitat— have a larger long

term impact. An example in the U.S. is the Passenger pigeon. Though hunting took its toll, widespread changes in land use ultimately doomed the species (Bucher, 1992). It is also difficult to see the clear role of hunting on these species when monitoring organizations do not make listing criteria readily available such as with the IUCN.

It is interesting to note that human wildlife interactions influence the degree to which game species are considered wild. For example, the majority of American bison have some amount of cattle genetics as a result of early American hybridization programs (Allen, n.d.; Gilman, 2016). Other species such as feral hogs, pen raise Ring-necked pheasants and pen raised Whitetail deer have been exposed to varying degrees of genetic manipulation resulting from agricultural breeding programs. Genetic manipulation is not limited to captive wild game animals. Although some contend that wild animals can't be managed to improve genetics (Brothers & Ray, 1982) others indicate a more direct effect by humans on animal populations (Leopold, 1987). In light of international differences in the meaning attached to hunting and the motivations for hunting and in spite the past and continued influence of humans on wild game, this article will highlight hunting participation in the U.S. and will operate under the assumption that wild game species are sufficiently wild as to be classified as wild animals.

The first step in addressing the gap between prior sociological leisure research and current social psychological trends in hunting participation research is to situate the existing body of research on hunting participation within the social science disciplines of sociology, psychology, and social psychology. The goal is to trace how theory from the various contributing disciplines has been used to understand hunting participation and

thereby identify biases and blind spots in the existing literature. Once the field has been situated two questions that speak to long-term trends in hunting participation can be examined. Specifically, a) how increasingly popular support for alternative food impacts hunting participation, as well as b) how do potentially shifting value orientations affect hunting and other forms of outdoor recreation. The increasing popularity of alternative food ideologies has generated excitement among many wildlife professionals, who suspect alternative food supporters are attracted to hunting because of perceived benefits of wild game, but little rigorous quantitative research exists on this subject. Finally, though research on wildlife-related value orientations has provided a new avenue to examine factors influencing hunting participation trends, tests of the framework are concentrated in the western United States and the methods and measurement employed in such studies have exhibited inconsistency. The current work will clarify: the origins and current disciplinary affiliation of hunting participation literature, the relationship of alternative food support with pro hunting behaviors and attitudes, and the relationship between value orientations and socioeconomic characteristics of individuals in the eastern United States in order to better understand hunting participation in Ohio.

Wildlife Conservation and Hunting in the United States

Low hunting participation was not always a concern in the U.S. During early postcolonial periods over hunting was a primary concern (Geist, 1988). Following WWII, outdoor recreation in the U.S. increased substantially (Flather & Cordell, 1995; Rojek, 1985) and, due in part to this spike, researchers became increasingly interested in explaining hunting and other forms of outdoor recreation as well as leisure in general.

Some believed that in the postindustrial period leisure would increasingly define individuals and societies (Roberts, 2011). There was a decline in hunting participation in the 1960s followed by another increase in the late 1960s and early 1970s (U.S. Fish and Wildlife Service, 2003, 2013). In the 1970s and 1980s hunting participation rates began a stable decline and there has not been much indication that change is on the horizon. This is in spite of a recent small increase in hunting in 2011 and 2012 (U.S. Fish and Wildlife Service, 2003, 2013). These trends have largely been reported at the state level. For many states the change in hunting participation, and in response, wildlife management objectives, has coincided with increased tensions between state wildlife management agencies. Prime examples include harvest targets set on Whitetail deer by state wildlife agencies, as well as management of carnivore species such as wolves and cougars (Diefenbach, Palmer, & Shope, 1997; J. C. Mangun, Throgmorton, Carver, & Davenport, 2007; Schoenecker & Shaw, 1997). These tensions can foster public distrust of wildlife management agencies, leading to further tensions between agencies and stakeholders. The current research focuses on hunters in the state of Ohio. While Ohio may not have had the acute social tensions between state wildlife agencies and the general public such as in the cases of states like Wisconsin or Pennsylvania, tensions are higher than during the peak of hunting participation periods of past decades (Nelson, 2010; Pennsylvania Game Commission, 2004).

The decreasing number of hunters is a major concern for state wildlife management agencies because agencies depend on hunting participation (specifically license sales), as it is a vital determinate of the amount of conservation funding states

receive through the Pittman-Robertson Act—a federal law that provides federal funding for wildlife conservation activities via an excise tax on hunting-related goods such as ammunition and firearms (Williams 2010). Moreover, without hunting wildlife professionals would likely be unable to control populations of overabundant game species (Brown et al., 2000). These populations can pose a variety of problems for society including increases in wildlife-vehicle collisions, increased conflicts between people and wildlife, as well as damage to the animals' habitat. This is why hunting participation is such an important topic for hunters and nonhunters alike.

Given the importance of hunting participation for wildlife conservation, the chapters that follow will examine three prominent topical areas relevant to understanding hunting participation. These areas include the disciplinary perspective of hunting participation researchers, the influence of alternative food support on hunting initiation, and the extent that shifting wildlife value orientations and postmaterialist values depress hunting initiation rates.

The influence of Disciplinary Perspectives

The disciplinary training of researchers can play an important role in determining the character of management suggestions researchers' offer for regulating outdoor recreation participants. Yet, rigid adherence to one disciplinary perspective to the detriment of others can lead to problematic gaps in our collective understanding of phenomena. Though scholarship on leisure and outdoor recreation has sociological and economic roots, the disciplinary landscape related to participation in outdoor recreation is in constant flux due to temporally important issues (e.g. chronic wasting, periodic

hunting censuses etc.) and shifts in the number of researchers from differing disciplines (e.g. rural sociologists, interdisciplinary natural resource social scientists, economists etc.) (Manfredo, 2008). Sociological, Social psychological, and a host of interdisciplinary researchers are represented among its main contributors. This is both beneficial and challenging for researchers in this field.

Some of the prominent issues considered in the Human Dimensions of Wildlife (HDW) field include human wildlife conflict, changes in attitudes and values toward wildlife, public support/opposition to wildlife-related policies and management interventions, and factors impacting various forms of wildlife-associated recreation. In recent years interest in the latter category has been driven, in part, by declines in the number of hunters and increases in nonconsumptive recreationists (Larson et al., 2013; Papouchis, Singer, & Sloan, 2001). These contrasting recreations place state wildlife management agencies in a difficult position as they consider changes for state wildlife management programs. The disciplinary focus of researchers will play a role in determining the character of management suggestions to manage outdoor recreation participants. Indeed, adherence to one discipline to the detriment of another might signal a knowledge gap on the part of researchers and state agencies. As the breadth of research grows, researchers occasionally look back to "take the pulse" of the field by examining a multi-year span of research (Christensen & Garkovich, 1985; Flinn, 1982; Garkovich & Bell, 1995).

Chapter 2 is based on a systematic review of literature related to hunting participation from 2001 to 2010. A keyword search and subject evaluations were

collected from the journals: Human Dimensions of Wildlife, Society and Natural Resources, Leisure Sciences, Wildlife Society Bulletin, and Rural Sociology. The variables assessed in this analysis include: year of publication, location, author submitted keywords, target species, author's academic orientation, and statistical method. Authors' academic orientation was determined by a search of the first three authors listed for each article. The orientation was determined by the discipline listed on individual graduate degrees. The disciplinary perspective of journal articles referenced was determined by examining the references for all journals. Geographic regions were used to classify article location according to the target location for each article. In addition to these regions, larger geographic locations were included to account for national level data sets such as Canada, United States, and studies over more than one region. The geographic region was determined by location of data collection.

Articles relating to hunting participation research published in Human Dimensions of Wildlife, Society and Natural Resources, Wildlife Society Bulletin, Leisure Sciences, and Rural Sociology, were reviewed over a ten year period. Cognitions accounted for 44% of keywords, but author's disciplinary training was relatively equal between sociological and social psychological degrees. Most state level research occurred in the mid-Atlantic region, while the mountain states produce more articles when subnational and state level datasets are combined.

Alternative Food Support and the Effect on Hunting Participation

The increased permeability of boundaries within hunting participation literature is exhibited by the examination of nontraditional areas of research such as the effect of food

ideologies on hunting participation. Alternative food supporters, including those that promote organic, local, seasonal, or non-genetically modified (GMO) food, are an intriguing potential target market for state fish and wildlife management agencies who wish to increase participation in hunting and fishing (Ljung, Riley, Heberlein, & Ericsson, 2012; Responsive Management, 2013b; Tidball, Tidball, & Curtis, 2014; Tidball, Tidball, Larson, Poindexter, & Stedman, 2014). Some wildlife professionals believe that alternative food supporters are more likely to initiate hunting than those who do not identify as alternative food supporters because they have positive attitudes toward alternative food sourcing and wild game is one type of alternative food available to individuals. One of the reasons alternative food supporters are an enticing target is that they represent a demographic that has traditionally been less involved in hunting and other consumptive forms of outdoor recreation (i.e. young, urban, and lacking rural mentors). In contrast, many hunter recruitment and retention programs target those who are likely already primed to hunt (such as in the case of youth hunting seasons) in an attempt to slow hunting discontinuation. For fish and wildlife professionals alternative food supporters may represent that rare combination of individuals who do not hunt currently but who might be easily swayed to initiate hunting.

Chapter 3 will examine the relationship between alternative food attitudes and hunting attitudes and behaviors in the context of the cognitive hierarchy theoretical framework in relation to an analysis of hunting behaviors and support in connection to alternative food support. This theoretical framework suggests that there is a relationship between values (abstract, enduring beliefs that are judged to be favorable by individuals

and groups (Rokeach, 1973)), attitudes (a positive or negative assessment of an object (Eagly & Chaiken, 1993)), and behaviors that indicate consistency and similarity between abstract cognitions and behaviors (Fulton et al., 1996; Homer & Kahle, 1988; Rokeach, 1973).

There is little research examining support for alternative foods and hunting. Are nonhunting alternative food supporters more likely to hunt? Do nonhunting individuals who score highly on alternative food support items correlate positively with support for hunting? A comparison of those who hunt and those who do not hunt will indicate whether alternative food is a consistent indicator of support for recreational hunting and engagement by measuring support for hunting and support for various food ideology preferences.

Chapter 3 seeks to clarify the relationship between alternative food support and hunting behaviors and attitudes. While some wildlife professionals and nongovernmental organizations have made a logical connection between support for alternative food and hunting participation, the empirical results have not yet indicated such a direct effect. The following analysis attempts to add clarification through several statistical analyses. Data were obtained from the Ohio Division of Wildlife (Ohio Department of Natural Resources, Ohio Division of Wildlife, 2015) and Survey Sampling International. A principal components analysis (PCA) was performed on food related survey items. Regression factor scores were created and saved for each respondent. The resultant two factors were identified as alternative food support and support for wild game meat. The factor scores for alternative food support and wild game support from the principal

components analysis were entered as independent variables in a logistic regression. Respondents indicated whether they thought hunting should be allowed on public lands as well as whether they had ever hunted. Control variables included sex, age, education, income, residence during formative years, and residence where respondent currently lives. The first logistic regression model examined the relationship between variables measuring income, education, age, gender, hunting behaviors, residence place size, and factor scores for food ideologies in reference whether or not they had ever hunted. The second logistic model contained the same independent variables as the first model regressed on the dependent variable of dichotomized support for hunting on public lands. A third logistic model included the factor scores and control variables for nonhunters only. The alternative food support factor score did not correlate with hunting support or behavior in any model. Of the individual alternative food factor score items only organic and non-GMO food support correlated to support for hunting, but wild game cannot be categorized as organic or non-GMO. These data foreshadows a low conversion rate when targeting alternative food consumers.

Socioeconomic Influences on Postmaterialist Values and Wildlife Value Orientations

Though approaches that seek to explain behavior based on internal cognitive processes have provided useful insights into factors associated with hunting participation, the idea that recreation is conditioned, though not fully determined, by economic forces has not been abandoned (see Manfredi, Teel, & Bright, 2003; Manfredi et al., 2009). That is, economic forces are an important force, but not the only force. Fulton et al. (1996) introduced an approach to understanding changing belief systems surrounding

wildlife that was heavily influenced by psychological research on values and ideologies (see Kluckhohn & Strodtbeck, 1961; Rokeach, 1973). Subsequent research ultimately identified two independent orientations, labeled "domination" and "mutualism," that characterize American's beliefs about the treatment and management of animals (Manfredo et al., 2009). In subsequent articles wildlife value orientations (WVOs) were found to be associated with "materialist" and "postmaterialist" values, as defined by Ronald Inglehart (Inglehart, 1990, 1997). These studies provided a theoretical perspective for understanding social and economic factors affecting value shift and ultimately, the relationship between humans and wildlife.

Inglehart argued values develop during formative years in reaction to early economic conditions (labeled the scarcity hypothesis) and are consistent over a lifetime (Inglehart, 1977, 1997; Inglehart & Welzel, 2005). But, one's sense of economic security cannot be accurately measured by objective economic measures alone. Previous research identified relationships between economic factors and value orientations, but neglected subjective measures of perception of economic conditions and their assessment of their position relative to others. Therefore chapter 4 will examine the like between values and socioeconomic indicators while also including a relative measure of subjective well-being. In addition, while noting that the current research is not a strict replication of primary articles on the subject, the current work expands the spatial location of research from articles primarily sampling the western U.S. and Europe to samples in the eastern U.S.

Chapter 4 examines postmaterial values and Wildlife Value Orientations in the context of an additional indicator of subjective socioeconomic position and an alternative measure of place size in the eastern United States. Wildlife value orientations have been linked to values and outdoor recreation behaviors in an attempt to predict long term hunting trends (Manfredo et al., 2009). Chapter 4 seeks to deconstruct the relationship between socioeconomic factors and values and value orientations. Principal Components Analysis (PCA) was used to identify latent factors underlying Wildlife Value Orientation (WVO) items. Similarly to Gamborg & Jensen (2016) and Manfredo, Teel and Henry (2009) two factors described as mutualism and domination were identified. OLS regression tested the relationship between income, education, perceived relative economic position (PREP), residence, sex, and age to WVOs and postmaterial values over three regression models. Two models applied to the mutualism construct regressed mutualism on age, sex, income, education, PREP, and urbanization. Model 1, included income, place size and education items, but excluded PREP. In model 2 PREP was added to the variables present in model one. A second set of two models regressed domination factor scores on age, sex, income, education, PREP, and urbanization. An OLS regression also tested associations between postmaterialist items and income, education, PREP, residence, sex and age over two models. Model 1 regressors included income and education items but excluded PREP. In model 2 all regressors were included. ANOVAs were performed to examine postmaterialist and WVO items by age cohorts (i.e. 20-39, 40-59, and 60-79).

Results from chapter 4 indicate mutualism values are positively correlated with income. Also, domination values positively correlated with PREP and residency at formative years, but negatively correlated with education. Postmaterialist values are correlated negatively with PREP, but positively with education and place size during formative years. WVOs and postmaterial values did not vary by age cohorts. These results indicate a patterned relationship between socioeconomic variables and mutualism/domination measures in contrast with previous studies. Limited support for PREP as a correlate of postmaterialist values indicates the potential for inclusion of PREP in future analyses.

Chapter 2: Meta-analysis of Hunting Participation Research from 2001-2010

Abstract

Sociological, Social psychological, and a host of interdisciplinary researchers are represented in hunting participation research. The variability in disciplinary perspectives and approaches used in the human dimensions field challenges researchers to integrate diverse perspectives. Often researchers make assumptions about the nature of the field without systematic examinations of the literature. A review of the roots of hunting participation researcher's academic orientations, spatial dispersion of research, and species of interest will provide context for the current state of the field. Articles relating to hunting participation research in the journals *Human Dimensions of Wildlife*, *Society and Natural Resources*, *Wildlife Society Bulletin*, *Leisure Sciences* and *Rural Sociology*, were reviewed over a ten year period. Psychological concepts (i.e., cognitions) accounted for 44% of keywords, but authorship was relatively equal between sociological and social psychological researchers. Most state level research occurred in the mid-Atlantic region, while Mountain states produce more articles when national and state level datasets are combined.

Hunting participation research is a substantively and theoretically diverse field. Sociological, social psychological and a host of interdisciplinary researchers are represented among its main contributors. This is both beneficial and challenging for researchers in this field as a variety of disciplinary perspectives and approaches are used. The interdisciplinary field of Human Dimensions of Wildlife (HDW) is an expanding field of study that has grown from sociological and economic roots (Manfredo, 2008). Some of the prominent issues considered in the field of HDW include human wildlife conflict, changes in attitudes and values toward wildlife, public support/opposition to wildlife-related policies and management interventions, and factors impacting various forms of wildlife-associated recreation. In recent years, interest in the latter category has been driven, in part, by declines in the number of hunters and concomitant increases in nonconsumptive recreationist numbers. Balancing wildlife population goals such that they meet the expectations of people who participate in these contrasting forms of recreation places state wildlife management agencies in a difficult position. The disciplinary focus of researchers will play a role in determining the character of management recommendations directed at an increasingly diverse set of outdoor recreation participants. Indeed adherence to one discipline to the detriment of another might signal a knowledge gap of the part of researchers and state agencies.

Though HDW has sociological and economic roots, the disciplinary landscape is in flux due to temporally important issues and contributions from various disciplines such as social psychology. Often researchers grapple with characterizations that are dependent on traditional versus current representations of the literature. During transition periods

between disciplines researchers have taken the pulse of the discipline by examining a multiyear breadth of research (Christensen & Garkovich, 1985; Flinn, 1982; Garkovich & Bell, 1995). The current examination is the first article that attempts to organize the peer-reviewed research on hunting participation. Factors such as author supplied keywords, author's degree granting department's disciplinary orientation, spatial location of research, and species of interest were some of the variables included to organize the literature.

Basis of hunting research in the U.S.

Following World War II, Americans experienced growth in leisure time and the number of outdoor recreationists increased dramatically (Rojek, 1985). This led to interest in understanding engagement in outdoor recreation in general, and hunting in particular, resulting in the creation of the U.S. Fishing, Hunting and Wildlife Associated Recreation survey and the Outdoor Recreation Resource Review Commission survey (ORRRC). The U.S. Fish Wildlife and Associated Recreation survey dates to 1955 and has been conducted roughly every five years since then. The ORRRC dates to 1958 (University of Michigan Department of Conservation, 1962). These surveys formed the basis for much of the early scholarship in the human dimensions field.

In the 1950s, a number of sociological articles on leisure included hunting as one of many types of recreation analyzed (Clarke, 1956; White, 1955), but hunting was often not the focus of sociological investigations of leisure. Subsequent articles in this line of research largely treated hunting as just another form of recreation –like watching TV, sex and playing board games etc. (Parry, 1983). Though researchers continue to study the

sociology of leisure, much of the contemporary sociological work is not exceptionally relevant to hunting participation research.

In the 1960s research in the field of fish and wildlife management became increasingly concerned with social factors related to participation in these activities. Hendee & Potter (1971) indicated methodological approaches from the social sciences were increasingly used in wildlife research. In that same year Hendee, Gale, & Catton (1971) discussed satisfactions and motivations as a method of grouping recreational behaviors. Hendee & Schoenfeld (1973) coined the phrase “Human Dimensions of Wildlife” to refer to emerging research addressing human or social aspects of wildlife-related recreation and management. This marks the point when HDW emerged from neighboring fields of study (e.g., recreation and leisure, wildlife ecology and management, and rural sociology (Manfredo, 2008)) as a fledgling field of study.

It took another two decades for this field to launch its own journal; *Human Dimensions of Wildlife* was created in 1996, offering a consolidated location for social science research related to wildlife conservation and management. Prior to the publication of the HDW journal, research articles were dispersed in such publications as *Leisure Science*, *Journal of Parks and Recreation Management*, the *Wildlife Society Bulletin*, *Transactions of the North American Conference of Wildlife Management*, and *American Journal of Agricultural Economics* to name a few. Since that time, *Human Dimensions of Wildlife* has been a primary outlet for discussions relating to natural resource recreation, including consumptive uses of wildlife. As evidenced by the early articles published in the emerging human dimensions field as well as the U.S. Fishing

Hunting and Wildlife Associated Recreation (FHWAR) survey, attempting to accurately describe hunting participation, motivations for hunting, and satisfaction with hunting participation, has been a long-standing HDW focus, with nonconsumptive concerns coming to the fore more recently (Manfredo, 2008).

Although topics such as predator control, social carrying capacity, and human wildlife conflict are prominent topics in the current literature, hunting participation affects these and many other topics within the field of HDW and therefore deserves increased attention. Hunting is an issue of primary importance to consumptive and nonconsumptive recreationists because funding for conservation efforts related to consumptive as well as nonconsumptive recreations is primarily driven by hunter participation (W. R. Mangun & Shaw, 1984; Williams, 2010). Also understanding varied motivations for participation in outdoor recreation generally was one of the original concerns of the human dimensions literature (Manfredo, 2008). Though the number of articles has varied by year, the importance of hunting recruitment and retention has not flagged for wildlife professionals.

To the current researchers knowledge this is the first article that focuses on synthesizing hunting participation literature within the subset of human dimensions research. The general purpose of this review is to: determine disciplinary influences and theoretical frames that have impacted this literature, identify gaps in knowledge, and determine which factors provide the best explanation for hunting participation. This paper used reviews undertaken by Christensen & Garkovich (1985), Garkovich & Bell

(1995), Glikman, Frank, Sponarski & Barrangan-Palasinés (2014) as a methodological guides.

