BELIEFS, ATTITUDES, AND INTENDED BEHAVIOR OF MINNESOTA DEER BOWHUNTERS

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ABSTRACT

This study investigated elements of bowhunter satisfaction and dissatisfaction as defined in Hendee's theory of the Multiple Satisfaction Approach. Previous studies on deer hunters had alluded to relationships between the bowhunter's attitudes of satisfaction/ dissatisfaction and their intentions. They discussed this relationship in the discussion of their findings. However, none of the studies attempted to empirically test this relationship. Using Ajzen and Fishbein's Reasoned Action model, this study attempted to test an empirical relationship between attitude and intention. Also included was an analysis of the social influence on the bowhunter's behavior. A significant relationship was found between attitude and intentions, however, the predictive power of the research model was of moderate magnitude. Behavioral belief elements in this study were compared with elements of satisfaction/dissatisfaction in previous hunter attitude studies and were found to be similar in meaning and order of ranking. A few of the

positive elements that ranked high in this study were seeing deer, viewing nature, and challenge and excitement of the hunt. Other bowhunter characteristics were investigated as well, such as number of deer harvested, seasons hunted, average number of days hunted per season, etc.

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Chapter 1

INTRODUCTION

Background of the Problem

The history of game management has seen several important changes in methods of measuring hunter satisfaction. Initially, game managers believed the amount of "game bagged" by the hunter was the key element for measuring hunter satisfaction. In other words, the greater the number of game bagged the greater the hunter's satisfaction. However, managers today can no longer keep pace with growing demands of hunters merely by producing more game. Dramatic increases in game populations have been achieved, but the population of hunters has also increased. This means the probability of success has decreased for the majority of hunters and the quality of hunting in general has begun to deteriorate. For example, increased bowhunting pressures in some areas has caused changes in the deer's natural patterns of behavior and ultimately forces the bowhunter to change his traditional hunting techniques. Also, in some states herd sizes have been allowed to reach such high levels as to cause

significant loss and destruction of domestic crops all in the name of sport hunting. For these reasons and many others it can be seen that the "game bagged" approach was no longer appropriate.

As a result, a new method of measuring hunter satisfaction was implemented. It was called "days afield." With this method, the amount of game bagged was still important; however, managers began using the number of man-days of recreation as a measure of hunter success or satisfaction. The "days afield" approach implies that hunter satisfaction is maximized by increasing the number of man-days of recreation spent in the field. In addition, managers began using the jargon phrase "quality of experience." However, this approach did not really identify a method for assessing the characteristics of a quality hunting experience. Rather, it assumed that there would be a constant increase in levels of benefits per hunter man-days regardless of success or what was actually experienced in terms of enjoyment. For example, managers believed that if they doubled or tripled the number of days in a season and/or the number of hunters permitted in the field, the harvest rate and quality of the hunting experience would improve. This belief does not hold true, however in all cases. In some cases, it merely reduces the success rate per hunter and may have led to unsafe

hunting conditions. What was needed then was an approach that would identify and measure possible benefits of hunting other than just success rate.

Just such an approach soon followed. The approach evolved as a logical extension of "game bagged" and "days afield" theories. Hendee (1969) terms it the "multiple satisfaction" approach and it has been supported in a study done by Potter, Hendee, and Clark (1973). Hendee's theory works on the premise that there is a broad range of satisfying elements within hunting behavior that can be experienced. Included are both consumptive and nonconsumptive forms of satisfaction. Actually taking or killing the deer would be considered consumptive whereas viewing nature or enjoying peace and solitude while hunting would be considered nonconsumptive. The most significant aspect of this approach is that it takes a more indepth look into what ingredients are necessary for a quality hunting experience. Also, by identifying a variety of satisfaction elements it tends to deemphasize the importance of bagging a deer.

Additional support for this multiple satisfaction approach can also be evidenced by the paradox that exists in many hunting regions of America today. Although the success rate of hunters is declining and the number of hunters is increasing, hunters continue to hunt and have

not reached a peak threshold level where they stop hunting (Stankey & Lucas, 1973). Hendee's (1974) "multiple satisfaction" theory has stimulated other research investigators to develop methods and tools that will adequately identify important elements of satisfaction and dissatisfaction which add to or detract from the quality hunting experience. Knowledge of these elements could be of considerable use to natural resource managers responsible for the management of sport hunting. This study, like so many before it, is one more attempt to further clarify elements of satisfaction which influence the hunting experience.