Theoretical Orientation

While the origins of human dimensions of wildlife are aligned with sociology and economics, currently HDW tends to focus on concepts (e.g., attitudes, values, beliefs) which are traditionally the realm of psychologists and social psychologists (Jacobs et al., 2012). In part this perception of shift toward micro social forces is fueled by the reality that many contemporary researchers in the field have received interdisciplinary social science training with a focus on social psychological perspectives. Because sociology, psychology, and social psychology overlap in many areas and the theoretical bounds of each discipline are ever changing, describing the two fields before labeling individual authors or articles is helpful. It is important to note disciplinary boundaries such as in the case of sociology and social psychology are neither fixed nor concrete necessarily resulting in ultimately incomplete distinctions.

Two chapters contained within the text, “Human Dimensions of Wildlife Management” offer a concise comparison of sociological and social psychological perspectives in relation to human dimensions of wildlife research (Decker, Riley, & Siemer, 2012). The first is written by Richard Stedman and the second by Jerry Vaske and Michael Manfredo. In these two articles we see a contrast between more macro sociological orientations and more micro social psychological orientations.

Stedman (2012) begins by describing the disciplinary perspectives of sociology. He quotes Babbie (2007) "As social science, sociology is concerned with systematic

prediction of behavior—the logical and persistent patterns of regularity in social life."

Further he discusses constraints on individuals, highlighting the tension between structure and agency, sociological imagination, and social facts. Later he explains how sociological inquiry fits within human dimensions work under the three main sociological perspectives, conflict, functionalism, and symbolic interactionism. These perspectives point to the forces that exist beyond the individual, and shape the environment in which behavior occurs.

Vaske & Manfredi (2012) offer a similar primer on social psychology in the chapter prior to Stedman's. They describe social psychology as the study of thoughts, feelings and behaviors, and how these internal states are influenced by one's environment. They highlight values, attitudes, and norms as psychological constructs of interest to social psychology. They discuss two general approaches in the social psychological literature that have been influential in the human dimensions field. The first is the cognitive hierarchy. This includes various specific interpretations that propose a progression of general cognitions such as values which in turn influence beliefs, norms and finally specific cognition such as attitudes which influence behaviors. The second approach is linked to satisfactions and motivations for participating in various types of wildlife-related recreation. Motivations are the perceived benefits associated with recreation and satisfactions are the actual benefits acquired.

While Stedman highlights group factors and Vaske and Manfredi highlight individual factors, there is significant overlap. Both cite norms, beliefs, and social structure, in addition both discuss individual action to obtain various desired outcomes.

In addition to understanding the overlap in perspectives, it is important to understand differences in disciplinary approaches and what is the effect on HDW articles. These fields cannot be defined in terms of exclusivity of perspectives, but rather the emphasis of various perspectives. Two studies could conceivably use the same variables but espouse a sociological or social psychological perspective. This presents a problem for those seeking to identify the disciplinary origins of human dimensions approaches.

Participation literature indicators

While hunting participation continues to be an important topic, the number of articles devoted to regional, spatial influences is relatively small. Often the spatial influence on culture, political change, and environmental concerns is ignored in social science research (Lobao, 2004). Some articles reference a spatial/regional influence (Manfredo et al., 2009), but many do not highlight any potential confounds due to spatial setting. The relatively small number of articles dealing with participation hinders a spatial comparison of similar research themes because often hunting participation data is sponsored by state wildlife agencies and methods employed to collect data in one state are not often replicated in other states.

In spite of this lack of replication, some characteristics are common among state level surveys. For example, hunting participation research that may be collected from one species is often generalized to the hunting of various other species, but attributes of one species are often specific to one species or several species of animals. While research and theoretical foundations may be generalized from one species to another, differences in hunting methods, constraints to hunting, as well as demographic

differences between target species may affect conclusions in differing target species. The implication is that research that focuses on deer may not be particularly relevant for waterfowl, but might be very relevant for turkey hunters. An examination of target species in research will indicate which species inform researchers' understandings of participation.

Topical areas in hunting participation go through ebbs and flows of publication rate due to temporal events. Increases in these numbers give us a sense of what topics were important to authors and funders. Trends in scholarship are determined by such factors as publication of national reports or relevant disease outbreaks, but overall changes in publication rate might indicate a shift in the importance placed on participation research in general and also to spikes in popular articles.

Keywords included in journal submissions are another important indicator of the direction of the field and the disciplinary perspective of the article. Often the authors will indicate the statistical method, species of interest, sample frame, or theoretical origin in the keywords.

Authors often cite articles from the same journal in which the article is published. Of potential journals that might be cited the inclusion of sociological, psychological, and social psychological citations give a relatively objective measure of the disciplinary perspective of the paper. This reflects the disciplinary association of many journals such as *Social Forces* and the *Journal of Personality and Social Psychology* which list a disciplinary association on the journal's website.

Often disciplinary publications develop a comfort level with certain statistical methods (such as ANOVAs for psychology and regression for sociology) or with various forms of data collection (such as experiments for psychology and surveys for sociology). These comforts zone might indicate a stagnation in development as well and a potential springboard for new methods. Further an examination of methods may point toward a disciplinary preference among researchers based on common methods.

Research questions

In an effort to provide a foundation for hunting participation research, factors influencing hunting participation literature were examined. The factors examined include descriptive statistics concerning 1) author submitted keywords, 2) articles referenced, 3) author's degree granting discipline, 4) number of relevant articles per journal, 5) articles by geographic region, 6) publications by year, and 7) the data and statistical methods used in the research. Though HDW participation research as a whole does not indicate a single disciplinary attachment, the composition of these disciplinary perspectives in current literature will clarify dominant perspectives, and provide insight into areas previously unattended in the literature. Of particular interest was determining the balance between sociology and social psychology within the articles.

Methods

The meta-analysis is based on a systematic review of literature related to hunting participation from 2001 to 2010. A keyword search and subjective evaluations determined relevant articles for the analysis. These journals included: Human Dimensions of Wildlife, Society and Natural Resources, Leisure Sciences, Wildlife

Society Bulletin and Rural Sociology. While there was no objective metric for determining journal inclusion, factors included: the topical and theoretical focus of the journal, the relation of the journal's field of study to the origins of human dimensions research, number of related articles published and an examination of citations from relevant articles. In short, these journals are some of the most likely publication to locate articles on hunting participation.

A Boolean search that included the word "hunt*" (any suffix) and the item set "initiation OR retention OR desert* OR discontinu* OR participat* OR recruit*" (added via the "AND" function). The preliminary searches included well over 1,000 records. Non-target articles were initially included in the search because of issues such as an author named "hunt" or common research terms such as "participant." Each article was initially examined to determine its relevance by reading the abstract. Any article that had any possible association with the topic was retained. A second review was conducted on the remaining articles. This included a thorough examination of the article's content to determine if it was relevant to hunting participation. At the final step only those articles relating to hunting were retained leaving out articles on consumptive recreations such as fishing or nonconsumptive recreation topics such as wolf reintroduction where hunting was mentioned in passing and hunting participation data was not collected.

The Author's disciplinary orientation was determined by a search of the first three authors listed for each article. Each author's disciplinary orientation was determined by the discipline granting degrees to the listed authors. Often human dimensions social scientists list some variant of human dimensions study related to social science (e.g.

Human Dimensions of: Natural Resources, Fisheries, or Wildlife) in contrast to a traditional social science disciplinary position. For example, a degree might be granted from human dimensions of natural resources program rather than a degree in social psychology with a concentration in HDW. These departments are often distanced from traditional social science departments both physically and ideologically.

The discipline of journal articles referenced was determined by examining the references for all journals and categorizing each article as having either sociological references, social psychological references or psychological references. Other disciplinary journal references were present in the current articles, but were not recorded for the present analysis.

The keyword search included the first six keywords for each article. The keywords were collected and then condensed to account for minor variations such as hunters, hunter, hunt etc. The keywords were then combined into categories determined by the author. Any keyword that identified the target population in relation to hunting was coded as hunting. For example, deer hunting, hunting and deer hunters were all included in the code hunting. Items such as hedonic pricing, elasticity and market segmentation were coded as economic variables. Items such as attitudes, beliefs, and values were coded under cognitions. Items such as deer, coyote, or big game were coded as species. Items such as hunter effort, methods, and density were coded as hunt behaviors. Items such as state, population density, and geographic region were coded as spatial. Items such as retention, recruitment, and participation were coded as hunter recruitment and retention. Items such as access, hunting opportunities and hunter

disability were labeled under constraints. Items such as wildlife management, state land purchases, and bounty were coded under regulation. Items such as income and socioeconomic trends were labeled as socioeconomic characteristics. Items such as mediation, logistic regression, and population modeling were labeled as stats/methods. Items such as hunter families, rural socialization, and hunting clubs were labeled as socialization. Several items were listed related to the general topic of recreation and were coded as recreation such as outdoor recreation and nonconsumptive recreation. Items related to chronic wasting were labeled disease. Items such as animals harvested, antlered and hunter success were labeled harvest.

The geographic regions used by the FHWAR survey were used to classify article location according to the target location for each article. The map used in the recreation survey is similar to the map used by the census bureau except the recreation map includes Nevada in the pacific region (Figure 1.4). This classification breaks the U.S. down into the Pacific, Mountain, West North Central, East North Central, mid-Atlantic, New England, West South Central, East South Central and south-Atlantic regions. In addition to these regions, larger geographic locations were included to account for national level data sets such as Canada, United States and studies over more than one region. The geographic region was determined by location of data collection.

Four journal articles representative of the field of Human Dimensions of Wildlife were selected representing four primary perspectives within the Human Dimensions literature. The selection criteria reflect the current authors' subjective interpretation of articles representative of prominent perspectives in human dimensions research. The

perspectives are economic, cognitive, social structural and motivations/satisfactions.

Bivariate correlations between all variables directly related to hunting participation were examined to detect patterns in the data among the articles.

Results

The first wave of the final iteration of the search yielded 442 articles from the Taylor and Francis database, including the journals *Human Dimensions of Wildlife*, *Leisure Sciences*, and *Society and Natural Resources*. Another 205 articles were collected from the Wiley database including the journals *Rural Sociology* and *Wildlife Society Bulletin*. A review of the abstracts was conducted to determine the relevancy of the article. Following the review, 45 articles remained from the Taylor and Francis database and 32 remained from the Wiley database. The final review yielded 49 articles retained between the five journals over a ten year period (Appendix A). From the Taylor and Francis database 39 articles were retained and 10 from the Wiley database. There was substantial variation in the number of articles by publication with *Human Dimensions of Wildlife* publishing the most (34). The *Wildlife Society Bulletin* provided nine articles. The remaining three journals provided six articles with three articles coming from *Leisure Sciences*, two from *Society and Natural Resources*, and one from *Rural Sociology*.

The examination of disciplinary orientation in relation to sociology and social psychology revealed six sociologists (according to highest degree granted) who published articles over the study period and ten social psychologists. That number includes each

author once regardless of the number of articles they published. When author orientation was tallied including multiple authorships by a single author twenty articles were authored by sociologists and fifteen were authored by social psychologists. Other prominent disciplines represented include economists and natural scientists.

While the most often cited articles were typically from the same journal in which the article was published, a number of articles referenced sociological, social psychological and psychological journals with known disciplinary perspectives. Authors

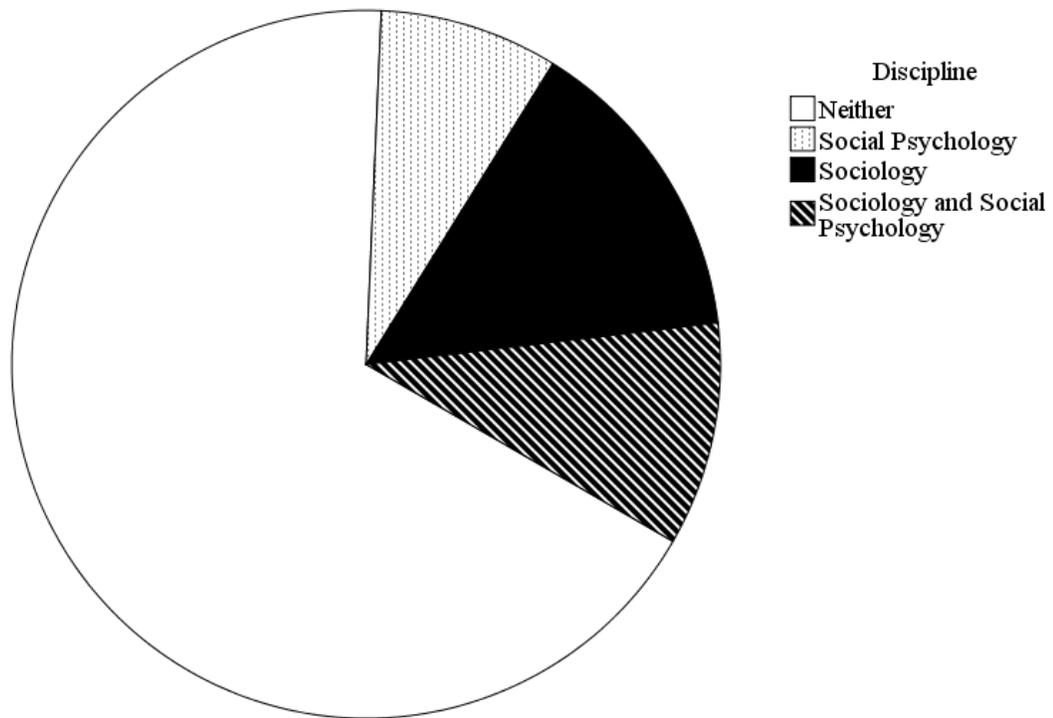


Figure 2.1. Number of Articles by Reference to Disciplinary Journals

in seven articles referenced sociological journals including *Social Forces* and *Rural Sociology* (Figure 2.1). Five articles referenced social psychological journals such as the *Journal of Personality and Social Psychology* and *European Journal of Social Psychology*. An additional six articles referenced both psychology and social psychology journals. The remaining citations largely consisted of nondisciplinary journals such as the *Wildlife Society Bulletin* or *Leisure Sciences* as well as resource management journals such as the *Journal of Wildlife Management*.

There were a wide variety of keywords listed in the present articles. A total of 142 keywords were identified. Nearly 45% of the keywords were only used once. Only four original keywords were mentioned more than four times over the 49 articles. These were: hunting, satisfaction, chronic wasting disease, and whitetail deer. To make the results more interpretable keywords were reduced to 18 keyword categories (for example constraints, access, and hunters with disabilities were reduced to “constraints”). The most common of those groups was “cognitions,” which included terms such as attitudes and values, with nearly half (44%) of all keywords included in that grouping (Figure 2.2). Authors included the keyword hunting in nearly 10% of articles. Regulation, which includes items such as management, was supplied in 8% of keywords. The species of interest represented 8% of the keywords. A reference to statistical or data collection method(s) was included in 7% of articles. Another 7% related to hunting behavior such as hunter effort or distribution. About six percent related to spatial items such as state of sample frame. Five percent referenced constraints. Variables strongly associated with sociology, the 9th most popular keyword grouping, included keywords related to topics

such as socialization/culture represents only 4% of supplied keywords. Furthermore, socioeconomic keywords only represented 2% of total keyword submissions.

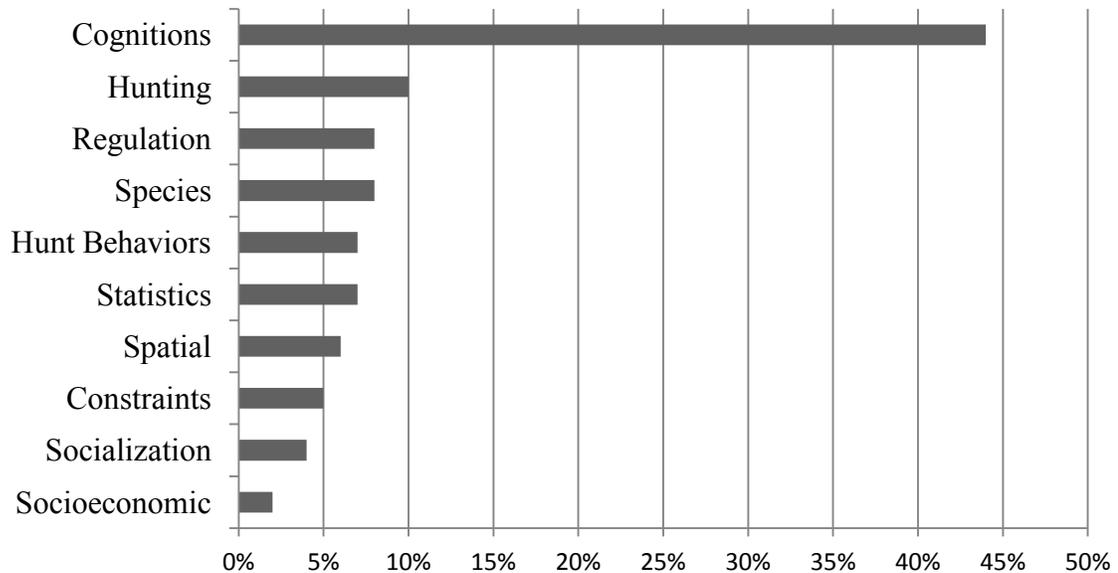


Figure 2.2. Keywords as a Percent of Total Keywords for Selected Articles

The number of publications by year and topic point to popular relevant scholarship at that moment in time (Figure 2.3). The years with the highest number of publications were 2003, 2004 and 2008. There were eight qualifying publications in 2003 and nine in 2004 and eight in 2008. The number was a bit lower in 2001 and 2002 at five and six respectively and no other year had more than three articles.

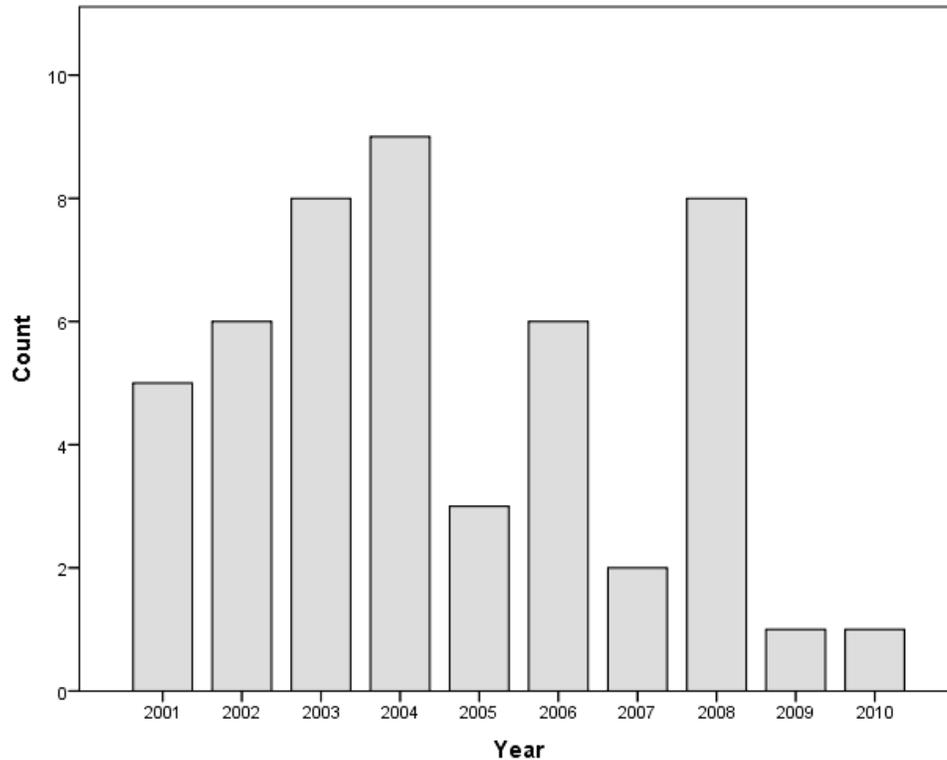


Figure 2.3. Number of Articles by Year

Deer hunting was the species of interest in 37% of the articles. Thirty-nine percent of studies did not mention a particular species. Coyote, elk, water fowl, furbearers, dove, moose, and multiple animal studies each accounted for one to three articles accounting for the final 24% of articles.

Mail surveys were by far the most popular method of data collection used in 30 of the 49 articles. Secondary data analysis accounted for six of the remaining articles. Three studies used phone surveys and five used mixed method approaches.

The number of articles focusing on a single subregion varied from zero to ten (Figure 2.4). The Pacific and south-Atlantic regions recorded the fewest articles with one

and zero articles respectively. The West South Central and East South Central recorded two and four articles respectively. The Mountain states recorded five, the West North Central three, East North Central six, mid-Atlantic eight and New England four. One article sampled all U.S. adult residents. Three articles sampled Canadian populations. Ten articles focused on more than one region. Some articles spanned several subregions. A majority of the multiple subregion articles were located in the Pacific, Mountain, and West North Central area. If grouped into more general regions the West had six articles, the Midwest nine, the north east twelve, and the south six. Of the more than one region

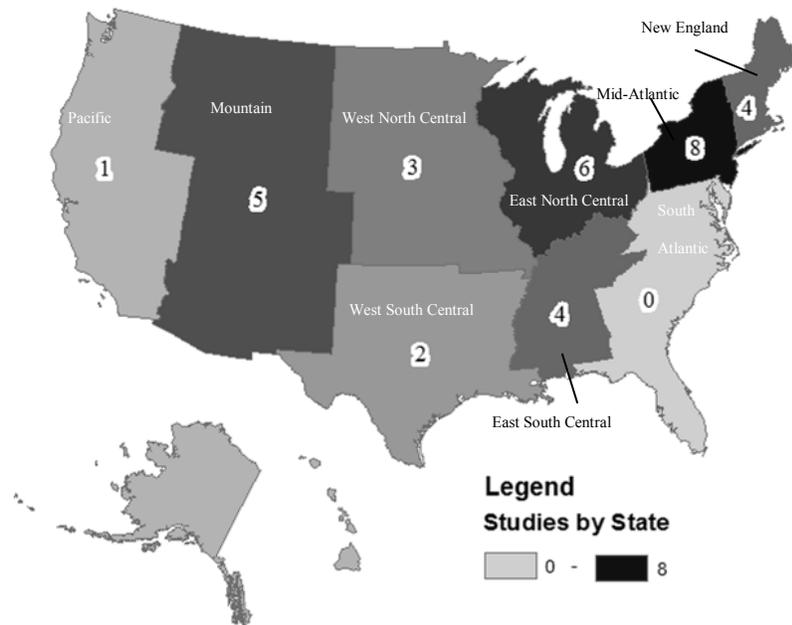


Figure 2.4. Study Locations by Region (excluding multi-state analyses)

group eight of the ten pertained to the west in general with the research performed by Colorado State over a group of states across the Pacific, Mountain, and West North Central regions.

A statistical comparison of independent variables in hunting participation articles is problematic for multiple reasons including: limited number of articles, the omission of zero order correlation tables from publications, multiple statistical techniques, diversity in independent and dependent variables, as well as coding applied to those variables, not to mention the diversity of social and physical environments the samples are drawn from. In spite of these limitations a small sample (four articles) were selected from the current sample of articles to represent a common themes in human dimension scholarship. An examination of correlations between independent and dependent variables was performed. The four articles used are (Green, Grijalva, & Kroll, 2004; Hayslette, Armstrong, & Mirarchi, 2001; Manfredo et al., 2003; Stedman & Heberlein, 2001). Dependent variables include willingness to pay, percent materialist/utilitarian values among respondents in a state, whether the respondent had ever hunted and whether the respondent hunts currently. The diversity of dependent variables does not allow for a uniform comparison, but does provide some context for general relationships among variables.

Income was a significant predictor in both studies in which it was included as an independent variable though it was positively correlated with willingness to pay for hunting and negatively correlated material values. Family hunting mentors was positively correlated in two articles with both articles producing significant positive

correlation with a respondent indicating they had ever hunted. Place size of residents was positively correlated with respondents who had ever hunted. Education was positively correlated with willingness to pay. The remaining independent variables include: willingness to pay related to value of hunting supplies, which was positively correlated, having ever hunted related to being male was positive and to age of initiation, which was negative, harvest based motivations were negative and nonharvest based motivations were positive.

Discussion

Though the field of human dimensions research is well represented by sociologists and social psychologists, the articles that are produced tend to highlight social psychological concepts. The line between social psychology and traditional sociology can be difficult to definitively locate, and this task is even more difficult when comparing social psychology with micro sociological scholarship.

In the context of informal discussions HDW researchers often suggest a bias toward social psychology exists in HDW scholarship. An objective measure of this relationship is citations within the HDW journal, especially citations to primary, disciplinary journals. In the case of HDW there is little reference to more prominent (well known, respected) disciplinary social science journals. A plurality of articles cited sociological journals but not psychological, social psychological, or a mix of psychological and social psychological references. This does not indicate an overall preference for sociological orientations as six articles referenced sociology journals while nine referenced either social psychology, psychology, or prominent journals in both

disciplines. In spite of sociological journals having the greatest number of disciplinary citations, the keyword search indicated social psychological cognitions were a primary focus of the included articles.

The turn toward social psychology might be influenced by the desire to better understand hunter participation as participation levels have dropped. Some perceive the ability to motivate individuals to participate is a more reasonable goal than altering structural forces that impact hunting participation. Sociology examines long-term macro processes that are not readily manipulated and often do not yield clear, direct effects. This fact, coupled with the desire of wildlife professionals to reverse the downward trend in hunting participation might understandably attract wildlife professionals toward social psychological research.

Articles published between 2001 and 2010 have been marked by topical issues such as the rise of chronic wasting disease and new theoretical perspectives, such as wildlife value orientations. A number of articles are also marked by the lack of a strong theoretical focus, instead conforming to a more applied rationale (i.e. recounting hunting traditions, biological articles as with chronic wasting disease or articles focused on application of statistical methods). The inclusion of a simple theoretical framework is needed to understand and advance hunting participation scholarship.

The increase in publications in the earlier half of the decade coincides with two factors. The first is the publication of the 2001 U.S. Fishing, Hunting and Wildlife Associated Recreation survey that was performed in 2001 and reported in 2002) and the second is the discovery of chronic wasting disease in wild deer herds in the upper-

Midwest (Gigliotti, 2004; Holsman & Petchenik, 2006; Miller, 2004; Vaske, Timmons, Beaman, & Petchenik, 2004). The FHWAR report supported the declining trend in hunting participation that wildlife agencies had feared, but was obscured by changes in methodology between the 1985 and 1991 surveys (U.S. Department of the Interior, 2006). Wisconsin has one of the most populous deer herds and deer hunting is sufficiently important to play a role in political campaigns (Adams, Hamilton, & Ross, 2009; Nelson, 2010). In 2004 four of the nine articles published focused on the implications of chronic wasting disease on hunting participation. Three of those articles focused on the East North Central region.

A similar increase in publications was noticed in 2006 following the detection of chronic wasting disease in New York. The articles in this time period do not focus on one state, instead the articles focus on Wisconsin, New York and six western states. It is likely not coincidence that there was a bump in publications following discovery in New York, which houses one of the first human dimensions research units in the United States (at Cornell University).

In 2008 there was another spike in participation literature. Unlike the spike in 2004 that appeared to be partially driven by chronic wasting disease, there was no unifying topic or region of analysis. Similarly to the spike in 2003 this may have been a reaction to the 2006 FHWAR survey (U.S. Department of the Interior, 2006).

Whitetail deer was the most commonly studied game animal in relation to hunting participation research. This is a result of the popularity of big game hunting among current hunters in the U.S. Of 13.7 million hunters in 2011, 10.9 million pursued deer.

Another reason is the unease about the ability to control deer herds by state wildlife agencies that fear an uncontrollable increase in deer populations (Brown et al., 2000). In response to this focus, some have called for more focus on small game hunting participation research such as Burt, Chase, & O'Dell (2014). No other single species was studied even 25% as often as deer.

Though parent disciplines appear to incorporate a wider variety of methods of data collection to obtain data such as experiments and government data sets hunting participation research relies heavily on institutionally generated survey research. This may again be a result the applied nature of the field, but the overwhelming adherence to a single data collection format has the potential to hinder different observations from data. The inclusion of methods such as meta-analyses and experiments could offer alternative explanations and potentially increase the validity of HDW research among researchers in other fields.

Human dimensions research is typically performed in the Mountain, East North Central, and mid-Atlantic areas. The prominence of the Mountain region is suppressed due to a number of multistate analyses performed in the western half of the United States. The spatial distribution is tied to several prominent universities in each area such as Colorado State, Penn State, Cornell, and Wisconsin. The studies, to some extent, do reflect the region from which they originate. For example, hunting access will differ significantly in the Mountain West where big game permits are in high demand. In contrast, in a state such as Wisconsin demand from hunters is offset by a relative abundance of deer and accessible hunting land. Value shift, another topic influenced by

region, in western states is influenced by migration patterns that are likely not identical to those experienced in the Southeast, which might have a differential effect on value shift. Other areas might be understandably underrepresented such as California which is the third largest state, but harvests about half as many deer as Ohio the 34th largest state. Research from the Southeast is entirely lacking. For example, the Latino population may have a greater population from Caribbean than Mexico. In the West migration might be represented more so by affluent whites. In order to capture more diverse hunting cultures, hunting participation research should be more evenly dispersed throughout the country.

Four study comparison

The comparison of four articles indicated three variables that were significant across multiple articles. The variables income, place size, and a hunting mentor were significant in two articles. The variables education and age were nonsignificant across multiple articles. If sex had been included in more than one study we would see a cluster of independent variables that are traditionally perceived as correlates of hunting (i.e. sex, place size, and hunting mentors). Males dominate the hunting ranks. Those in rural areas have greater access to hunting. Having a mentor facilitates hunting initiation from a cognitive as well as practical perspective. An often neglected factor is family income in that it is included as a control variable, but not a main correlate. The lack of attention to income and more generally economic status is difficult to understand given the costs associated with hunting, which necessitates a certain income level. One reason these variables receive less focus is these variables represent factors that are difficult to

manipulate. The majority of individuals have limited control over their income, familial social networks, and place size of residence. If this relationship is consistent across multiple settings and over time the most important finding would be that programs designed to increase hunting participation may not be as effective as programs that monitor long-term indicators and seek to alter the structure of hunting regulations to best reflect changing hunting needs.

Limitations

Though the individual theories used in an article are the best indicators of the disciplinary origin of the work, the increasingly interdisciplinary nature of social science research presented in the human dimension participation literature blurs the distinctions between fields. Given that social psychology is a field that was developed in the gap between sociology and psychology, the theoretical bounds become more difficult to distinguish. For example, in some cases satisfactions are presented as variables in a cognitive hierarchy and analyzed in reference to attitudes that lead to behaviors and are mediated by perceived behavioral control. In other cases satisfactions can be interpreted as economic benefits acquired through hunting. In still other cases terms like satisfaction are not clearly defined and it becomes difficult to tell which if any perspective is emphasized. Because of the similarity of the social science disciplines included and the vagueness of the variables it is difficult and possibly unwise to dissect the disciplines into coherent subparts. As Freudenberg notes:

"My favorite way to decide whether there is in fact a "divide" is by trying to draw one, doing so in a way that fairly categorizes at least the vast majority of the work

in the field. In this case, I have quickly found that I have been unable to do so. Even in terms of specific papers. I found that at least a third to half of the papers I tried to characterize simply cannot be made to fit clearly on one side of that purported "dividing line" or the other. Freudenburg, 2002

In several cases author's degree is not listed or authors received degrees in multiple social science fields resulting in difficulties assigning to one field. Given the small sample size, misspecification of these authors could skew the results, but there is little to indicate that the unknown disciplinary degrees would contrast with the known degrees.

Lastly the selection of journals represents the most likely location to find participation articles, but the choice of keywords and the possibility of excluded journals might possibly influence results. Furthermore the inclusion of journals such as rural sociology that contributed only one article might influence the reader to perceive greater variance in the disciplinary perspectives used. The bulk of articles came from human dimensions of wildlife making the analysis largely a review of one journal. The disciplinary perspective of such a journal becomes magnified because there are few journals to present a contrasting perspective. A more general "Google Scholar" search was performed to discover additional journals that might be useful to include, but few articles that fit the parameters were discovered.

Conclusion

Current research tends to focus on study locations near the researchers home institutions. For example, much literature is published in Colorado where the Colorado State Human Dimension of Natural Resources department is based. Given that there are likely cultural, environmental and economic differences between varying regions in the U.S. this lack of diversity represents a limitation in the application of findings to other locations in the U.S. Although researchers at universities such as Colorado State have expanded to other states this is largely confined to other western states while other university researchers often do not venture outside their own state for data collection.

Deer are the most popular target of hunters in the United States and the species of interest in the literature with whitetail deer focused studies representing over a third of all articles. In spite of the popularity of deer hunting, researchers should not lose sight of other species such as small game which might be important in the initiation of young hunters (Burt et al., 2014) who then progress to large game or upland game. The management of small game species has implications for the development of diverse habitats beyond the game species of interest.

The current literature in hunting participation is best described as more applied than theoretical; typically mail survey research; emanating from a limited number of locations in the U.S. leaning toward social psychological disciplinary explanations. This is in spite of the largely sociological and economic roots of the discipline and the even distribution of disciplinary origins of HDW researchers.

A turn back to more sociological, theoretical research questions could lead to resurgence in hunting participation literature. Though researchers have provided extensive examination of cognitive factors, focusing on social factors provides new avenues for inquiry and allow for explanations of phenomena that occur at the social level. For example, Manfredo and colleague's incorporation of macro forces into their micro level model used to explain hunting participation has created broad interest among hunting participation researchers. Predictors such as class and hunting social networks might provide new insights on hunting participation literature and allow wildlife agencies to transition to policy directives informed by longer term variables.

Chapter 3: Alternative Food Ideology and Hunting Initiation

Abstract

Alternative food social ideologies have become increasingly popular over the last several decades. Some of the more popular subtypes include organic, local, and seasonal foods. Often the supporters are rebelling against conventional, industrial farming systems. Urban residents identify with various food ideologies and adopt alternative food sourcing behaviors in an attempt to gain greater control over food sourcing options. Some hunting recruitment and retention professionals have proposed alternative food supporters as hunting recruitment targets due to their eagerness to control food sourcing options. The current study examines the relationship between attitudes toward food sourcing and hunting behaviors and beliefs using the 2013 Ohio Outdoor Recreation survey. Analyses indicate two types of food support: popular alternative food systems such as organic or local food and wild game food supporters or those that prefer wild game to conventional game. A factor score for traditional alternative food support did not correlate with hunting support or behavior in any model. Of the alternative food factor score items only organic and non-genetically modified food correlated to support for hunting, unfortunately wild game cannot be categorized as organic or non-GMO. The data indicate a low conversion rate should be expected from alternative food recruitment programs.

Alternative food ideology supporters, including those that promote organic, local, seasonal or non-genetically modified food, are an intriguing potential target market for state fish and wildlife management agencies who wish to increase hunting participation (Ljung, Riley, Heberlein, & Ericsson, 2012; Responsive Management, 2013b; Tidball, Tidball, & Curtis, 2014; Tidball, Tidball, Larson, Poindexter, & Stedman, 2014). Some wildlife professionals believe that alternative food supporters are more likely to initiate hunting than those who do not identify as alternative food supporters because they have positive attitudes toward alternative food sourcing (see Pettis, 2015; Tidball, Tidball, & Curtis, 2013; Warnke, 2014). After all, wild game is: seasonal, often local, not genetically modified, and wild game animals are not actively fed genetically modified organisms (GMOs). The idea that there is some linkage between attitudes and behaviors is widely accepted, but many cite the issues with the strength of individual relationships (Ajzen & Fishbein, 1974, 2005; Dunlap & Catton, 1979; Vaske, Jacobs, & Sijtsma, 2011). Also, due to gaps in specificity between various attitudes and the associated behaviors, alternative food support may not have a strong correlation to hunting beliefs or behaviors, which leads to difficulty linking alternative food attitudes to hunting support attitudes or hunting behaviors (Whittaker, Vaske, & Manfredo, 2006). In order for hunting initiation programs targeting alternative food supporters to be more successful than numerous other potential target groups there should be some significant level of positive correlation between alternative food support and hunting attitudes and behaviors. If no such positive correlation exists, using alternative food support as an identifier for hunting recruitment programs may not yield better more likely initiates than any other

identifier. The following analysis combines inductive and deductive reasoning to inform and expand practical and theoretical understanding of the link between attitudes and behaviors within the context of hunting participation research while informing real world program initiatives at the state and national level.

The article will explicate the relationship between alternative food attitudes and hunting attitudes and behaviors in the context of the theoretical framework of the cognitive hierarchy. That is, the cognitive hierarchy framework will be used to structure the following statistical analysis. This theoretical framework suggests that there is a relationship between values (i.e. abstract, enduring beliefs that are judged to be favorable by individuals and groups (Rokeach, 1973)), attitudes (i.e. a positive or negative assessment of an object (Eagly & Chaiken, 1993)) and behaviors that indicate consistency and similarity between abstract cognitions and behaviors (Fulton et al., 1996; Homer & Kahle, 1988; Rokeach, 1973). The following analysis will discuss various alternative food attitudes in reference to hunting behaviors in the context of declining hunting participation trends.

The current interest in alternative food supporters by hunting recruitment and retention professionals is partly motivated by declines in hunting participation (Larson, Stedman, Decker, Siemer, & Baumer, 2014; U.S. Department of the Interior, 1991, 1996, 2001). Research indicates numerous explanations for the decline in hunting participation. These explanations include limited time for recreation, more attractive substitutes, access constraints, declining populations of traditional rural hunters, urban sprawl and aging of current hunter cohorts (Winkler & Warnke, 2012).

One of the reasons alternative food supporters are an enticing target is that they represent demographics that have not traditionally identified as hunters (i.e. they are young, urban, and lacking rural mentors). These nontraditional hunting initiate targets might offer higher potential returns than traditional rural targets, which might be perceived to be a saturated market due to relatively higher participation rates compared to their urban counterparts. There are many hunting recruitment and retention programs currently in use in the U.S. Some programs focus on increasing hunting among low participation rate groups such as spouses of hunters, rural minority groups, or children. Recruitment programs have not reported consistently effective outcomes related to such hunter recruitment programs (Tidball, Tidball, Larson, Poindexter, & Stedman, 2014), are often "gray" (nonacademic) literature (e.g. Keith, 2014; Responsive Management, 2013b) and many have a primary flaw in that the groups that programs often target may be more likely to hunt because of confounds of hunting initiation correlates such as in the case of special season family guided youth hunts where participants are more likely to hunt than nonaffiliated hunters regardless of these special seasons (Byrne 2009). Alternative food supporters may represent that rare combination of individuals who do not hunt currently but might be easily swayed to initiate hunting.

This article contributes to the conceptual framework indicated above by examining the relationship between alternative food preferences and participation in and support for hunting by Ohioans. Are alternative food supporters more likely to hunt? Are alternative food support items correlated to support of hunting among nonhunters? Specifically the analysis tests the hypothesis (H1) that alternative food attitudes are

positively correlated with support for hunting. Also, the analysis tests the hypothesis (H2) that alternative food attitudes are positively correlated with hunting behaviors. In addition, the analysis will examine the hypothesized relationship between alternative food support and support for hunting among survey subsamples selected based on hunting status (i.e. hunter and nonhunter respondents).

Social aspects

Hunting has been described as a predominately male, rural, social activity (Stedman & Heberlein, 2001; U.S. Department of the Interior, 2011), though most hunters come from metropolitan statistical areas, a greater percentage of rural residents hunt than urban residents (U.S. Department of the Interior, 2011). Hunters are overwhelmingly male and are generally initiated by a close male friend or relative (Decker, Provencher, & Brown, 1984).

Hunters who were raised in rural locations and subsequently move temporarily or permanently to urban locations are less likely to hunt (Manfredo & Zinn, 1996; Zinn, 2003) due to loss of access, social connections, social acceptance and physical infrastructure needed to continue hunting (Burch, 1969; Decker et al., 1984). If hunters relocate, straining these social and physical ties, hunting may be discontinued either to be substituted by another outdoor activity or with nonconsumptive recreations (Choi, Loomis, & Ditton, 1994; Ditton & Sutton, 2004). Social acceptance of hunting is particularly important for urban hunters as they tend to rate social aspects of hunting more important than rural hunters (Langenau & Mellon, 1980). Though nontraditional hunting targets such as urban hunters may possess belief systems that increase

recruitment odds, such as in the case of alternative food support, urban targets lack the supportive hunting socialization important to recruitment.

Any increase in hunting participation would be welcomed by state wildlife professionals both as a source of revenue and as a means of controlling wildlife populations, but recruiting individuals from groups that do not traditionally hunt would be particularly welcomed (Byrne, 2009). State wildlife agencies have attempted similar programs for women (e.g. "Becoming an Outdoors Woman" (Baird, n.d.)) and various minority groups, but reports of successful recruiting programs have been sparse (Byrne, 2009). It is worth noting that most programs target nonhunters who have close ties to hunters because they may be socially primed to hunt through positive representations of hunting by hunting mentors. But it is possible these groups are harder to recruit if they have been exposed to hunting motivators and resisted. For instance, "Take a spouse hunting" implies that the desire to hunt is shared by family members and they just need a gentle push to hunting. Likewise, "Take a kid hunting" implies that children with hunting role models are more likely to continue to hunt if they begin hunting earlier. But these groups are already exposed to hunting and have not begun hunting indicating potential indifference or antagonism to hunting. Alternative food supporters likely have less exposure to hunting and therefore might not have fully formed belief systems meaning that they have not rejected hunting but rather are unexposed.

Alternative food support

Alternative food support has been increasing in popularity over the last several decades (DeLind, 2011) in part because consumers have less trust in conventional, and

increasingly integrated, capitalist commercial agriculture (Friedland, 1991; Miele, 2001) and placed an emphasis on knowing where food came from and the farming methods by which it was produced to overcome the disconnect inherent in large scale agriculture (Feldmann & Hamm, 2015; Goodman & DuPuis, 2002; Lyons, Lockie, & Pritchard, 2001). Marx's concept of commodity fetishism (Marx, 1887) speaks to this disconnect. Consumers want a tangible connection to the production process, but often not through labor inputs. The producer becomes an abstract representation of the production process and allows a social connection to agricultural products (Brones, 2013; Farrell, 2009; Jin-Young Kim, 2013; Schmidt, 2013; J. . Sharp & Smith, 2003).

Alternative food support has been identified by state agencies, academics, hunting advocates and various researchers as a means to address declines in hunting participation (Durkin, 2013; Garris, 2013; Responsive Management, 2013b; Rinella, 2007; Tidball et al., 2013). The perception among state agencies, private research entities, and natural resource journalists, such as that relayed by Tidball and Responsive Management, is that the increased interest in food origins and quality coupled with the increasingly cited motivation to hunt for meat might influence nonhunters to be more positive to hunting without priming from various hunting recruitment organizations. Although recreational hunting has always been partially motivated by securing food (e.g. even in Royal French and English hunting tradition, the *curee* -the distribution of meat- was a central aspect of the hunt (Almond, 2003; Marvin, 2006)), the emphasis hunters and others place on hunting as a way to obtain meat has received renewed attention (Cohn, 1988; Decker, Stedman, Larson, & Siemer, 2015; Decker et al., 2015; Ljung, Riley, Heberlein, &

Ericsson, 2012; Responsive Management, 2013a). Those concerned with hunting recruitment identify locavores as a possible source of new hunters to bolster a long term decline in hunting participation and counteract negative attitudes toward hunting (Heberlein & Ericsson, 2005; Tidball et al., 2013).