Many broad, comprehensive studies on the sport of hunting as a recreational activity have been completed in recent years. Also, thousands of studies have been done on the white-tailed deer and several dozen have been done on the gunhunter. However, very few have been done on bowhunting deer hunters. There is one study that included bowhunters and is particularly pertinent to this study. The study, done by Jackson and Anderson (1983), was a survey of Wisconsin deer hunters. Jackson and Anderson compared elements of satisfaction found in both bowhunters and gunhunters. They compared the two groups by using 21 elements of satisfaction from Hendee's (1974) multiple satisfaction studies.

Jackson and Anderson's findings lend support to Hendee's concept of multiple satisfaction. They found that the actual killing or bagging of a deer was not ranked as one of the more significant satisfaction factors for either the bowhunter or the gunhunter. Additionally, they found that bowhunters expressed much higher levels of overall satisfaction than the gunhunters. This seems almost contradictory given the fact that the success rate amongst bowhunters who bag a deer is extremely low as compared to the rate for gunhunters. In 1984 46% of the licensed gunhunters in Minnesota bagged a deer where only 12% of the licensed bowhunters bagged a deer. Not only does this probably lend credence to Hendee's approach, but it also might be indicating that the elements of satisfaction enjoyed by the bowhunter are a sufficient substitute for the limited probability of bagging a deer.

Previous attitude studies on bowhunters have identified elements of hunter satisfaction which together make up the quality hunting experience desired by most hunters. In these studies the attitudinal-attributes have been ranked according to their perceived importance or degree to which they contribute to the overall perceived quality of the experience. Many of these studies have suggested a fundamental assumption that there is a causal relationship between the positive elements of attitudinal

satisfaction and the actual act or motivation to bowhunt. If this were true and game managers implemented these elements in the proper form and intensity, the manager should then be able to predict future hunter participation rates and levels of hunter satisfaction. Unfortunately this assumption has not been proven. These research studies do not empirically test the causal relationship between hunter attitudes of perceived satisfaction and the actual hunting behavior. Also, not taken into consideration in these studies is the social influence which might have an impact on hunter attitude and behavior. For example, a hunter may have very positive attitudes towards the various satisfactions and attributes of hunting, but may cease hunting because the spouse dislikes the idea of hunting and killing.

Dr. Thomas Heberlein (1983) stated at a Midwest Bowhunting Conference held in La Crosse, Wisconsin that little is known about the bowhunter in terms of scientific research, and yet, bowhunters are probably more committed to their activity than most recreation groups. He believes the bowhunter is seeking a higher quality of hunting satisfaction and is even willing to take a lower probability of success at bagging a deer to attain this goal.

Purpose of Study

The purpose of this study is to identify the underlying factors which determine the Minnesota bowhunter's decision to hunt deer. Ajzen and Fishbein's (1980) "reasoned action" model will be used to identify what beliefs, attitudes, and social influence affects the bowhunter's intention to hunt deer in Minnesota.

The model will assess the influence of salient attributes of satisfaction and dissatisfaction on the beliefs, attitudes, and subjective norms that underlie intention to bowhunt deer. According to Ajzen and Fishbein's theory a bowhunter's expressed intention to hunt is the immediate determinant of the behavior; in this case, bowhunting deer in Minnesota in the next five years. Intention, in turn, is a function of two basic determinants, one is personal attitude toward the behavior and the other social influence from others. Beliefs, behavioral and normative, are the immediate determinants of attitude toward the behavior and social influence.

If the statistical analyses within the model are found to be significant in predicting behavioral intention, then the specific objectives of this study will explore the following questions.

1. Are elements of belief in this model similar to elements of satisfaction found in previous hunter attitude studies? If so, how do they compare? Is there a difference in the order of their ranked importance?

2. How do bowhunters with strong and weak intentions to hunt in the next five years differ in their beliefs about hunting? Do they differ in their beliefs about the impact of social influence on their behavior? Do they differ on the following aspects of hunting: (a) number of seasons hunted, (b) number of days hunted in a season, (c) number of deer taken, (d) preference for hunting alone or with a group, and (e) age at which they first started hunting?

3. For the total sample population what were the statistical averages and ranges for the following demographic and hunter characteristics: (a) age, (b) sex, (c) seasons hunted, (d) number of deer taken, (e) average number of days hunted in a season, (f) age they first started hunting, and (g) time spent hunting alone, with one other person, and with a group?

Assumptions and Limitations

Assumptions

1. The random sampling method and sample size are assumed to be sufficient for accurate statistical analysis of the data in this study.

2. It is assumed in this study that the respondents, in the majority of cases, answered all questions honestly.

3. It is assumed, as stated in the theory of reasoned action, that a person's actions are under their volitional control and that their expressed intentions are the immediate determinant of their behavior.

4. A few respondents inadvertently skipped or missed questions; however, it is assumed that the small number will have no affect on the findings of this study.

Limitations

1. Limited funds and certain time constraints limited the size and depth of this study. More salient beliefs would have been analyzed along with additional external variables and the sample population would have been increased if more resources were available.

2. There seems to be some question among researchers as to whether the proposed measure of subjective norm used in this study is the best way to directly assess perceived

social pressure to perform or not perform a behavior. It must, however, be taken into account in order to explain social behavior.

3. Because only licensed bowhunters were surveyed, the question of intention to hunt will be heavily skewed toward the positive side of the bipolar scale. This may have some effect in lowering the overall significant correlations found in this study.

Definition of Terms

This section is devoted to defining important terms within this study so that the reader will fully understand the meaning and significance of the study. Many of the terms included here are confusing because investigators often have differing opinions on how to define these terms. The definitions given here pertain to the research method (Ajzen & Fishbein, 1980) used in this study and some of the literature which is reviewed in the following chapters of this study.

Attitude

Attitude is an index of the degree to which a person likes or dislikes an object or (in this study) a behavior. In this study no useful purpose is served by treating

reasons for and the consequences of a person's evaluation as part of attitude. Other research studies have included a person's perceptions, beliefs, motivations, intentions, etc. as a part of the attitude definition. In this study, however, each of these aspects are treated as separate concepts that can be related to attitudes.

Attitude toward the Behavior

This is a person's judgment that performing the behavior in question is either good or bad and that s/he is in favor of or against performing the behavior. It is a determinant of intention and is mediated by intention in predicting behavior.

Attributes

These are aspects of a recreational experience which have a major influence on the choice process of the activity. The major aspects are the physical setting where the activity occurs, social impact from other people, and the managerial activities that shape the nature of the recreational setting. Knowing the desired attributes can be helpful in understanding the choice process and behavior of people.

Behavioral Beliefs

Behavioral beliefs are specific attributes (see deer, view nature, etc.) of the behavior (bowhunting deer) which can be observed or experienced and are usually an outcome of the behavioral experience. Strength of these beliefs are measured by asking a person to indicate the likelihood that performing the behavior will result in their experiencing this attribute outcome. The summed products of all behavioral beliefs (likely/unlikely) and their respective outcome evaluations (good/bad) becomes a determinant of "attitude toward the behavior" and is mediated by attitude toward the behavior" and "intention" in predicting behavior.

Behavioral Elements

Behavioral elements are behavioral criterion which must correspond throughout the sequential steps in the research model.

Action. Single action or behavioral category of interest (bowhunting).

Target. Objective toward which the behavior is directed (deer).

Content. Location, setting, or atmosphere under which the action occurs (in Minnesota).

Time. A given point in time or a set time period in which the action is performed (next five years).

Cognitive Dissonance

Inconsistencies between cognitive elements (beliefs, attitudes, behaviors) causes dissonance. Dissonance is unpleasant and motivates the person to change one or more of the elements to bring about consistency between cognitive elements.

Correspondence

Behavioral elements (action, target, context, and time) within each of the respective sections of the research model (behavior, intention, attitude, subjective norm, and beliefs) must be identical.

Days Afield

This is a management method that measures the number of man-days of recreation to determine the quality of the hunting experience. It is determined by multiplying the total number of hunters times the number of days hunted in the season.