Several alternative food preferences held by consumers are compatible with consuming wild game meat. Some hunting advocates have moved to label hunters as the original locavores (Rinella, 2007). Wild game is available locally in most cases (excluding particularly large metro areas such as New York or Los Angeles). Because direct human management of game animals is minimal they have received little genetic modification. Wild animals are harvested seasonally. Wild animals have access to natural feed supplies and are free range. In fact, Rinella (2007) highlights the benefits of wild game, although not immune from hyperbole, stating "... in keeping with the times, it might be better to relabel it as free-range, grass-fed, organic, locally produced, locally harvested, sustainable, native, low-stress, low-impact, humanely slaughtered meat." While all of these descriptors are inaccurate to some degree, the quote illustrates how hunting symbolizes a means of obtaining sustainable, alternative sources of food.

Research questions

Alternative food consumers might appear to be desirable recruitment targets by wildlife professionals because a) several hunting benefits align with alternative food supporters' values, b) alternative food supporters generally would not hunt otherwise and c) alternative food supporters could potentially improve hunter perception in urban

locations. Given these assumed relationships and applying the cognitive hierarchy, the current analysis examines the relationship between alternative food preferences and

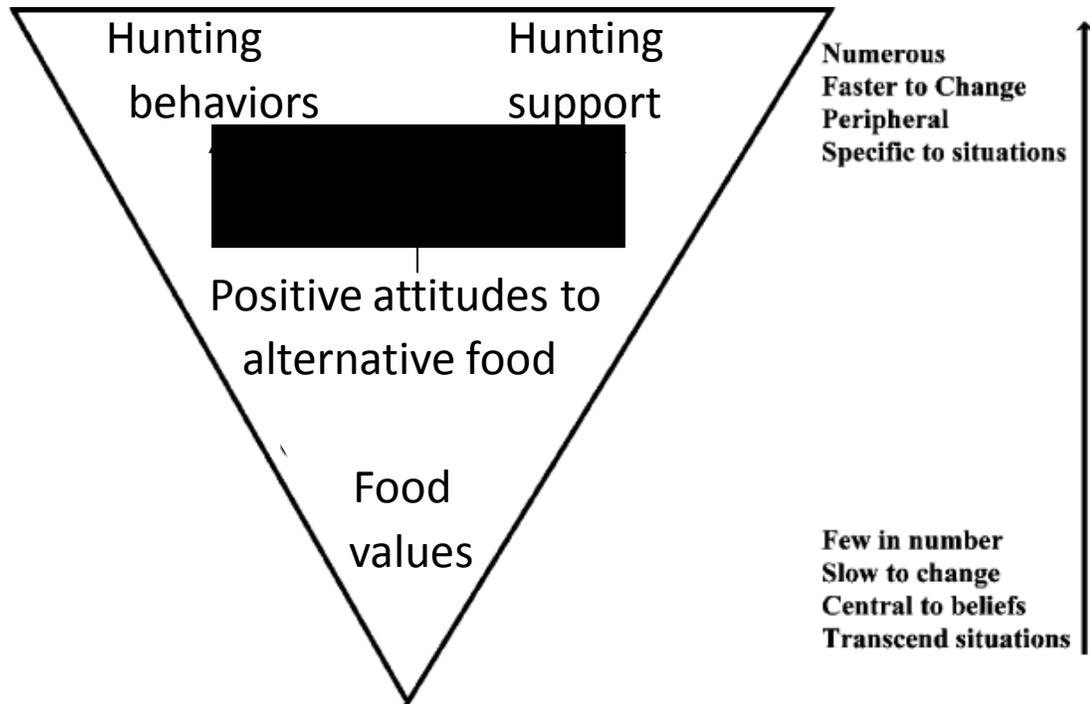


Figure 3.1. Application of the Cognitive Hierarchy to Recruitment of Alternative Food Supporters.

Note. Adapted from Vaske & Donnelly (1999).

participation in and support for hunting among respondents to the Ohio Outdoor Recreation survey (Figure 3.1). Specifically the analysis tests the hypothesis (H1) that alternative food attitudes are positively correlated to hunting attitudes. Also the analysis

tests the hypothesis (H2) that alternative food attitudes are positively correlated to hunting behaviors. In addition, the analysis will examine the hypothesized relationship between alternative food support and support for hunting among subsamples determined by hunting status (i.e. hunter and nonhunter respondents).

Several states have implemented various alternative food based hunting recruitment programs, but there is a lack of research identifying correlations between alternative food support and hunting support and behaviors. Wildlife professionals appear to conflate various alternative food consumer choices with various active food provisioning behaviors (the act of processing some raw food product through some form of harvest). The analysis will clarify the relationship between alternative food support and hunting engagement and support for hunting.

Methods

The Ohio Outdoor Recreation mail survey included two samples of Ohio residents with each sample consisting of 1,200 potential respondents. Mailing began March 2013 and responses were collected until July of 2013. The sample frame included 1200 Ohio Hunting license holders drawn from existing Division of Wildlife (DOW) database of hunting license holders who purchased a hunting license in at least one of the three most recent years. The sample frame also included 1200 random Ohio residents selected by Survey Sampling International. The target sample size for the hunter and random samples was 385 completed surveys providing a 95% confidence level with a +/-5% margin of error.

Mailed surveys generally followed the methods specified by Dillman's (2007) Tailored Design Method. Briefly, this entails 1) an initial prenotification letter, 2) the questionnaire accompanied by a cover letter, 3) a reminder post card, and 4) a second, replacement questionnaire. A fourth mailing included a copy of the original survey with different cover graphics. The response rate to the fourth mailing did not substantially increase response rates; therefore no additional surveys were mailed.

Data were professionally keypunched by a private data entry firm (Entry Time Pittsburgh, PA) and analyzed with the aid of the Statistical Program for the Social Sciences (SPSS v.22, for Windows) and ArcGIS Desktop 10 (education edition).

Eight items, including importance of organic, local, seasonal, non-genetically modified foods and agreement with "wild game is healthier than meat grown conventionally on a farm," "given the choice I would rather eat wild deer meat than farm raised beef," "wild game is an organic food source" and "I support legalizing the sale of wild game," were selected for inclusion in a principal components analysis. The individual alternative food items were included based on lists of popular food provisioning ideologies (e.g. Grauerholz & Owens, 2015). Food ideologies were limited to reflect types that could be applicable to wild game meat provisioning (e.g. ideologies such as vegetarian, fair trade, and raw food were perceived to be less relevant to wild meat provisioning and were not included).

Data Analysis

A principal components analysis (PCA) with an oblique rotation was performed on eight food related items. Oblique rotation accounts for inter-item correlation among

factors. Regression factor scores were created and saved for each respondent. This method was preferred over additive scaling because items that represent the factor more accurately receive a greater weight in the factor score reducing skewing by lesser items (DiStefano, Zhu, & Mindrila, 2009). Four items (organic, local, seasonal and non-GMO food importance) loaded onto factor one, which was labeled “alternative food support”. Three items (wild game is healthier, wild meat is preferred over farmed meat and wild game is organic) loaded onto factor two, which was labeled “wild game support”.

The factor scores for alternative food support and wild game support from the principal components analysis were entered as independent variables in a logistic regression. The first logistic regression model examined the relationship between variables measuring socioeconomic status, education, age, gender, residence place size and factor scores for food on the dependent dichotomized variable indicating whether or not the individual had ever hunted. The model tested H2 for all respondents while controlling for key demographic variables. The second logistic model contained the same independent variables as the first model regressed on the dependent variable of dichotomized support for hunting on public lands. This model tested H1 for all respondents. The third logistic model included the factor scores and control variables for nonhunters only. The third model could not be used on hunters because the dependent variable would have one option (there would not be variance in the response variable). This model tested H1 for nonhunters. In a final effort to detect any connection between alternative foods and support for hunting the third model was modified. The individual

variables contributing to the alternative food factor score were substituted for the alternative food factor score from model three.

Respondents indicated whether they thought hunting should be allowed on public lands using Likert items asking the respondent to rate support for hunting on public land from 1-5. Those who opposed hunting (responses of 0 or 1) were coded as zero and those who did not oppose hunting (responses of 2-4) were coded as a one. The other dependent variable was hunting experience (0 = no hunting experience, 1 = any hunting experience). Control variables included sex (male = 1), age, dichotomized education (0 = no postsecondary degree, 1 = any postsecondary degree), dichotomized income (0 < \$50,000, 1 > \$50,000), dichotomized place size during formative years and dichotomized place size where respondent currently lives (0 = inside any city boundaries, 1 = outside any city boundaries).

Results

Of the 1200 surveys mailed out, nondeliverables from the hunter sample totaled 139. The 346 completed surveys yield a confidence level of 95% with a +/- 5.27% margin of error. The adjusted cooperation rate (American Association for Public Opinion Research, 2011) was just under 33%. Of the 1200 potential recipients 132 nondeliverables were recorded. The random survey sample yielded 239 respondents. The adjusted cooperation rate was approximately 22%, the confidence level was 95%, and the margin of error was +/- 6.08%.

The sample was analyzed first among all respondents using a logistic regression with dependent variables hunter vs. nonhunter and hunting support vs. not a hunting

supporter. Then additional logistic models were run for the nonhunter subset of respondents using similar independent variables.

Respondents to the survey tended to cluster around population centers (Figure 3.2). For all respondents the average age was 55 (Table 3.1). Fifty-eight percent of

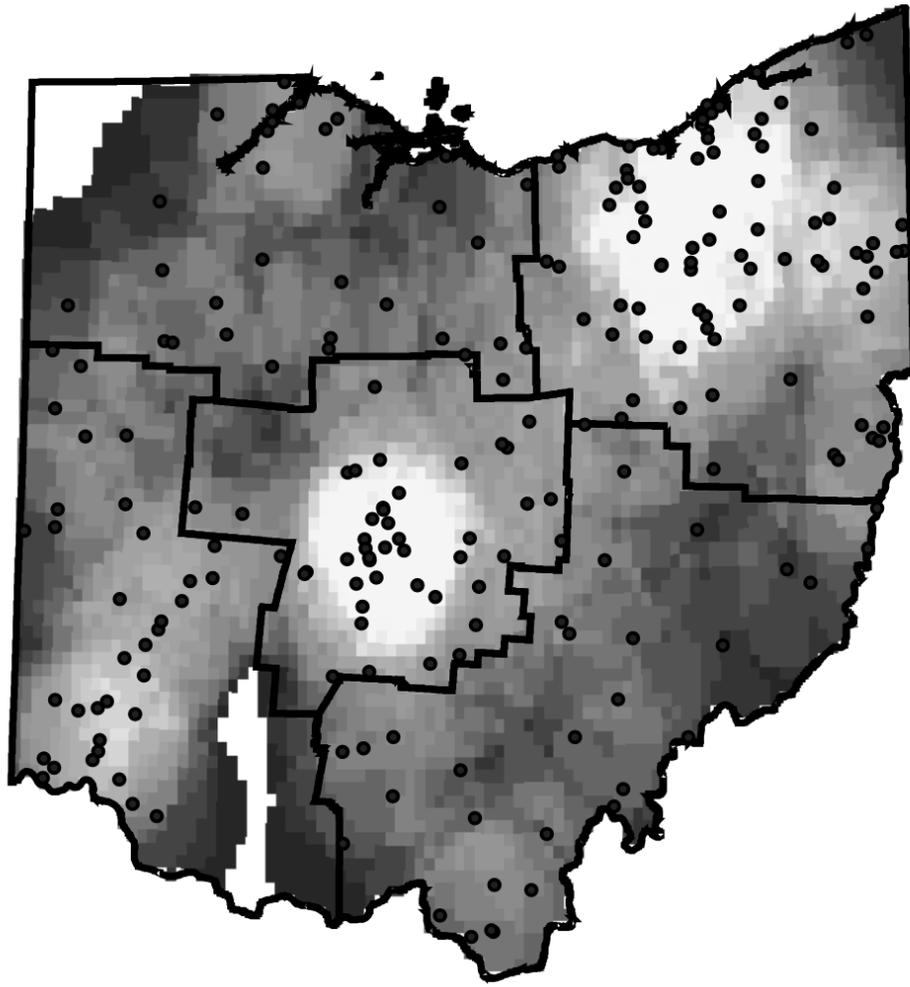


Figure 3.2. Chloropleth of Respondent Location and Density

respondents hunted in the prior year. Sixty-two percent of respondents made at least \$50,000, 31% reported part time hourly employment, and 31% were retired. Technical work such as a teacher or nurse described 16% of respondents. Skilled workers such as mechanic or electrician accounted for 30% of respondents. Lastly 42% of respondents currently live in a rural area, while 39% grew up outside any city boundaries.

Table 3.1

Descriptive Statistics for All Respondents

	Mean/%
Age	55
Hunted in the last year	58%
Household income > \$50,000	62%
Part time employment	31%
Retired	31%
Technical employment	16%
Skilled employment	30%
Currently live outside city boundaries	42%
Grew up outside city boundaries	39%

Support for food sourcing options for the entire sample was highest for local and seasonal foods at 62% for both (support includes important and very important). Organic had the lowest support at 21%. Support was 44% for non-GMO. Agreement for the wild game meat items was 57% for wild game as healthy (agree and strongly agree), 36% prefer wild game over farm raised beef, and 58% agreed that wild game is organic.

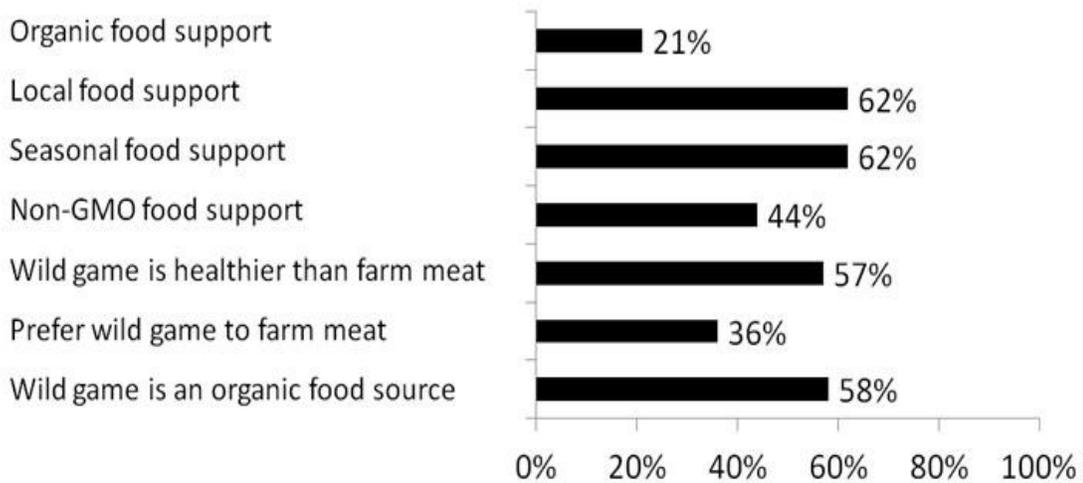


Figure 3.3. Support for Alternative Food Items.

Note. Percents represent the responses "important and very important" (agree/strongly agree) for all respondents.

For nonhunters the average age was 56 (Table 3.2). Fifty-nine percent of respondents made at least 50,000, 22% per part time hourly, and 30% were retired. Technical workers such as a teacher or nurse were 25% of the sample, 22% were clerical, and 5% were skilled workers such as a mechanic or electrician. Sixteen percent currently live in a rural area and 17% grew up in a rural area.

For hunters the average age is 54 (Table 3.3). Sixty-four percent of respondents made at least \$50,000. Thirty-five percent were full time hourly workers while 31% were retired. Skilled workers accounted for 39% of nonhunters and service, semiskilled and technical each totaled about 10%. Forty-seven percent of hunters grew up in rural areas and 52% currently live in rural areas.

Support varied slightly for alternative food items between hunters and nonhunters, but wild game meat showed a greater difference between the two samples (Table 3.5). Of nonhunters 23% supported organic, 63% local, 63% seasonal, and 49% supported non-GMO. Of hunters 19% supported organic, 61% local, 60% seasonal, and 43% non-

Table 3.2

Descriptive Statistics for Nonhunters

	Mean/%
Age	56
Household income > \$50,000	59%
Part time employment	22%
Retired	30%
Technical employment	25%
Skilled employment	5%
Clerical	22%
Currently live outside city boundaries	16%
Grew up outside city boundaries	17%

GMO. Among nonhunters, responses to wild game meat items indicated less agreement than among hunters as 25% agreed wild game is healthy, 13% preferred wild game, and 40% believed wild meat is organic. This is in contrast to hunters of which 68% agreed wild game was healthier, 45% prefer wild game, and 64% agreed wild meat is organic.

Bivariate correlations were performed for the individual food support items. The items for traditional alternative food support and wild game preferences tended to

correlate significantly within each group of items and tended not to correlate with items of the other factor. Inter-item correlations of the alternative food items and wild game

Table 3.3

Descriptive Statistics for Hunters

	Mean/%
Age	54
Household income > \$50,000	64%
Part time employment	35%
Retired	31%
Technical employment	10%
Skilled employment	39%
Semiskilled	10%
Clerical	22%
Currently live outside city boundaries	52%
Grew up outside city boundaries	47%

items exhibited mostly weak ($r < .3$) partial correlations (Cohen, 1988). For example, organic food preference and non-genetically modified food items correlated significantly, but weakly with the wild game items (Table 3.6). The correlations ranged from .10 to .16. Local and seasonal items generally exhibited nonsignificant correlations with wild game items. Correlation within alternative food items and wild game items were all

Table 3.4

Descriptive Statistics for Hunters and Nonhunters and All Ohioans

	Hunter	Nonhunter	Ohio
Age (mean)	54	56	39*
Inc (% > 50k)	64	59	49
Place size during formative years (percent rural)	47	16	19

*Median age

** U.S. census, 2010

Table 3.5

Percent Positive Alternative Food Attitudes for Hunters and Nonhunters

	Hunter	Nonhunter
Organic food	19%	23%
Local food	61%	63%
Seasonal food	60%	63%
Non-GMO food	43%	49%
Wild game is healthier than conventional meat	68%	25%
I prefer to eat wild game over farm raised meat	45%	13%
Wild game is an organic food	64%	40%

significant at $p < .01$, and exhibited moderate or strong effect sizes within items. Inter-item correlations of the wild game items were significant at $p < .01$. Within all other items the correlations ranged from .32 to .53.

Table 3.6

Part Correlations for Individual Food Items

	Organic	Local	Seasonal	Non-GMO	Wild healthier	Prefer wild to farm	Wild game as organic
Organic support	1						
Local support	.416**	1					
Seasonal support	.273**	.674**	1				
non-GMO support	.566**	.355**	.240**	1			
Wild game healthier	.120**	.080	.038	.159**	1		
Prefer wild to farm meat	.103*	.050	.000	.106*	.623**	1	
Wild is organic	.145**	.097*	.065	.128**	.465**	.424**	1

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Identifying Food Principal Components

The principal component analysis of food item attitudes initially yielded a three factor solution based on Eigen values greater than one. Several of the alternative food items cross-loaded onto to a third factor. Only one variable loaded strongly onto this third factor. That variable was support for legalizing sale of wild game. This variable was removed from the analysis and the factor analysis was performed again. This analysis yielded a two factor solution based on Eigen values > 1.0 and visual scree plot examination. All seven items loaded on to one of the two factors at a value greater than .3 (Tabachnick & Fidell, 2011) and the lowest factor loading was .64. All cross loadings were more than .15 from main loading scores (Worthington & Whittaker, 2006). Seven items remained which still satisfied the requirement that for each factor at a minimum three items (Raubenheimer, 2004; Velicer & Fava, 1998). Bartlett's test of sphericity was significant at .001 indicating the factor matrix was not an identity matrix. The alternative

food support factor (factor one) included items rating the importance of organic foods, local foods, seasonal foods and non-genetically modified foods. The wild game support factor (factor two) included items that rated agreement with health of wild game over conventional farm meat, preference for wild game over conventionally raised farm meat and wild game as an organic meat. The lowest factor loading was a .69 for importance of non-GMO food with all other loadings for both factors ranging between a .7 and .9 (Table 3.7). Cross loadings $> .2$ were absent. Reliability was adequate with Cronbach's alpha greater than .7 for each of the proposed multi-item factors. The two factor solution explained 62% percent of the variance across 7 response items.

Table 3.7

Component Loadings for Alternative Food Principal Components Analysis

	Components	
	One	Two
Organic food support	.73	
Local food support	.84	
Seasonal food support	.75	
Non-GMO food support	.69	
Wild game is healthier than conventional meat		.86
I prefer to eat wild game over farm raised meat		.84
Wild game is an organic food		.740

Model 1 (Table 3.8) regressed hunting behaviors on food attitudes and socioeconomic variables for all respondents. The Nagelkerke value for model 1 was .61 indicating a strong relationship between predictors and outcome variables. Significant variables included sex, education, place size of current residence, place size of residence during formative years and support for wild game meat factor score, which were significant at $p < .05$. The alternative food factor was not a significant predictor of hunting experience net of all other variables. Odds ratios for significant variables range from .37 (indicating a negative relationship) for education to 19.39 for sex (i.e. college educated males are more likely to hunt). The exponential beta in logistic represents a nonlinear relationship. Because the relationship is not linear, a one unit increase in the

Table 3.8

Socioeconomic and Food Attitudes for Hunting Behavior for All Respondents

	B	SE	OR
Age	.00	.01	1.00
Sex (male)	2.97	.42	19.39*
Education (some college or more)	-1.01	.35	.37*
Income (>50,000)	.44	.38	1.56
Place size, current residence (outside any city boundary)	1.72	.46	5.60*
Place size, formative years (outside any city boundary)	.95	.45	2.59*
Support alternative food factor score	-.32	.18	.72
Support wild game meat factor score	1.20	.21	3.30*
	Nagelkerke	.61	
	Chi-squared	220.16	

* $p < .05$.

independent variable means the odds ratios increase by a factor of the given exponential beta, in this case 2.97 for sex (indicating a positive relationship). A negative relationship is present in the case of income as the exponential beta (.44) is between zero and one.

Table 3.9

Socioeconomic and Food Indicators for Hunting Support for All Respondents

	B	SE	OR
Age	.00	.02	1.00
Sex (male)	2.71	.43	15.01*
Education (some college or more)	-.43	.43	.65
Income (>50,000)	.46	.45	1.58
Place size, current residence (outside any city boundary)	.31	.55	1.36
Place size, formative years (outside any city boundary)	1.16	.57	3.19*
Support alternative food factor score	-.04	.22	.96
Support wild game meat factor score	.86	.25	2.37*
Nagelkerke	.46		
Chi-squared	100.90		

*p < .05.

Model 2 (Table 3.9) regressed hunting support on food attitudes and socioeconomic variables for all respondents. Significant variables included sex, support for wild game meat, and place size where the respondent grew up at $p < .05$. Again the alternative food variable was not a significant predictor. Odds ratios of significant variables ranged from .65 for the wild game factor to 15.01 for sex. Model 2 resulted in a

Nagelkerke of 46% indicating a moderate relationship between independent and dependent variables.

Table 3.10

Socioeconomic and Food Indicators for Hunting Support for Nonhunters

	B	SE	OR
Age	.02	.02	1.02
Sex (male)	2.05	.67	7.74*
Education (some college or more)	-.31	.63	.73
Income (>50,000)	.57	.69	1.77
Place size, current residence (outside any city boundary)	-.19	.98	.82
Place size, formative years (outside any city boundary)	1.53	.97	4.60
Support alternative food factor score	.18	.32	1.20
Support wild game meat factor score	1.21	.46	3.34*
Nagelkerke	.36		
Chi-squared	23.11		

*p < .05.

Though the alternative food variable did not have a significant affect when tested using all respondents, the difference in responses between hunters and nonhunters was a suspected confound. "A confounding variable is one which, if not controlled or held constant between groups, will cloud the certainty about the effect the independent variable has..." (Sharma, 1997). Model 2 was repeated on the nonhunting portion of the sample only. The dependent variable was support for hunting on public land.

The factor loadings, reliability, and sphericity were all similar between the two samples. Therefore the nonhunting subsample uses the initial PCA factor scores in the subsequent logit model to allow for more direct comparisons between the analyses.

Table 3.11

Socioeconomic and Food Indicators for Hunting Support (DV) for Nonhunters Using Disaggregated Alternative Food Indicators

	B	SE	OR
Age	-.01	.02	1.01
Sex (male)	2.07	.74	7.94*
Education (some college or more)	-.52	.74	.60
Income (>50,000)	1.03	.81	2.81
Place size, current residence (outside any city boundary)	-.33	1.14	.97
Place size, formative years (outside any city boundary)	1.88	1.13	6.55
Organic importance	-1.25	.44	.29*
Local importance	.72	.48	2.04
Seasonal importance	-.13	.57	.88
Non-GMO importance	.74	.38	2.10*
Support wild game meat factor score	1.23	.51	3.44*
Nagelkerke	.50		
Chi-squared	34.89		

*p < .05.

Model 1 (Table 3.10) regressed hunting support on food attitudes and socioeconomic variables for nonhunters. The Nagelkerke value for support for hunting

among nonhunters was .36 indicating a moderate relationship between independent and dependent variables. Significant variables included sex and wild game meat significant at $p < .05$. The support for alternative food factor was not a significant predictor of hunting experience net of all other variables. Odds ratios for significant variables range from 3.34 for education to 7.74 for where the respondent grew up.

Reducing the sample size by removing hunters from the sample and adding variables to the model results in a model that approaches minimum standards for acceptable sample size criteria ($> 50 * 8m$) increasing the chances of over fitting the model. The results of this analysis share similar patterns with models two and three as sex and the wild game factor score present the largest odds ratios. Model 4 (Table 3.11) regressed hunting support on food attitudes and socioeconomic variables for nonhunters, but substituted the alternative food support factor score for the items that comprise the factor. Of the popular alternative food items organic and non-GMO importance resulted in a significant relationship with support for hunting. The Nagelkerke value for model 4 was 50% indicating a moderate relationship between variables. The odds ratios ranged from .29 for organic to 7.94 for sex. Because local and seasonal foods theoretically are items that are the best descriptors of wild game compared to other alternative food items one might expect these variables would have the strongest relationship to support for hunting, but the relationship is not significant relationship to hunting support. Moreover, the relationship between support for hunting and organic food is negative. In other models the support for alternative food factor was not significantly related to either support for hunting or hunting participation. An additional logit analysis explored a

model similar to model 3, but where the factor score for alternative food support was the dependent variable. The model produced an adjusted R^2 of less than .01 with no significant independent variables.

Discussion

With the decline in the number of hunters and the rise human wildlife conflict, recruiting new hunters is a focus of state wildlife agencies. Given the lack of strong evidence for the success of current recruitment programs, programs targeting recruitment of those who support alternative food ideologies have received interest from state wildlife agencies indicating a possible avenue to recruit hunters who are internally motivated to hunt and would not be likely to hunt without agency recruitment efforts. The ability to recruit hunters based on positive attitudes toward alternative food support is dependent on a positive correlation between alternative food support and support for hunting.

The current research indicates similar relationships as previous hunting motivation analyses (see Stedman & Heberlein, 2001) with sex (male) and residency (rural) demonstrating the strongest relationships with hunting engagement and support. Not surprisingly wild game preference positively correlated with hunting behavior and support for hunting. Of the alternative food score items non-GMO importance was the strongest positive correlate of hunting support. Organic food importance was also a strong correlate but a negative one. The two most apt alternative food descriptors for wild game (local and seasonal) had no significant relationship with hunting support among nonhunters. The alternative food preference factor score was not correlated with

attitudes toward hunting or engagement with hunting in any model. The wild game meat support factor score was significant in each of the four models.

The increase in hunting for meat and alternative food ideologies might conflate two phenomena. On the one hand hunting for meat is increasingly cited by hunters, and on the other alternative food support and consumption has become increasingly popular. The level of motivation to hunt for meat is likely static among those who can hunt economically (i.e. those hunters whose direct yearly hunting costs primarily consists of ammunition), but may be more salient due to the popularity of alternative food ideologies and poor economic conditions leading individuals to rationalize their recreations. Hunting for meat might be a justification that is used more often during difficult economic times to justify recreation expenditures. The question is to what extent is alternative food support motivating support for hunting for meat. The current data indicate little connection.

Alternative food support is increasing among the general population but hunting participants are not. This indicates that hunting has intentionally not been chosen by nonhunters, alternative food supporters are not aware of hunting, or the tangible constraints associated with hunting are too great to overcome. The problem is alternative food supporters are like many other groups who might be expected to support hunting, but who do not engage in the practice. There is some confound that interrupts or alters consistency between consumptive values to nonconsumptive behaviors (e.g. I like local or seasonal meat, I will go hunting vs. I like local or seasonal meat, or I will go to the farmers market). There are other factors that are well known that indicate alternative

food supporters are less likely to initiate hunting. The problem may be that wild game is not perceived as a practically accessible food or that they are opposed to physically killing an animal. Even if wild game is a motivating factor for alternative food supporters that does not remove the traditional constraints faced by all hunters.

Adherents to locavore ideologies promote the individual as a consumer as opposed to producer (DeLind, 2011). Kemp, Insch, Holdsworth, & Knight (2010) found alternative food attitudes and behaviors are incongruent between surveys and food provisioning/sourcing behaviors. What wildlife professionals view as a shift in potential sourcing preference is likely a shift in relations between consumers and producers. When choosing between organic and conventional food the choice is between two relatively similar consumption patterns and sourcing behaviors as alternative food choices become more widely available (e.g. organic and conventional foods are equally convenient purchase in many stores). When hunting the consumer must become a producer and not just a recipient of the end product. This is not the same type of act, nor is it a similar commitment on the part of the individual, as choosing between nonorganic and organic at the meat counter.

Hunting brings on a deeper understanding of food, which might be a barrier itself to interest in food provisioning as individuals become aware of the more unpleasant aspects of self-provisioning food (Peterson, Hansen, Peterson, & Peterson, 2010). Often individuals beginning a new activity hold an idyllic perception of an activity that cannot be matched by the reality of the activity, which may be the case with alternative food consumer recruitment targets. The discovery of liver flukes, the knowledge that deer are

eating nonorganic foods, fears of transmission of bovine spongiform encephalopathy from cervids to humans, or concerns over butchering and food safety are all real concerns that are not likely to be perceived by the casual alternative food supporter.

The lack of association between alternative food and hunting support does not end the debate on whether alternative food supporters might be recruited as hunting participants. In only one model, support for hunting on public land among nonhunters, did an alternative food item indicate a negative association with support for or engagement in hunting. One could make an argument that a nonsignificant relationship allows for more focus on this group as opposed to a negative one. In essence, the lack of a significant relationship could indicate a group that is primed for recruitment because they do not have strong attitudes for or against hunting allowing them to be more easily swayed by recruitment campaigns. But, the primary reason alternative food supporters are an enticing target is the perceived support for hunting resulting from alternative food support. There are many groups that might have no correlation with hunting support that might share some trait in common with hunters such as athletes, hikers, or wildlife watchers, but would likely make poor hunting recruitment targets. Though alternative food support might be expected to be related to hunting support, for various reasons such as the passive nature of alternative food sourcing, support for alternative food does appear to be linked to hunting support.

Consumption of wild game by urban locavores may counteract negative perceptions of hunting. Heberlein & Ericsson (2005) noted that consumption of wild game led to positive attitudes of hunters. A confound between game meat consumption

in the U.S. and Sweden (the setting of the Heberlein & Ericsson article) might be that wild game is available for sale in Sweden to the general public, but it not in U.S. markets. This would be a power barrier to exchange of game meat in the United States. In addition, rural residents are more likely to exchange game meat with other rural residents than urban residents (Hofferth & Iceland, 1998) due to proximity and also as a result of the stronger bonding capital among rural groups than urban (Sørensen, 2014). Therefore without allowing the sale of wild game in the United States there is little chance nonhunters would have widespread access to wild game meat.

Sale of wild game, which might have a substantial impact on support for hunting and lead consumers to consider willingness to hunt, is a contentious issue that calls into question certain aspects of the seven pillars of the supposed "North American Model" of wildlife conservation as reflexively proposed by Geist (Geist, 1988; Geist, Mahoney, & Organ, 2001). Specifically the model calls for an end to the sale of wild game meat in North America. Of late there is some renewed support for legalizing wild game sales with certain restrictions that would prevent the return of over hunting species bound for urban markets (Butler, Teaschner, Ballard, & McGee, 2005; VerCauteren et al., 2011). However, supporters of the North American Model of Wildlife Conservation have been skeptical of opening markets for wild game.

Any hunter has to overcome certain structural barriers. The reason male rural mentors and hunting support networks are correlates of hunting are that they speak to the ability to overcome barriers. Structural barriers (constraints) such as urban residency,

nonaffiliation with current hunters, and gender norms will be at least as big a barrier for alternative food nonhunters than those groups that are predisposed to hunt.

Conclusion

Support of alternative foods is not significantly correlated with engagement in hunting net of individual demographic characteristics. Moreover, support for alternative foods fails to indicate increased support for hunting. This is in spite of the fact that local and seasonal foods are some of the most supported food ideologies among nonhunters in this sample. Local and seasonal food are two types of alternative food that accurately describe wild game as opposed to other descriptors such as organic, non-GMO, grass fed, low stress or humane harvest. Nonhunting alternative food consumers are probably no more likely to initiate hunting than other nonhunters. Hunting for wild game meat may be an increasingly cited motivation for hunting, but in light of current research such as that released by Responsive Management (a private research organization primarily engaged in research concerning natural resource management), the rise in hunting for food is likely as much of rationalization of hunting rather than increase motivation to acquire wild game meat. If increases in alternative food support lead to increased support for hunting, we likely would have seen some impact over the last several decades with the increased popularity of alternative food, but hunting rates have steadily dropped over this period. Alternative food support does not appear to be a viable path to increase hunting participation.

Chapter 4: Deconstructing Wildlife Value Orientation and Postmodernization

Correlates in Ohio

Abstract

Researchers in the human dimensions of wildlife field have long been interested in wildlife-related values; however, early approaches to studying values were not well-grounded in social science theory. Inglehart's theory of intergenerational value change provided theoretical grounds for research on wildlife value orientations (WVO), and a framework that related value orientations (internal, cognitive factors) with and external, socioeconomic forces. Though prior examinations of WVOs indicated a consistent correlation between socioeconomic variables and WVOs among aggregated respondents from 19 states in the U.S. West, few studies have examined this relationship among non-western U.S. populations. A measure of perceived relative economic position (PREP) is included with the intent of counteracting limitations of cross-sectional samples (i.e. because relative scarcity during formative years is carried throughout an individual's lifetime it may be useful in lieu of time series data) based on Inglehart's postmodernization theory. The current study adds to the literature by examining WVOs among non-western participants and examining postmaterial values while accounting for PREP. Mutualism values positively correlated with income. Domination values positively correlated with PREP and residency at formative years, but negatively correlated with education. Postmaterialist values are correlated negatively with PREP,

but positively with education and place size during formative years. WVOs and postmaterial values did not vary by age cohorts. These results indicate a patterned relationship between socioeconomic variables and mutualism/domination measures in contrast with previous studies such that specific variables are related to one construct or the other as opposed to a reversal in the sign of the correlation. Limited support for PREP as a correlate of postmaterialist values indicates the potential for inclusion of PREP in future analyses.

Hunting patterns over the last 50 years in the U.S. have not been static, leading researchers to investigate factors driving participation trends. In the 1950s hunting license sales steadily increased; then, in the early 1980s began to steadily decline (U.S. Fish and Wildlife Service, 2003, 2013). In the 1950s an increase in post-WWII affluence and outdoor recreation (U.S. Fish and Wildlife Service, 2015) led to a greater focus on leisure studies (Rojek, 1985). In an effort to better understand outdoor recreation (in particular hunting), as well as its antecedents and consequences, large-scale studies such as the Outdoor Recreation Resource Review Commission survey (ORRRC) and the Fishing Hunting and Wildlife Associated Recreation survey (FHWAR) were initiated. These studies assessed such factors as number of recreational trips, number of hunters in a hunting group, and other basic information on participation. During the 1980s hunting participation became more erratic and started to decline (U.S. Fish and Wildlife Service, 2003, 2013) once again motivating researchers to investigate correlates of leisure behavior.

To date few macro-level theories have been offered to explain this trend, leaving a gap in understanding long term hunting participation influences. A possible reason for the inability to explain the declines is a disproportionate focus on cognitive perspectives within human dimensions literature (Larson et al., 2014). A more balanced merger of cognitive and social/structural forces may provide an avenue to better understand this trend. Inglehart's postmodernization theory merges cognitive and structural factors. His hypotheses about the mechanisms driving value shift underpin research on Wildlife Value Orientations, a theoretical framework that has been applied extensively in

Human Dimensions of Wildlife research. In spite of its popularity few articles have examined the theoretical mechanisms driving Inglehart's theory and its relationship with shifting value orientations (Manfredo et al., 2003, 2009), and research to date has been almost exclusively focused in the Western U.S..

Early research in the U.S. attempting to explain outdoor recreation motivations included sociological understandings of socioeconomic factors, hunting opportunities, and economic impacts related to outdoor recreation. These sociological perspectives, in conjunction with agricultural economists and parks and recreation researchers have shaped the "Human Dimensions" (HDW) literature (Manfredo, 2008, p. 12). But, while socioeconomic factors are valuable for understanding hunting initiation and discontinuation resulting from more stable socioeconomic variables than attitudes, they are not easily manipulated by those who would seek to increase participation rates. Also socioeconomic variables do not tend to be linearly related with all types of hunting (Mueller & Gurin, 1962; Pettis, 2009)

Subsequent research attempts to explain hunting behavior by identifying internal, cognitive constructs theorized to predict behavior (Ajzen & Fishbein, 1970). For example, an individual might be influenced to go hunting by a constellation of beliefs that support utilitarian interactions with wildlife. But, cognitions such as attitudes are often weakly correlated with behaviors, in part because of such factors as specificity of measures (Heberlein & Stanley, 1976; Whittaker et al., 2006), awareness of descriptive norms, and actions that are constrained by other factors (Ajzen & Fishbein, 1974; Cialdini, 2003).

In spite of the recent popularity of approaches that seek to explain behavior based on internal cognitive processes, the idea that recreation was conditioned, though not determined by economic forces, has not been abandoned (see , Teel, & Henry, 2009; Manfredi, Teel, & Bright, 2003). Fulton et al. (1996) introduced WVOs to human dimensions literature, conceptualizing these orientations to basic belief systems that are intimately connected with more basic values, and more resilient than higher order cognitions (e.g., attitudes, intentions). Their initial analysis found eight belief domains (Fulton et al., 1996) which, in subsequent studies, was reduced to two orientations (Manfredi et al., 2009). The most recent version labels these two orientations as “domination” and “mutualism.” The domination orientation denotes a differential power relationship between animals and humans -- with humans in control of animals (Manfredi et al., 2003, 2009). The mutualism orientation describes a relationship where humans have an emotional connection to animals as well as maintaining relatively equal rights to humans (Manfredi et al., 2009; Manfredi et al., 2003).

In subsequent articles the WVOs were associated with Inglehart’s (1990) postmaterialist model as a means of understanding how social and economic changes could drive value shift. Inglehart argues that values are developed from reactions to the economic conditions of one's youth. He argues that once solidified, values persist over a lifetime (Inglehart, 1977, 1997; Inglehart & Welzel, 2005). Inglehart contends: "A large body of evidence indicates that people's basic values are largely fixed when they reach adulthood, and change relatively little thereafter... If so, we would expect to find

substantial differences between the values of the young and the old in societies that have experienced a rising sense of security." (Inglehart & Welzel, 2005, p. 99).

Yet, one's sense of economic security cannot be accurately gauged by objective economic measures alone. Rather one's security is theorized to be influenced by the perception of one's economic security. In particular it is the perception that is developed during an individual's formative years that tends to persist over the life of the individual. Measurement of an individual's PREP attempts to capture the individual's perception of economic position within society. Given the inclusion of socioeconomic factors in determining WVOs, more stable, long term indicators such as socioeconomic status and in particular PREP may improve wildlife professionals' long term planning because of the stability of relative socioeconomic indicators as opposed to basing decisions on short term and temporally sensitive attitudes.

Inglehart's Postmaterialist Hypothesis

Inglehart notes the widely held belief in sociology that many of Marx's relatively deterministic theories of social evolution were not supported in later empirical analyses (Inglehart, 1997; Inglehart & Welzel, 2005). Inglehart proposed that it is not that Marx's ideas on modernization in general are wrong, but rather, that Marx failed to properly account for the complexity of social interactions when making his theoretical predictions. Inglehart's theory of modernization is an attempt to improve upon Marx's theories of social evolution, based more strongly on economic determinism than relative influences, by examining changes in social values in the context of socioeconomic conditions. Inglehart's (1977) modernization theory is based on two hypotheses, which he labels the

"scarcity hypothesis" (based on Maslow's (1943) hierarchy of needs) and the "socialization hypothesis" (cohort effect based on Mannheim's (1923) sociology of generations). In simple terms, modernization is hypothesized to drive a nonlinear shift in values in reaction to economic conditions experienced in one's youth that socialize a generation of individuals (Inglehart & Welzel, 2005). As successive generations acquire higher status in the population, they promote societal values that shape the goals and structure of that society (Inglehart, 1997; Inglehart & Rabier, 1986).

Inglehart and colleagues' (Inglehart, 1997; Inglehart & Welzel, 2005 etc.) scarcity hypothesis proposes that "material sustenance and physical security are immediately linked with survival; therefore scarcity leads individuals to adopt 'materialistic' goals." Inglehart uses Maslow's hierarchy of needs to explain how individuals place the highest value on the most pressing survival needs before attempting to meet needs related to freedom and autonomy. As economic conditions improve people are more likely to emphasize "postmaterialist" goals such as belonging, esteem, and aesthetic and intellectual satisfaction (Inglehart, 1977).

The socialization hypothesis proposes that "The relationship between material conditions and value priorities is not one of immediate adjustment: to a large extent, one's basic values reflect the conditions that prevailed during one's preadult years and these values change mainly through intergenerational population replacement" (Inglehart, 1977). That is, values at the societal level are formed in youth in reaction to individually experienced economic conditions and, given some level of variation, maintain their

position relative to other cohorts until death. Societal value change occurs as older cohorts are replaced by younger cohorts with different with differing values.

Though cohort effects describe responses to overall economic conditions of which income is a factor, as a single item measure, current income more likely clouds than clarifies the relationship between scarcity and intergenerational value shift. Indeed, in discussing the role of income in value shift, Inglehart argues, "... there is no one-to-one relationship between socioeconomic development and the prevalence of postmaterialist values, for these values reflect one's subjective sense of security, not simply one's objective economic level" (Inglehart, 2008). In the long term it is cohort replacement described by the socialization hypothesis that drives the modernization process (Inglehart, 1995).

Perceived Relative Economic Position

When discussing his "scarcity hypothesis" Inglehart uses the phrase "one's sense of existential security" indicating existential security is not objective, but rather, based on relative assessments of individual security (Inglehart, 1997; Inglehart, 2008). If Inglehart is correct, existential security is based on perceptions of objective scarcity. Although much of Inglehart's work is focused at the nation-state, his hypothesis incorporates an individual-level mechanism. A general definition of perceived relative economic position denotes a subjective comparison of one's economic situation compared to a specified referent group. Other similar measures compare actual and desired economic positions (perceived economic well-being) or a ranking of objective economic positions (relative economic position). A PREP variable rates the individual's perception of their

own economic position compared to a reference group. Given this subjectivity, PREP should correlate more strongly with values than income, which may vary considerably over time due to changes in employment (Güven, 2007; Inglehart, 1977; Karraker, 2014). Thus, Inglehart argues that income, though commonly available, is not the preferred indicator of scarcity

Per capita income and educational levels are among the best readily available indicators of the conditions leading to the shift from materialist to postmaterialist goals, but the theoretically crucial factor is not per capita income itself, but one's sense of existential security. (Inglehart, 2008)

Wildlife Value Orientations

Inglehart uses shifting postmaterialist values to explain cultural and institutional changes in societies over time, but the link between postmaterial values and lower order cognitions had not been discussed in human dimensions research prior to the work of Fulton et al. (1996). The union of these two concepts provides a link between changing thoughts and behavior regarding wildlife to broad-scale societal shifts.

For decades psychologists have argued that cognitions can be arrayed along a continuum from those that are few in number, stable, and abstract to those that are numerous, impermanent, and specific (Homer & Kahle, 1988; Rokeach, 1973). Values are abstract, motivational goals that are stable over time (Rokeach, 1973; Schwartz, 2006). Beliefs and attitudes are second and third order cognitions that are generally viewed as emanating from values (Fulton et al., 1996; Hrubec, Ajzen, & Daigle, 2001). This increasingly specific progression of cognitions became known as the “cognitive

hierarchy” among human dimensions researchers (Fulton et al., 1996). WVOs are a specific subset of the hierarchy referencing "ideal types" of wildlife beliefs located between values and attitudes. WVOs are comprised of a collection of similar beliefs mediating the relationship between values and higher-order cognitions, such as attitudes (Fulton et al., 1996; Manfredi et al., 2009).

WVOs have generally clustered around two broad belief domains: domination and mutualism (Manfredi et al., 2009). These opposing, but not bipolar, terms were derived from Manfredi et al.'s interpretation of Pratto's (1999) social dominance theory as well as Kluckhohn & Strodtbeck's (1961) conceptualizations of natural interactions. Both theories describe a continuum on which individuals tend to promote either harmonious relationships between groups and individuals or tending to endorse power differentials between individuals or groups.

Manfredi and colleagues (Manfredi et al., 2009; Manfredi et al., 2003) reimagine Inglehart's postmaterial hypothesis, linking WVOs with the same socioeconomic factors that Inglehart hypothesizes as drivers of value-shift.

The current inclusion of PREP is intended to account for subjective measures of economic position. A combination of the models indicates that individuals who experienced better economic conditions during formative years will adopt more “mutualist” beliefs and, in turn, are less favorable to hunting. In contrast, those experiencing relatively poorer economic conditions during formative years are more likely to hold domination beliefs. But, researchers such Vaske, Jacobs, & Sijtsma (2011) and Gamborg & Jensen (2016) have reported inconsistencies in correlations of various

individual-level socioeconomic characteristics and WVOs in European samples as opposed to patterns witnessed in the western U.S. These findings contrast with studies in the West that indicate limited empirical support for the relationship between socioeconomic variables and WVOs. Manfredi and colleagues reported materialist values and domination WVOs to be positively correlated and also reported postmaterialist values and mutualist WVOs to be positively correlated with socioeconomic status. Both mutualist and domination orientations correlated to socioeconomic characteristics (Manfredi et al., 2009; Manfredi et al., 2003).

Research Questions

The current study contributes to human dimensions literature by examining the relationship between PREP, traditional socioeconomic indicators, postmaterialist values, and WVOs. In addition, examination of these variables in different spatial locations will indicate potential regional discrepancies in WVOs within the United States. These analyses will indicate whether widespread support for models linking socioeconomic indicators with WVOs and postmaterialist values are consistent with past research and consistent across regions. The lack of a consistent relationship between socioeconomic variables across mutualism and domination WVO variables and also postmaterial variables indicates a need to reexamine a widely supported model.

Based on the current review of conceptual and empirical literature concerning PREP, traditional socioeconomic indicators, postmodernization values, and WVOs, I hypothesized: 1) individual's income, education, and urban residency during formative years will positively correlate with mutualism orientations and negatively correlate with domination orientations. Furthermore, I hypothesized that 2) individual income, education, and urban residency during

formative years will positively correlate with postmaterialist values. Additionally, I hypothesized 3) individual levels of PREP will positively correlate with mutualism orientations and postmaterialist values and negatively with domination orientations. Finally, I hypothesized that 4) individual postmaterialist values, domination WVOs and mutualism WVOs will vary by age cohort.

Methods

Data come from the 2013 Ohio Outdoor Recreation survey. The mail survey consisted of samples of Ohio residents and hunters with each sample consisting of 1,200 individuals. The first sample frame included 1,200 Ohio Hunting license holders drawn from an existing Division of Wildlife database of hunting license holders and was restricted to individuals who purchased a hunting license in at least one of the three most recent years. The second sample framed included 1,200 randomly selected Ohio residents provided by Survey Sampling International. The survey followed the methods specified by Dillman (2007) Tailored Design Method. Briefly, this entails mailing 1) a prenotification letter, 2) a questionnaire, 3) a reminder post card, and 4) a replacement questionnaire. A fifth mailing of the questionnaire was approved to increase response rate. Data were professionally keypunched by a private data entry firm (Entry Time Pittsburgh, PA) and analyzed with the aid of SPSS v.22.

Operationalization of Variables

WVO items were based on Manfredo et al. (2003) "Wildlife Values in the West" survey. Domination belief items were taken directly from previous work (Fulton et al., 1996; Manfredo et al., 2003, 2009), but mutualism items were modified to reduce emphasis on strong animal rights orientations while maintaining distance from utilitarian

views on animals. For example, we replaced items such as "wildlife are like my family ..." (Manfredo et al., 2009) with items such as "wildlife... has more than use value." Ideally a replication of previous survey items would be included in the current work. Two factors necessitated item modification: 1) lack of consistent question set used in previous work (although some items are used more consistently than others) and 2) wording for mutualism items were not consistent with the survey focus and survey sponsor directives. The operationalization of materialist vs. postmaterialist values followed Inglehart's eleven item scale (Inglehart noted the item "beautiful cities" tended to have low factor loadings) (Inglehart, 1997, p. 111,128-130). Two postmaterialist items were coded 2 (one point for each item), and two materialist items coded were -2. An individual selecting one of each was coded 0. Scores ranged from -6 to 5 following Inglehart (1997). Income categories below 35,000 and above 75,000 were collapsed reflecting federal poverty guidelines from 2013 (U.S. Bureau of the Census, 2013) based on average the Ohio family size (U.S. Census Bureau, 2012). PREP compared to others in the U.S. was scored 0 - 4 with 0 being far below average and 4 being far above average following Karraker (2014). Residency during formative years was coded 1 for rural and 0 for urban. The categories for place size during formative years are based on definitions of metropolitan and micropolitan areas (large city >50k, medium city <50k and >10k, small town < 10k and rural (residences outside any city boundaries). Education was collapsed. Resultant categories were: no college, some college degree, and any college degree. Sex was coded 0 = female and 1 = male.

Data Analysis

The survey sample was weighted by sex and hunting experience to more accurately reflect the general population of Ohioans as reported by the U.S. Department of the Interior (2011) survey. The weights were determined by calculating the population percentage by the response percentage for each combination of respondent sex and hunting experience.

A principal components analysis (PCA) was used to identify latent factors underlying WVO items. PCA was used because a new collection of items was created, and was applied to a novel population (to our knowledge, no other survey has attempted to assess WVOs among Ohioans) creating uncertainty as to the factor structure. Factor extraction followed Field (2005) including examination of Eigen values and scree plots. An oblique rotation accounted for the likelihood that there is some correlation between the resultant factors. Cronbach's alpha measured the internal consistency of items. Individual-level WVO scores were retained as PCA regression factor scores.

OLS regression tested the relationship between income, education, PREP, residence, sex, age, and WVOs over four models. Two models applied to the mutualism construct regressed mutualism on age, sex, income, education, PREP, and urbanization. A second set of two models regressed domination factor scores. Regression models for mutualism and domination shared identical structures. Model 1, included income and education items, but excluded PREP. In model 2 all items were included. OLS regression also tested Inglehart's postmaterialist hypothesis. Postmaterial value scores were regressed on income, education, PREP, residence, sex, and age over two models.

Model 1 independent variables included income and education items but excluded PREP. In model 2 all independent variables were included.

Three ANOVAs examined the relationship of postmaterialist values and WVOs by three age cohorts (i.e. 20-39, 40-59, and 60-79). A twenty year interval equals one generation (Beckford & Demerath, 2007) creating age cohorts from the current sample analogous to cohorts conceptualized in Mannheim's (1923) sociology of generations.

Results

Of the 1,200 surveys mailed to hunters, 139 were nondeliverable. The hunter survey yielded 346 responses. The adjusted cooperation rate was just under 33%. Of the 1,200 surveys mailed to random Ohioans, 132 were nondeliverables. The random survey sample yielded 239 responses. The adjusted cooperation rate was approximately 22%.

Prior to weighting performed for PCA, regression, and ANOVA analyses, the hunter sample included 6% female respondents. Respondents under 36 years of age represented 12% of the sample, while respondents between 36 and 55 represented 41% of sample and 47% were over 55 years of age. Among hunter respondents 64% had at a minimum attended college. More than half (63%) of respondents indicated household income of \$50,000 or more with \$100,000 - 150,000 the second highest response category among hunters. Skilled workers (mechanic, electrician) represented 41% of the sample and 12% of respondents were high professionals (CEO or national politician) or high administrators (doctor, lawyers, clergy). Respondents were most likely to have lived in rural areas during formative years as opposed to inside any defined towns or cities (53%). The 11-item scale categorization (positive sum of 11 items indicated a

postmaterialist and a negative sum indicated a materialist) of the hunter sample indicated 70% were materialists, 17% were mixed and 13% were postmaterialists. In addition, 13% of respondents chose the omitted variable 'beautiful cities' which was intended to represent postmaterial values.

Prior to weighting performed for PCA, regression, and ANOVA analyses, the sample of random respondents included 37% female respondents. Respondents under 36 years of age represented 11% of the sample, while respondents 36 to 55 constituted 38% of sample and 51% were over 55 years of age. Among random respondents 78% had at least some college. Over half the respondents (60%) made \$50,000 or more. Skilled workers represented 14% of the sample and 21% of respondents were high professionals or high administrators. One quarter of respondents lived in rural areas during formative years. Random respondents of the 11-item index indicated 62% were materialists, 17% were mixed, and 21% were postmaterialists. Respondents overrepresented outdoor recreation participants.

Wildlife Value Orientations

The selection of the final items was based on a combination of factors including high cross loading, loading on a one item factor, and cross loading values that ranged less than .15 from low to high values between factors (Worthington & Whittaker, 2006). Two factors were retained. The first factor explaining 26% of the variance included the items: it is acceptable to kill wildlife if it poses a threat to human life, it is acceptable to kill wildlife if it poses a threat to property, we should strive for a world with an abundance of species for hunting and fishing, and manage wildlife for human benefit. The second

factor explaining 33% of the variance included the items: it is my responsibility to improve habitat, wildlife has intrinsic value, diverse wildlife populations improve the environment, and nature should be protected for its own sake. Factor one was interpreted as a domination (utilitarian) orientation and factor two was interpreted as a mutualism (protectionist) orientation. The mutualism items all loaded at values over .65 and .69 was

Table 4.1

Principle Components Analysis and Reliability for Wildlife Value Orientations

Belief Items	Factor Loadings		Cronbach's Alpha
	Factor 1	Factor 2	
Domination			.69
It is acceptable for people to kill if they think it poses a threat to their life	.76	.13	
Humans should manage fish and wildlife populations so that humans benefit	.72	-.09	
We should strive for a world where there's an abundance of fish and wildlife for hunting and fishing	.71	.10	
It is acceptable for people to kill if they think it poses a threat to their property	.69	-.15	
Mutualism			.81
Diverse wildlife populations improve the environment for people	.15	.87	
Wildlife has intrinsic value (i.e. more than use value to people)	.00	.84	
It is my responsibility to improve wildlife habitat through either direct or indirect means	.03	.81	
The natural environment should be protected for its own sake rather than simply to meet our own needs	-.18	.65	
Eigen Value	2.11	2.63	
% Variance explained	26.35	32.87	

All factor item correlations significant at $p < .001$

the lowest loading for the domination factor. Four items were retained for each factor satisfying minimum guidelines of three factors per item (Raubenheimer, 2004; Velicer & Fava, 1998). Bartlett's test of sphericity was significant at .000 as directed by Field (2005). A modest Cronbach's alpha is .7 and .8 is recommended (Lance, Butts, & Michels, 2006; Nunnally, 1978). The current Cronbach's alpha for the mutualism was .81 and .69 for domination (Table 4.1).

Table 4.2

OLS Factors Associated with Values and Value Orientations

Variable	Mutualism		Domination		Postmaterialism	
	Model 1 β	Model 2 β	Model 1 β	Model 2 β	Model 1 β	Model 2 β
Age	-.04	-.03	.01	.0	-.08	-.07
Sex (male=1)	-.21***	-.23***	.26***	.24***	-.19***	-.18***
\$35k-\$50k	.09	.06	-.05	-.11	-.05	.01
\$50k-\$75k	.16**	.13	.10	.02	-.08	.04
\$75k or more	.22***	.19*	.04	-.09	.06	.02
Some college	.08	.04	.04	-.03	.03	.04
College degree	.12	.08	-.11	-.19**	.15*	.16*
PREP	—	-.03	—	.12*	—	-.12*
Residence during formative years	-.02	-.01	.18***	.17***	.11*	.10*
R2	.09	.09	.16	.17	.07	.08
Adjusted R2	.08	.07	.14	.15	.06	.06
Change R2	—	.01	—	.04	—	.00
N	412	400	412	400	435	400

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

Socioeconomic Covariates of Value Orientations and Values

For all regression models with the dependent variables (i.e., mutualism, domination, and postmaterialism) were regressed on the suite of socioeconomic variables. Covariates included income, education, and place size in addition to the control variables age and sex. The adjusted R^2 for all models ranged from seven percent to fifteen percent (Tables 4.2). Sex (male = 1) was significantly and negatively related to mutualism in both models. For both mutualism models the \$35,000 - \$50,000 income variable did not yield a significant result, but income >\$75,000 was significant and positively related to mutualism identification in line with research hypotheses. Contrary to expectations education was not significant in either model. Also PREP was not significant in model 2 of the mutualism regression contrary to expected outcomes.

As expected based on previous studies, residence during formative years and sex were significant and positively correlated in both domination models. As expected PREP was significant in the second mutualism model, but in contrast to our hypothesis PREP was positively correlated domination. In the domination model PREP and College degree were significant and positively correlated with domination, which is contrary to the direction of the relationship expected for education.

Both postmaterial values models had adjusted R^2 of 6%. Sex was significant and positively correlated in both postmaterial values models. Education (i.e. having obtained a college degree) and place size (i.e. residence during formative years) were significant in both values models. PREP was significant and negative in model 2. Income variables were not significant in either postmaterial values model.

Age Cohorts

Two models (one for mutualism WVOs and one for domination WVOs) were calculated comparing WVOs by age cohorts (Tables 4.3 and 4.4). Neither mutualism nor domination orientations varied significantly by age cohort (mutualism $F(2,446) = .88, p = .42$; domination $F(2,464) = .62, p = .54$). Similarly no significant difference was found between (Table 4.5) postmaterial values by age cohort ($F(2,446) = .31, p = .74$).

Table 4.3

ANOVA Domination WVO Scores by Cohort

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.97	2	3.49	.62	.54
Within Groups	2623.18	464	5.65		
Total	2630.15	466			

Table 4.4

ANOVA Mutualism WVO Scores by Cohort

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.74	2	.87	.88	.42
Within Groups	440.24	446	.99		
Total	441.98	448			

Table 4.5

ANOVA Postmaterialism Scores by Cohort

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.64	2	.32	.31	.74
Within Groups	461.81	446	1.04		
Total	462.44	448			

Discussion

Manfredo et al. (2009) found that the relationship between WVOs and socioeconomic factors generally conformed to hypotheses at the aggregate (state) level (see Manfredo et al., 2003). The current study does not support those orderly conclusions, but rather are similar to Gamborg & Jensen (2016). As with previous work (Fulton et al., 1996; Manfredo et al., 2003, 2009) the current study found two factors identified as domination and mutualism.

Current mutualism model variables were inconsistent with Manfredo et al. (2009) for both the aggregate and individual data. The current study did not find an association between residency during formative years and mutualism, but Manfredo et al. (2009), report a significant correlation for urban residents and mutualism. Similarly to the individual mutualism models in Manfredo et al. (2009) the current work found significant negative correlations for education and residency in the domination model, but where income was positive in the current mutualism model it was negative in Manfredo's model. Although Manfredo et al. (2009) found significant association between income

and education for both WVOs, the largest association was between income and mutualism and the largest association for education and urbanization was to domination WVOs.

The data analyses indicate a number of differences between the individual and aggregate results. Mainly Manfredo et al. (2009) found significant relationships between all variables and WVOs apart from age in relation to mutualism. The current data indicate income is significantly and positively associated with mutualism while place size and education are significantly correlated with domination. For example, in contrast to (Manfredo et al., 2003), urbanites were not more mutualist, and those with lower incomes were not more domination orientated. In contrast to Manfredo et al. (2009) and similarly to Gamborg & Jensen (2016), the current sample indicated college educated respondents were positively associated with domination WVOs net of other items.

Importantly, the current mutualism items differ from previous WVO items as several items in (Manfredo et al., 2003, 2009) scales did not load onto either factor or substantiate the need for a third factor. Likewise, we used a subset of the items that Manfredo and colleagues employed to assess domination orientations. Additionally, our survey focused on Ohio residents, as opposed to residents of Western states and our analyses contained additional covariates. These differences present us with a dilemma in interpretation; specifically, we cannot say whether the differences in observed effects between our study and Manfredo et al. (2009) are due to differences in measurement, population, or statistical procedure. Nevertheless, our data suggest that the strength and

direction of the effect of these social factors on wildlife value orientations among Ohioans is considerably different from that observed in western states.

Although PREP may appear to represent a similar construct as respondent income, but it behaved differently than income in the current models. The most interesting finding related to PREP is contrary to aggregate level relationships between socioeconomic and WVOs results found in previous literature (e.g. Manfredi et al., 2009). That is, PREP is positively associated with domination orientations and negatively with postmaterialist values net of other variables. That means as an individual perceives they are performing better than those around them they are more likely to be domination oriented and less likely to be postmaterialist. If relationships between socioeconomic and WVOs were the same as between PREP and WVOs we would expect the opposite relationship.

The current work found about two thirds of each subsample identified as materialists. This materialist skew is consistent with Manfredi et al. (2003) and the current sample would more closely resemble previous distributions if Inglehart's twelve item value index (used in Manfredi et al. (2009)) was used as opposed to the current use of Inglehart's eleven item index. Notably, the hunter sample was slightly more materialist than the random sample, which had a similar percentage of materialists as in Manfredi et al. (2003). The results indicate that the wildlife value orientations of Ohioans are relatively similar with those of residents in the West though the results are difficult to compare because there is little consistency between any two studies addressing WVOs.

The current work did not find significant differences between age cohorts for wildlife value orientations or postmaterial values. Manfredi et al. (2009) found a significant (but weak) correlation between age and WVOs for individual level effects, but age was not a significant correlate of WVOs or postmaterial values in the current work. Similarly no relationship was found in the current data when comparing WVOs and postmaterial values by cohort. If postmaterial value change is fueled by intergenerational cohort replacement and the replacement cohorts do not differ significantly in postmaterial values, we would not expect significant shifts in domination or mutualism to occur. Thus, though wildlife values may indeed be changing in the western U.S., as Manfredi et al. (2003) suggest, our data suggest they are not shifting among Ohioans. It is possible that Ohio residents represent a spatially specific anomaly in intergenerational value change, but could also potentially undermine a grand theory of value shift given the overall increasing affluence observed in the U.S. and Ohio (U.S. Regional Economics Analysis Project, 2015).

Limitations

Manfredi et al. (2003, 2009), though maintaining item wording, altered the scoring of Inglehart's postmaterial values ranking matrices. Differences should be expected when comparing Inglehart's and Manfredi's postmaterial values as the dependent variable in regression analyses. This is due to ipsativity in ranking method employed by Manfredi and colleagues where respondents rank all options from greatest to least as opposed to ranking the top two choices of postmaterialist measures leading to a greater likelihood of linear relationships between variables (McLean & Chissom, 1986).

The current work varies from Manfredi's measurement and therefore contributes to the variation in methods. To avoid future confounds researchers should consider ranking only the top two options in each block of Inglehart's survey items.

Most importantly individual level measures of income are not directly comparable to Inglehart's work on postmaterial values and much of Manfredi's work on WVOs. The current study attempted to collect spatial data on all respondents to allow aggregation of by spatial location, but an error in survey printing prevented the collection of the majority of survey respondents' location.

Conclusion

The addition of Inglehart's postmaterialist values index to WVOs is a valuable contribution to our understanding of the relationship between societal level economic indicators and cognitions by reemphasizing the relationship of socioeconomic characteristics to values and WVOs. There has been little application of the WVO model within the eastern United States. The current work found mixed support for the uniform relationship between socioeconomic variables and WVOs reported by Manfredi et al. (2009) whereby high income, education, and urbanization during formative years positively correlate with mutualism and negatively with domination. While aggregate socioeconomic variables in Manfredi et al. (2009) were generally significant, the current work found individual income significantly correlated to mutualism while education, residence and PREP significantly correlated to domination. Both models indicated relationships between sex and WVOs. The relationship between socioeconomic variables and postmaterialist values was similar to the domination model

with education, PREP, and residency during formative years yielding significant correlations to postmaterialist values. These results indicate a variable relationship between independent variables and WVO/postmaterialist variables in the context of aggregate and individual models. Rather than rising income, education and urban residency being threats to domination orientations at the societal level, increasing education and decreasing economic position are most likely to reduce individual domination identification. The lack of variation in postmaterial values and WVOs by generational cohort does leave questions in relation to Inglehart's postscarcity hypothesis and Manfredo's postmaterial values and WVOs given that nominal and inflation adjusted income has been increasing in Ohio without a corresponding change in individual cognitions.

Chapter 5: Conclusion

Hunting participation research examines not only trends in hunting participation, but also how the social context, and internal motivations and constraints impact hunting. Wildlife conservation funding relies heavily on high participation levels in consumptive recreations. That is because funding is dependent upon hunting and fishing license sales as well as excise taxes on the sale of hunting related goods such as ammunition and fishing rods to fund state level public conservation efforts for wildlife enjoyed by both consumptive and nonconsumptive recreation. Therefore it is vital to understand factors impacting hunting participation now and in the future. Not only does the currently declining trend jeopardize funding for wildlife conservation, but the effect of the decline in hunting inhibits state wildlife agencies' ability to control certain species of wildlife that have benefited from a transformation in the landscape from forces such as agricultural advances made during the 20th century in the United States. Because many social and cognitive factors are associated with hunting initiation and continuation, a better understanding of how these forces are impacting participation will enable state wildlife agencies to better adapt to changes in hunting participation in the future. By investing in programs that assist hunters in negotiating constraints (such as lack of access to land), agencies could ultimately gain greater control over harvest rate.

Hunting Participation Meta-analysis

Chapter 2 organized peer-reviewed research on hunting participation. The general purpose of this review was: to determine disciplinary influences and theoretical frames that have impacted this literature, identify gaps in knowledge, and to determine which factors provide the best explanation for hunting participation. Specifically, factors such as: 1) author submitted keywords, 2) disciplinary perspective of articles referenced, 3) author's degree granting discipline, 4) number of relevant articles per journal, 5) articles by geographic region, 6) publications by year, and 7) the data and statistical methods used in the research. Though hunting participation research has been informed by a variety of disciplines, the composition of these disciplinary perspectives in current literature clarify dominant perspectives.

The field of human dimensions of wildlife was developed by researchers based in rural sociology, resource economics, and parks and recreation. The varied scholarly perspectives created an interdisciplinary foundation for current research. The inclusion of interdisciplinary natural resource social scientists has coincided with an expansion in volume of research and diversity of perspectives brought to bear on the topic. In spite of the difficulties inherent in interdisciplinary social science research such as lack of shared meanings and the difficulty of staying current in more than one field (Heberlein, 1988), the diverse perspectives represented in the field of human dimensions allow a more comprehensive understanding of topics such as hunting participation. While interdisciplinary social science perspectives will continue to have a prominent position within the field, it is important to continue to promote economic and social fact (i.e.

interpretations of human action that are not reducible to the individual) based interpretations. For example, economic analyses allow wildlife professionals to make educated predictions of fiscal shortfalls resulting from hunting declines and social fact based research allows wildlife professionals to better understand hunter attitudes and preferences that are difficult to understand at the individual level because they emanate from group level processes.

Human dimensions of wildlife researchers often suggest informally that there is a bias toward the use of social psychological approaches in human dimensions of wildlife literature. The current analysis found hunting participation researchers well represented by scholars with both sociological and social psychological backgrounds (though articles tended to highlight social psychological perspectives more so than sociological perspectives). An objective measure of this relationship is the number of citations from psychological or social psychological journals within the hunting participation articles included in the analysis. In the case of HDW there are minimal references to prominent disciplinary social science journals associated with organizations such as the American Sociological Association or the American Psychological Association with social psychological journals having the fewest references. This does not indicate an overall preference for sociological orientations as six articles referenced sociology journals while nine referenced either social psychology, psychology, or prominent journals in both disciplines. In spite of the lack of references to social psychological parent journals the keyword search indicated the phenomena of most interest to social psychologists (i.e., attitudes, norms, and values) were a primary focus of selected articles.

Increased interest in the topic of hunting participation (as measured by the number of publications on this topic) coincides with two significant events. The first is the publication of the U.S. Fish and Wildlife Service's 2002 report on U.S. Fishing, Hunting, and Wildlife-Associated Recreation (FHWAR). The FHWAR reports had already documented a declining trend in hunting numbers; however, the trend was obscured by changes in methodology between the 1985 and 1991 surveys (U.S. Department of the Interior, 2006). The 2002 report made it clear that the decline in hunting participation had continued. The second event was the discovery of chronic wasting disease in wild deer herds in states such as South Dakota, Illinois, and most notably Wisconsin in 2002 (Gigliotti, 2004; Holsman & Petchenik, 2006; Miller, 2004; Vaske et al., 2004). In 2004 four of the nine articles published focused on the implications of chronic wasting disease for hunting participation. A similar increase in publications was noticed in 2006 following the detection of chronic wasting disease in New York.

The institutional source and physical location of hunting participation research are not highly diverse. Much of the research is associated with a limited number of universities and tends to reflect the spatial location of those institutions. The location of hunting participation research is typically the Mountain, East North Central, and mid-Atlantic areas. The spatial distribution is tied to universities with long-standing human dimensions programs (e.g., Colorado State University and Cornell University).

Alternative Food Supporter Recruitment

Consumers of alternative food are perceived as an ideal market segment to target for hunting recruitment because they: 1) support food ideologies that are typified by wild game, 2) are not a traditional hunting demographic, and 3) could potentially improve hunter perception in urban locations through sharing wild game meat. However, little empirical scholarship has examined the relationship between alternative food supporters and hunting attitudes and behaviors. Ohio residents and hunters were asked to respond to a survey including questions specific to alternative food support, drawing samples of both licensed hunters as well as households to explore support for alternative food types as well as attitudes toward hunting. This sampling approach allowed an examination of relationships between food sourcing preferences and hunting behavior and also provided robust estimates of support for hunting among hunters and nonhunters alike. Finally, examining individual types of alternative food support allowed a more intricate understanding of alternative food supporters' relationship with hunting and which, if any, types of alternative food supporters should be targeted for recruitment.

The current study indicated wild game meat support positively correlated with hunting behavior and support for hunting. Of the alternative food support items examined, support for non-GMO food was the strongest positive correlate of hunting support. Support for organic foods was also a strong correlate, but the correlation was negative—meaning people who preferred organic foods were less likely to have positive attitudes toward hunting. The connection between alternative food support and support for hunting only held for nonhunters within the context of certain types of alternative

foods. The two most appropriate alternative food descriptors for wild game (local and seasonal) have no significant relationship with hunting support among nonhunters. The alternative food preference factor score was not correlated with attitudes toward hunting or engagement with hunting in any model. The wild game meat factor score was significant in every model examined. The models included support for wild game with support for hunting and hunting engagement as dependent variables.

Though the percent of hunters who hunt for the meat does not follow a linear trend, recent increases in hunting for meat and urban food ideologies might conflate two phenomena. On the one hand hunting for meat is increasingly cited motivation by hunters and on the other alternative food ideologies are increasing. The level of motivation to hunt for meat is likely static among those who can hunt economically, but may be more salient due to popular alternative food ideologies and downturns in economic conditions potentially leading to inflated importance in reporting meat hunting motivations. For example, according to recent analyses of survey data (Responsive Management, 2013b; Responsive Management & National Shooting Sports Foundation, 2008) hunting for the meat was a more popular option when the United States was facing long recessions. Hunting for meat might be a justification that is used more often during difficult economic times to justify recreation expenditures. The question examined in chapter 3 was to what extent is alternative food support is related support for meat hunting motivations. The current data indicate little connection between the two factors that would support current efforts to target alternative food themed recruitment programs.

Interest in alternative foods is increasing among the general population, while hunting support is decreasing. This suggests that either alternative food consumers are actively choosing to avoid self-provisioning of wild game or alternative food supporters are not aware of hunting opportunities. If alternative food consumers are not aware of hunting opportunities the lack of awareness likely points to cultural and social barriers that are more influential among nontraditional hunters. Another important factor might be a fundamental misunderstanding of alternative food support. The literature describing locavore ideology often describes the individual as a consumer as opposed to producer (DeLind, 2011). Kemp, Insch, Holdsworth, & Knight (2010) found surveys of food attitudes were incongruent between food selection behaviors. What wildlife professional's view as a shift in potential sourcing preference may only represent a shift in consumer producer relations. Hunting participation is not the same type of act nor is it a similar commitment on the part of the individual as choosing between nonorganic and organic at the meat counter.

The lack of association between alternative food and hunting support does not end the debate on targeting alternative food supporters. In only one model (support for hunting on public land among nonhunters) did an alternative food item indicate a negative association. One could make an argument that a nonsignificant relationship allows for more focus on this group as a negative relationship was not found. In essence the respondents' lack of a significant relationship could indicate a group that is primed for recruitment because they do not have strong attitudes for or against hunting allowing

them to be more easily swayed by recruitment campaigns as opposed to those who have negative attitudes toward hunting.

Consumption of wild game by urban locavores may counteract negative perceptions of hunting. Heberlein & Ericsson (2005) noted that consumption increased positive attitudes toward hunters. The problem is that in that case wild game is available for sale and rural residents are more likely to exchange with themselves than urban residents (Hofferth & Iceland, 1998) due to proximity and also as a result of the stronger bonding capital among rural groups than urban (Sørensen, 2014). In the U.S. wild game is largely not available for sale and few urban residents have strong connections to rural residents.

Support for alternative food is thought to be a possible motivation for hunting initiation and the social network implications inherent in gifting and sharing food helps to place the largely cognitive analysis within a greater social framework. But, the data in the current study indicate alternative food may not be lead to hunting behaviors or indicate greater support for hunting. The attitude based assessment of alternative food support contrasts with more macro level factors related to individuals such as in chapter four.

Postmaterialism and Wildlife Value Orientations

The synthesis of Manfredo's wildlife value orientations with Inglehart's postmaterialist hypothesis attempts to address social forces such as income, education and place size in conjunction with values derived from individual cognitions (see , Teel, & Henry, 2009; Manfredo, Teel, & Bright, 2003). The current study examined the

relationship between PREP, traditional socioeconomic indicators, postmaterialist values, and WVOs. In addition, examination of these variables in different spatial locations will indicate potential regional discrepancies in WVOs within the United States.

The data indicate an interesting difference between the individual and aggregate results. Mainly Manfredó et al. (2009, p. 209) found significant individual level relationships between all variables and WVOs, apart from age in relation to mutualism. The current data indicate income is significantly correlated with mutualism while place size and education are significantly correlated with domination. For example, in contrast to Manfredó et al. (2003), urbanites were not more mutualist, and those with lower incomes were not more domination orientated. In contrast to Manfredó et al. (2009) and similarly to Gamborg & Jensen (2016) in the current sample higher educated respondents were positively correlated with domination WVOs.

PREP may be thought to represent a similar construct as income, but it behaved differently than income in the current models. The most interesting finding related to PREP is that PREP is positively correlated to domination orientations and negative to postmaterialist values. That means as respondents perceive they are performing better than those around them they are more likely to be domination oriented and less likely to be postmaterialist. If aggregate relationships were the same as in individual data we would expect the opposite relationship.

The current work did not find significant correlations between postmaterial values and socioeconomic variables between age cohorts. Manfredó et al. (2009) found a significant (but weak) correlation between age and WVOs for individual level effects, but

age was not a significant correlate of WVOs or postmaterial values in the current work. Similarly no relationship was found in the current data when comparing WVOs and postmaterial values by cohort. If postmaterial value change is fueled by intergenerational replacement and the replacement cohorts do not differ significantly in postmaterial values we would not expect significant shifts in domination or mutualism and ultimately attitudes and behaviors by age as indicated in Manfredo et al. (2009).

Implications

Heberlein (1991) was one of the first hunting participation researchers to note the potential effect of shifting values in the U.S. on the number of hunters in the U.S. As he did so he noted the association between structural and economic factors with value shift. He was careful to link individual social conditions to individual behaviors and we would do well to follow his lead. The aggregate data, with its minimized variance, tends to paint a picture of consistent economic and social effects on values that in turn lead to reduced hunting rates. But the individual data are not as clear on the subject. It may be that our measurement of socioeconomic characteristics inhibits us from making the more direct connection between social class and behaviors. In the absence of these better measures values are a useful proxy but not a causal factor. For example we see with the data more urban, educated, and affluent states are more mutualists, but mutualism is not necessarily mutually exclusive with hunting. It may be that individuals are mutualists in relation to pets, but more utilitarian with livestock and wildlife. Often those urban elites are not given the opportunity to comprehensively assess their values in multiple contexts. We see anecdotal evidence of this potential value conflict in hunters. They feel their bird

dog is a part of the family, but have no qualms about shooting wild birds. This is why we should not ignore the individual level data for the state level data. Both are necessary and the combination of these two types of data potentially indicate that behaviors are fueled by class and access factors that have been touched on in past research (see Stedman & Heberlein, 2001). Though analyses in this and previous work promote greater inclusion of macro level indicators researchers should continue to include indicators such as social class and social networks to better understand hunters in order to better serve the dwindling number of remaining hunters and plan more effective management plans based on this continued hunting decline.

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Appendix A. Meta-analysis Articles

Table A.1

Articles Included in Meta-analysis 2001-2010

Author	Year	Journal	Study Location	Species of Interest	Disciplinary References
Daigle, Hrubes, & Ajzen	2002	Human Dimensions of Wildlife Society Bulletin	Vermont	General Hunting	Social Psychology and Psychology
Grilliot & Armstrong	2005	Leisure Sciences Human Dimensions of Wildlife Society Bulletin	Alabama	General Hunting	Social Psychology
Li, Zinn, Barro, & Manfredo	2003	Human Dimensions of Wildlife Society Bulletin	Colorado/Pennsylvania	General Hunting	Sociology
Fulton & Manfredo	2004	Wildlife Society Bulletin	Colorado	Deer	None
Kilpatrick, LaBonte, & Seymour	2002	Leisure Sciences	Connecticut	Deer	None
Hunt, Haider, & Bottan	2005	Human Dimensions of Wildlife Society Bulletin	Ontario	Moose	None
Manfredo, Fix, Teel, Smeltzer, & Kahn	2004	Human Dimensions of Wildlife Society Bulletin	Colorado	Elk	None
Mangun, Throgmorton, Carver, & Davenport	2007	Wildlife Society Bulletin	Kentucky	Deer	None
Kilpatrick, LaBonte, Barclay, & Warner	2004	Human Dimensions of Wildlife Society Bulletin	Connecticut	Deer	None
Diefenbach et al.	2005	Human Dimensions of Wildlife Society Bulletin	Pennsylvania	Bear and Deer	None

Continued

Table A.1 continued

Author	Year	Journal	Study Location	Species of Interest	Disciplinary References
Ward, Stedman, Luloff, Shortle, & Finley Vaske, Timmons, Beaman, & Petchenik	2008	Society and Natural Resources	Pennsylvania	Deer	None
Brunke & Hunt	2004	Human Dimensions of Wildlife	Wisconsin	Deer	None
Miller Stedman, Bhandar, Luloff, Diefenbach, & Finley	2007	Human Dimensions of Wildlife	Arkansas	Waterfowl	None
Miller Stedman, Bhandar, Luloff, Diefenbach, & Finley	2004	Human Dimensions of Wildlife	Illinois	Deer	None
Poudyal, Cho, & Bowker	2008	Human Dimensions of Wildlife	Pennsylvania Alabama, Georgia, North Carolina, South Carolina, Tennessee, Virginia, Kentucky, Arkansas, Texas, and Louisiana	Deer	Sociology
Miller & Graefe	2008	Human Dimensions of Wildlife	Pennsylvania	General Hunting	None
Miller & Graefe	2001	Human Dimensions of Wildlife	Pennsylvania	Deer	None
Bartel & Brunson Bhandari, Stedman, Luloff, Finley, & Diefenbach	2003	Society Bulletin	Utah	Furbearers	None
Luloff, Finley, & Diefenbach Schulz, Millspaugh, Zekor, & Washburn	2006	Human Dimensions of Wildlife	Pennsylvania	Deer	None
Washburn	2003	Wildlife Society Bulletin	None	General Hunting	None

Continued

Table A.1 continued

Author	Year	Journal	Study Location	Species of Interest	Disciplinary References
Anderson & Fulton	2008	Human Dimensions of Wildlife	Minnesota	General Hunting	Social Psychology and Psychology
Mehmood, Zhang, & Armstrong	2003	Human Dimensions of Wildlife	Alabama	General Hunting	None
Heberlein, Serup, & Ericsson	2008	Human Dimensions of Wildlife	North America/Europe	General Hunting	Sociology
Brown et al.	2006	Human Dimensions of Wildlife	New York	Deer	None
Needham, Vaske, & Manfredo	2004	Human Dimensions of Wildlife	Arizona, Colorado, Nebraska, North Dakota, South Dakota, Utah, Wisconsin, Wyoming	Deer	None
Gigliotti	2004	Human Dimensions of Wildlife	South Dakota	Deer	None
Stedman & Heberlein	2001	Rural Sociology	United States	Deer	Sociology
Zinn	2003	Wildlife Society Bulletin	Colorado/Pennsylvania	General Hunting	Social Psychology
Miller & Vaske	2003	Human Dimensions of Wildlife	Illinois	General Hunting	None
Schroeder, Fulton, & Lawrence	2006	Wildlife Society Bulletin	Minnesota	Waterfowl	None
Brunke & Hunt	2008	Human Dimensions of Wildlife	Mississippi	Waterfowl	None
Hayslette, Armstrong, & Mirarchi	2001	Human Dimensions of Wildlife	Alabama	Dove	None
Zinn, Manfredo, & Barro	2002	Human Dimensions of Wildlife	Colorado/Pennsylvania	General Hunting	Social Psychology

Continued

Table A.1 continued

Author	Year	Journal	Study Location	Species of Interest	Disciplinary References
Fulton & Hundertmark	2004	Human Dimensions of Wildlife	Alaska	Moose	Social Psychology
Heberlein	2002	Human Dimensions of Wildlife	Wisconsin	Deer	Sociology
Holsman & Petchenik	2006	Human Dimensions of Wildlife	Wisconsin	Deer	None
Cooper, Pinheiro, Unsworth, & Hilborn	2002	Wildlife Society Bulletin	Idaho	Elk	None Social Psychology
Hrubes, Ajzen, & Daigle	2001	Leisure Sciences	Vermont	General Hunting	and Psychology
Lyon & Vaske	2010	Human Dimensions of Wildlife	Arizona, North Dakota, South Dakota, Wisconsin	Deer	None
Jagnow, Luloff, Finley, & San Julian	2008	Human Dimensions of Wildlife	Pennsylvania	Deer	Sociology
Green, Grijalva, & Kroll	2004	Human Dimensions of Wildlife	New York	General Hunting	None Social Psychology
Heberlein & Stedman	2009	Human Dimensions of Wildlife	Wisconsin	Deer	and Psychology
Boxall, Watson, & McFarlane	2001	Human Dimensions of Wildlife	Alberta	General Hunting	None Social Psychology
Whittaker, Vaske, & Manfredo	2006	Society and Natural Resources	Alaska	General Hunting	and Psychology

Continued

Table A.1 continued

Author	Year	Journal	Study Location	Species of Interest	Disciplinary References
Needham, Vaske, & Manfredo	2006	Human Dimensions of Wildlife	Arizona, Colorado, Nebraska, North Dakota, South Dakota, Utah, Wisconsin, Wyoming	Deer	None
Little & Berrens	2008	Human Dimensions of Wildlife	New Mexico, Utah, Colorado, Arizona	Big game	None
Floyd & Lee	2002	Human Dimensions of Wildlife	Texas	General Hunting	None
Manfredo, Teel, & Bright	2003	Human Dimensions of Wildlife	Alaska, Arizona, Colorado, Idaho, North Dakota, South Dakota	General Hunting	Sociology
Mcfarlane, Watson, & Boxall	2003	Human Dimensions of Wildlife	Alberta	General Hunting	None

Appendix B. Survey Instrument

OHIO OUTDOOR RECREATION STUDY OHIO RESIDENT'S VIEWS ON WILDLIFE AND PUBLIC LAND MANAGEMENT



Researchers at *The Ohio State University* are conducting a study to learn more about Ohio resident's use of public lands, and attitudes toward public lands and wildlife management. Please take a few moments to share your views about how wildlife should be managed. **When you are finished filling out this questionnaire, simply drop it in the mail; postage has been paid.**



THE OHIO STATE UNIVERSITY

SCHOOL OF ENVIRONMENT AND NATURAL RESOURCES

210 Kottman Hall | 2021 Coffey Road | Columbus, Ohio 43210

About this study:

Researchers at the Ohio State University are conducting a study to learn more about Ohio resident's use of public lands, and attitudes toward various land management policies. In particular, we are interested in your use of Ohio's *wildlife areas*. A *wildlife area* is land owned by the Ohio Department of Natural Resources, Division of Wildlife that is managed primarily to benefit wildlife and wildlife dependent recreation such as hunting, fishing, and wildlife watching. The Division of Wildlife manages over 195,000 acres of land in Ohio as wildlife areas. The funds used to manage these lands come from hunting and fishing license sales as well as Federal grants primarily from the US Fish & Wildlife Service, not state tax dollars. The information you provide will be used to assist the Ohio Division of Wildlife in their planning and management of Ohio's *wildlife areas* in addition to shaping wildlife management strategies across the state.

Confidentiality:

As researchers representing the Ohio State University and the Ohio Division of Wildlife we take confidentiality very seriously and many safeguards are in place to ensure that individual responses are not linked to any individual respondent. To ensure that the responses you provide will not be traced back to individual respondents after the data have been collected any identifying information will be disassociated from response data.

Survey Length:

This survey will likely take 15-20 minutes to complete.

Questions about this project:

For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.

If you have any comments or questions about the research topic feel free contact Jeremy Bruskotter at 614-247-2118 or bruskotter.9@osu.edu. You can also contact Adam Pettis at 614-292-2179 or pettis.19@osu.edu.



Jeremy Bruskotter
Assistant Professor
School of Environment and Natural Resources
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Adam Pettis
Rural Sociology Ph.D. Student
School of Environment and

A. YOUR WILDLIFE-RELATED RECREATION

A1. The first set of questions concern your recent participation in wildlife-related recreation in Ohio. Please indicate which of the following activities you participated in during the past 12 months (on the left) and whether the activity was on private or public land, or both (on right).

<i>Yes / No</i>	<i>Activity</i>	<i>If Yes...</i>	<i>On Public land, Private land or both?</i>
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Both	Hunting deer		<input type="checkbox"/> Public only <input type="checkbox"/> Private only
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Both	Hunting turkey		<input type="checkbox"/> Public only <input type="checkbox"/> Private only
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Both	Hunting waterfowl		<input type="checkbox"/> Public only <input type="checkbox"/> Private only
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Both	Hunting rabbit or squirrel		<input type="checkbox"/> Public only <input type="checkbox"/> Private only
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Both	Hunting pheasant, grouse, quail		<input type="checkbox"/> Public only <input type="checkbox"/> Private only
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Both	Hunting (other: _____)		<input type="checkbox"/> Public only <input type="checkbox"/> Private only
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Both	Fishing (for any species)		<input type="checkbox"/> Public only <input type="checkbox"/> Private only
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Both	Wildlife photography		<input type="checkbox"/> Public only <input type="checkbox"/> Private only
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Both	Birding (bird watching)		<input type="checkbox"/> Public only <input type="checkbox"/> Private only
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Both	Wildlife viewing (other than birds)		<input type="checkbox"/> Public only <input type="checkbox"/> Private only

A2. Over the past 5 years, have you ever... (Circle one for each)

A. Purchased an Ohio conservation stamp (wetlands or wildlife legacy stamp)?	Yes No
Unsure	
B. Donated to the Ohio Division of Wildlife using the tax check-off option?	Yes No
Unsure	
C. Purchased an Ohio conservation license plate?	Yes No
Unsure	
D. Accessed information on the Ohio Division of Wildlife's web page?	Yes No
Unsure	
E. Called or written the Ohio Division of Wildlife to voice your opinion about the management of Ohio's wildlife resources?	Yes No
Unsure	
E. Taken a trip specifically to view wildlife (e.g., birding) in Ohio?	Yes No
Unsure	

Please indicate which of the following public lands you have visited.

	Natnl park	Natnl forest	St park	St forest	Natnl wildlife refuge
In Ohio	<input type="checkbox"/>				
In other states	<input type="checkbox"/>				

A3. Have you ever hunted (circle one)? Yes / No If no skip to section C

A3a. In what year did you first hunt (any species)? _____

A3b. In what year did you first hunt (any species) in Ohio? _____

A4. Please estimate how many animals you harvested during the past 12 months
(please answer for each category):

Antlered deer _____
 Antlerless deer _____
 Waterfowl _____
 Turkey _____

Rabbit _____
 Squirrel _____
 Pheasant _____
 Quail _____

A5a. During the past 12 months how many days did you hunt for...
 Deer _____ days
 Small game _____ days
 Waterfowl _____ days

A5b. On your average day of hunting, please estimate how many hours you hunted for...
 Deer _____ hours
 Small game _____ hours
 Waterfowl _____ hours

A6. Please estimate how much you spent on hunting activities during the past 12 months?
(please answer for each category)

\$_____ Equipment (e.g., guns, ammunition, decoys, camouflage, etc.)
 \$_____ Lodging (e.g., motels, lodges, cabins, or campgrounds, etc.)
 \$_____ Travel (e.g., fuel costs, meals, refreshments, etc.)
 \$_____ Land access fees (e.g. lease, rent, hunting club, etc.)
 \$_____ Hunting dog(s) (e.g., feed, veterinary bills, etc.)

B. HUNTING IN OHIO

The next set of questions concern deer hunting in Ohio. If you have not hunted in at least one of the most recent 5 years, please skip to section C.

B1. If you hunted deer in Ohio during the last year, please indicate which weapons you have hunted with. (check all that apply)

Shotgun Muzzleloader Handgun Crossbow Bow

B2. If you recall the physical characteristics for any of the deer you harvested during the most recent deer hunting season...

	1st deer	2nd deer	3rd deer
What was the age?	_____	_____	_____
What was the weight?	_____	_____	_____
How many antler points?	_____	_____	_____

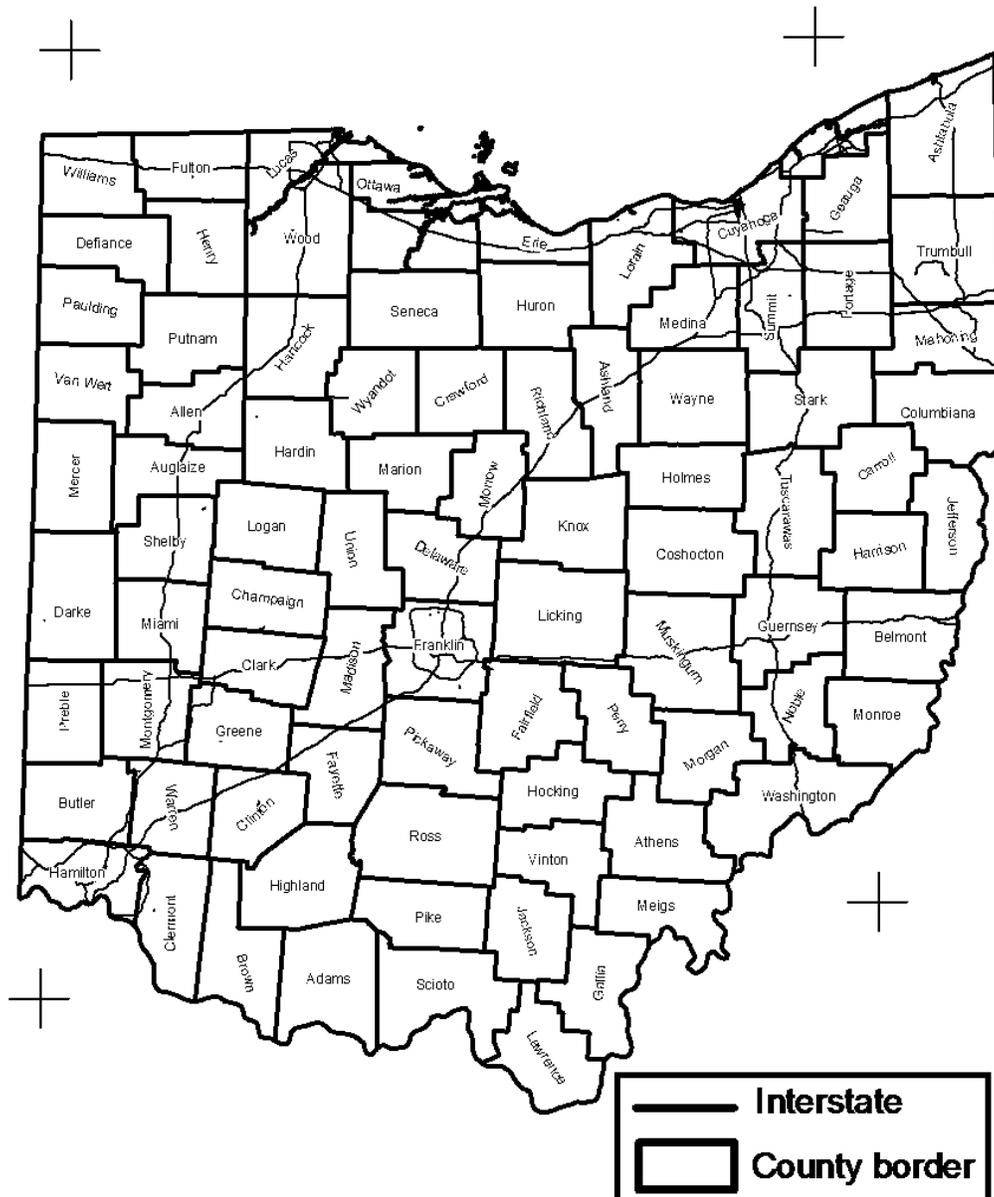
B3. Please indicate the extent to which you agree or disagree with each of the following statements.

Strongly disagree	Somewhat disagree	Neutral	Some what agree	Stron gly agree
-------------------	-------------------	---------	-----------------	-----------------

Where I hunt there are too many does compared to bucks.	-2	-1	0	1	2
Sex ratios (the number of bucks to does) are important for deer herd health.	-2	-1	0	1	2
Only bucks over 2 1/2 years old should be harvested.	-2	-1	0	1	2
In my hunting area there are too many deer.	-2	-1	0	1	2

B4. Please estimate the total number of hours that you spent scouting for deer in the last 12 months. (DO NOT include those hours you were actually hunting) _____
hours

B5. Think of the location where you hunt deer most often, waterfowl most often and small game most often. Please make an "X" for each hunting location (label with "D" for deer, "W" for waterfowl or "S" for small game). (Dark lines indicate county boundaries, light line indicate interstate highways).



If you know the address for the deer location, enter it on the line below.

C. VISITING OHIO WILDLIFE AREAS

A **wildlife area** is land owned by the Ohio Department of Natural Resources, Division of Wildlife that is managed primarily to benefit wildlife and wildlife dependent recreation such as hunting, fishing, and wildlife watching. Please take a few moments to tell us about your recreation at **Ohio's wildlife areas**.

C1. Do you plan to visit any wildlife area during the next 12 months? (Circle one)

No | Yes | Not Sure

C2. Have you ever visited a wildlife area in Ohio? (Circle one)

No | Yes | Not Sure

If no, skip to section D.

C3. How often have you visited any wildlife area during the last 12 months? _____visits

C4. How many miles did you travel (*one way*) to get to the wildlife area you visited most? _____miles

C5. Please look at the list of activities below and indicate how many times you have participated in each of the activities at ANY Ohio wildlife area during the past 12 months.

	Did not participate in this activity	1-5 times	6-10 times	11-15 times	16 or more times
A. Hunting any type of game species	NA	1	2	3	4
B. Fishing	NA	1	2	3	4
C. Shooting rifle, pistol, shotgun, archery at range	NA	1	2	3	4
D. Bird / wildlife-watching	NA	1	2	3	4
E. Berry / mushroom / nut hunting	NA	1	2	3	4
F. Looking for wildflowers	NA	1	2	3	4
G. Outdoor photography	NA	1	2	3	4
L. Hiking / camping	NA	1	2	3	4

C6. If you hunted at a wildlife area, what species did you hunt for? (Check all that apply)

- | | | |
|---|------------------------------------|---|
| <input type="checkbox"/> Deer | <input type="checkbox"/> Pheasant | <input type="checkbox"/> Turkey |
| <input type="checkbox"/> Dove | <input type="checkbox"/> Quail | <input type="checkbox"/> Woodcock |
| <input type="checkbox"/> Ducks | <input type="checkbox"/> Rabbit | <input type="checkbox"/> Did not hunt in a WA |
| <input type="checkbox"/> Geese or Brant | <input type="checkbox"/> Squirrel | <input type="checkbox"/> Other: _____ |
| <input type="checkbox"/> Grouse | <input type="checkbox"/> Wild boar | |

C7. If you hunted at a wildlife area, did you hunt with a dog? (Circle one) No | Yes

C8. Generally speaking, how satisfied or dissatisfied were you with your experience at wildlife areas you visited over the last 12 months? (Check one)

- Very satisfied
- Somewhat satisfied
- Neither satisfied nor dissatisfied
- Somewhat dissatisfied
- Very dissatisfied

C8. If you were dissatisfied with an experience at a wildlife area, what was the cause?

D. MANAGEMENT OF OHIO'S WILDLIFE AREAS

D1. What types of activities should be permitted in Ohio's Wildlife Areas? (Please indicate the extent to which you support or oppose permitting each activity in Ohio's Wildlife Areas).

Activity	Strongly oppose activity	Somewhat oppose activity	Neither support nor oppose	Somewhat support activity	Strongly support activity
A. Hunting	-2	-1	0	1	2
B. Hunting/fishing access for the disabled	-2	-1	0	1	2
C. Trapping	-2	-1	0	1	2
D. Range shooting (e.g., rifle, pistol)	-2	-1	0	1	2
E. Bird / wildlife-watching	-2	-1	0	1	2
F. Berry / mushroom / nut hunting	-2	-1	0	1	2
G. Fishing	-2	-1	0	1	2
E. Other: _____	-2	-1	0	1	2

D2. In my opinion, the amount of public land available for hunting in Ohio... (Check one)

- Exceeds what is needed
- Is about right for meeting demand
- Is not adequate for meeting demand

E. YOUR OPINIONS, ETHICS AND VALUES

E1. To what extent do you agree or disagree with the management of Ohio's wildlife?

I feel that the Ohio Division of Wildlife...	Strongly disagree	Somewha t disagree	Neutral	Somewha t agree	Stron gly agree
A. ...shares similar values as me.	-2	-1	0	1	2
B. ...takes similar actions as I would.	-2	-1	0	1	2
C. ...shares similar goals as me.	-2	-1	0	1	2

E2. Below are statements that represent a variety of ways people feel about fish and wildlife and the natural environment. Please indicate the extent to which you disagree or agree with each statement. (Circle one number for each statement)

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
Humans should manage fish and wildlife populations so that humans benefit.	-3	-2	-1	0	1	2	3
We should strive for a world where there's an abundance of fish and wildlife for hunting and fishing.	-3	-2	-1	0	1	2	3
The needs of humans should take priority over fish and wildlife protection.	-3	-2	-1	0	1	2	3
Animals should have rights similar to the rights of humans.	-3	-2	-1	0	1	2	3
People should never be allowed to use any fish or wildlife for any reason.	-3	-2	-1	0	1	2	3
It is acceptable for people to kill wildlife if they think it poses a threat to their life.	-3	-2	-1	0	1	2	3
It is acceptable for people to kill wildlife if they think it poses a threat to their property.	-3	-2	-1	0	1	2	3
The natural environment should be protected for its own sake rather than simply to meet our needs.	-3	-2	-1	0	1	2	3
Diverse wildlife populations improve the environment for people.	-3	-2	-1	0	1	2	3
Wildlife has intrinsic value (i.e. more than use value to people).	-3	-2	-1	0	1	2	3
It is my responsibility to improve wildlife habitat through either direct or indirect means.	-3	-2	-1	0	1	2	3

E3. People sometimes talk about what the aims of this country should be for the next ten years. Listed below are some of the goals which different people would give top priority.

E4a. Would you please indicate which one of these you, yourself find most important by circling the number next to you answer for first and second choice.

	First Choice	Second Choice	
A high level of economic growth	1	2	} Choose only one first choice and one second choice.
Making sure this country has strong defense forces	1	2	
Seeing that people have more say about how things are done at their jobs and in their communities	1	2	
Trying to make our cities and countryside more beautiful	1	2	
Don't know	1	2	

E4b. If you had to choose, which one of the options below would you say is most and next most important?

	First Choice	Second Choice	
Maintaining order in the nation	1	2	} Choose only one first choice and one second choice.
Giving people more say in important government decisions	1	2	
Fighting rising prices	1	2	
Protecting freedom of speech	1	2	
Don't know	1	2	

E4c. Here is another list. In your opinion, which one of these is the most and next most important?

	First Choice	Second Choice	
A stable economy	1	2	} Choose only one first choice and one second choice.
Progress toward a less impersonal and more humane society	1	2	
Progress toward a society in which ideas count more than money	1	2	
The fight against crime	1	2	
Don't know	1	2	

F. Wild Game as a Food Source

F1. How important to you is it to purchase foods that are...

Very important	Important	Moderately important	Low importance	Not at all important
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Organic food	0	1	2	3	4
Local food	0	1	2	3	4
Seasonal food	0	1	2	3	4
Non-genetically modified food	0	1	2	3	4

F2. Please indicate the extent to which you agree or disagree with each of the following statements.

	Strongly disagree	Somewhat disagree	Neutral	Somewhat agree	Strongly agree
Wild game is healthier than meat grown conventionally on a farm	-2	-1	0	1	2
Given the choice I would rather eat wild deer meat than farm raised beef	-2	-1	0	1	2
Wild game meat is an organic food source	-2	-1	0	1	2
I support legalizing the sale of wild game meat	-2	-1	0	1	2

F3. How concerned would you be about the following if it became legal to sell wild game meat.

	Very concerned						Not concerned		Don't know
	0	1	2	3	4	5	6	DK	
Adequate resources to regulate hunters	0	1	2	3	4	5	6	DK	
Adequate resources to regulate food safety	0	1	2	3	4	5	6	DK	
Increased poaching	0	1	2	3	4	5	6	DK	
Increased hunting pressure (number of hunters)	0	1	2	3	4	5	6	DK	
Decrease in game population	0	1	2	3	4	5	6	DK	
Increase in permit cost	0	1	2	3	4	5	6	DK	

G. ABOUT YOU

The following questions will help wildlife area managers to better understand the social and demographic characteristics of visitors, and be used to understand how visitors differ from the general public. Providing this information is strictly voluntary, but will allow game managers to make decisions that best serve hunters. For example, some hunters with white collar jobs might

prefer a different type of recreational setting than a blue collar worker. Knowing the ratio and location of these groups would allow game managers to provide hunting experiences that benefit all hunters. Remember that this information will be kept confidential and responses will not be associated with any individual.

G1. I am... (Circle one) Male | Female

G2. What is your age? _____ Years

G3. What is the highest level of education that you have completed? (Check one)

- | | |
|---|--|
| <input type="checkbox"/> Less than 9th grade | <input type="checkbox"/> Some college, business, or technical school |
| <input type="checkbox"/> Some high school, but no diploma | <input type="checkbox"/> Associate's degree |
| <input type="checkbox"/> High school graduate or GED | <input type="checkbox"/> Bachelor's degree |
| | <input type="checkbox"/> Graduate degree (MS, MD, JD, PHD) |

G4. What is your approximate annual household income from all sources before taxes? (Check one)

- | | |
|--|--|
| <input type="checkbox"/> Less than \$10,000 | <input type="checkbox"/> \$50,000 - \$74,999 |
| <input type="checkbox"/> \$10,000 - \$14,999 | <input type="checkbox"/> \$75,000 - \$99,999 |
| <input type="checkbox"/> \$15,000 - \$24,999 | <input type="checkbox"/> \$100,000 - \$149,999 |
| <input type="checkbox"/> \$25,000 - \$34,999 | <input type="checkbox"/> \$150,000 or more |
| <input type="checkbox"/> \$35,000 - \$49,999 | |

G5. Please describe your primary source of income.

- | | |
|--|---|
| <input type="checkbox"/> I own a business with at least one employee | <input type="checkbox"/> I am a part-time hourly employee |
| <input type="checkbox"/> I own a business and I am the only employee | <input type="checkbox"/> I am currently unemployed |
| <input type="checkbox"/> I am a salaried employee | <input type="checkbox"/> I am retired |
| <input type="checkbox"/> I am a full-time hourly employee | <input type="checkbox"/> Other _____ |

G6. Which best describes your current or last job held?

- Higher professional (ex. doctor, lawyer, clergy)
- Higher administrator (ex. CEO, national politician)?
- Technical (ex. nurse, teacher, lab tech)?
- Clerical (ex. secretary, office manager, bookkeeper)?
- Sales (ex. sales manager, insurance agent)?
- Service (examples: policeman, barber, janitor)?
- Skilled worker (ex. mechanic, electrician)?
- Semi-skilled worker (truck driver, baker)?

Unskilled worker (examples: fast food worker)?

G7. Compared with most of the people you know personally, (i.e. friends, family, neighbors, and work associates) would you say that your household income is:

- Far below average
- Below average
- Average
- Above average
- Far above average

G8. Compared with American families in general, would you say that your household income is:

- Far below average
- Below average
- Average
- Above average

Far above average

G9. Which of the following best

describes where you currently live?

- Large city (more than 50,000 residents)
- Medium city (more than 10,000, but less than 50,000 residents)
- Small town (less than 10,000 residents)
- Rural area (outside any city boundaries)

G10. Which of the following best describes where you grew up?

- Large city (more than 50,000 residents)
- Medium city (more than 10,000, but less than 50,000 residents)
- Small town (less than 10,000 residents)
- Rural area (outside any city boundaries)

G11. Are you a member of any of the following organizations? (Check all that apply)

Wildlife Groups

- National Audubon Society
- Ohio Ornithological Society
- National Wildlife Federation
- The Sierra Club
- Defenders of Wildlife
- Quality Deer Management
- Other? _____

Sportsmen's Groups

- Ducks Unlimited
- Pheasants Forever
- National Wild Turkey Fed.
- Boone & Crockett Club
- Trout Unlimited
- Walleyes Unlimited
- Other? _____

Please leave any additional comments here:

THANK YOU VERY MUCH FOR YOUR INPUT!

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