Elements and Dimensions

Elements are the smallest component parts found in the multiple satisfaction concept. Dimensions represent a major aspect of the hunting experience and are a consolidation or grouping of elements with similar meaning.

Expectancy-Value Model

This is a theory that says a person's evaluation (good/bad) of an object or action is strongly related to his/her expectations/beliefs that the object or action furthers or hinders the attainment of the desired goals.

External Variables

These are variables which are not considered a part of the reasoned actional model but which can sometimes enhance our understanding of the behavior. Personality traits and demographic characteristics are examples of these variables.

Game Bagged

This is a management method where the percentage of game bagged per number of hunters is calculated and used as a means of measuring hunter satisfaction.

Game Managers

Game managers are Natural Resource staff who are responsible for the management of sport hunting.

Intention

Intention is a person's response to the likelihood (likely/unlikely) of whether they will perform the behavior in question. An appropriate measure of intention is the most accurate predictor of behavior. Intention is a determinant of behavior (as per Ajzen & Fishbein, 1983).

Motivation to Comply

Generally speaking, this measures how likely or unlikely a person is to comply with the wishes of specific referent others. The summed products of all motivations to comply (likely/unlikely) and their respective normative beliefs (should/should not) becomes a determinant of "subjective norm" and is mediated by "subjective norm" and "intention" in predicting behavior.

Multiple Satisfaction

This is a method for measuring hunter satisfactions and benefits of the hunting experience. It measures both consumptive (killing deer) and nonconsuptive (viewing nature) elements of the experience.

Normative Beliefs

These are similar to subjective norms except that they involve specific individuals or groups (spouse, hunting friends, etc.) rather than a generalized term "important others." Strength of these beliefs are measured by asking a person to indicate whether s/he believes these referents think one should or should not perform the behavior in question. The summed products of all normative beliefs (should/should not) and their respective motivations to comply (likely/unlikely) becomes a determinant of "subjective norm" and is mediated by "subjective norm" and "intention" in predicting behavior.

Outcome Evaluation

This measures a person's evaluation of how good or bad it is to experience the consequences of a particular behavioral belief. The summed products of all outcome evaluations (good/bad) and their respective behavioral belief strengths (likely/unlikely) becomes a determinant of "attitude toward the behavior" and is mediated by "attitude toward the behavior" and "intention" in predicting behavior.

Quality

It is a human concept, dependent upon the fulfillment of certain needs or desires. In hunting it is achieved when the hunter experiences the desired elements of hunter satisfaction, along with a reasonable probability of success and is not hindered by elements of hunter dissatisfaction. Each element must be in the preferred form and intensity. Also, the hunter's perspective of quality is dynamic--continually changing with the increase in hunting experiences.

Reasoned Action

This is a theory (see Fishbein & Ajzen, 1975) and research method for understanding and predicting an individual's behavior (in this study--bowhunting deer in the next five years).

Referent

A referent is an individual or a specific group of people close to a person who can influence his/her thinking.

Salient Beliefs

These are a relatively small number of beliefs which best determine a person's attitude toward a behavior or

object. They are used to further understand a person's attitude toward a behavior.

Satisfactions/Dissatisfactions

These are the positive and negative elements of the recreational experience that effect the person's perceived quality of the experience.

Semantic Differential

This scaling method is used to get a more accurate measure of attitude. With a bipolar scale it asks the same question each time, but with different evaluators (important-unimportant, good-bad, nice-awful), and the sum of these scores provides a single score that measures a person's overall attitude toward the behavior or object.

Strong Intenders

In this study, strong intenders are those respondents who marked Question 6, intention, and Questions 7, 8, and 9, attitude, with a +3. This indicated that it was extremely likely they would hunt in the next five years and had an extremely positive attitude toward hunting in the next five years.

Subjective Norm

A subjective norm measures the degree to which important referent others can influence a person's intention to perform the behavior in question (social influence factor). It is a determinant of intention and is mediated by intention in predicting behavior.

Weak Intenders

In this study, weak intenders are those respondents who marked Question 6, intention, and Questions 7, 8, and 9, attitude, with a +1 or less. This indicated, at best, it was only slightly likely that they would hunt in the next five years and showed a less positive attitude toward the behavior than the strong intenders.

Chapter 2

REVIEW OF RELATED LITERATURE

Introduction

An extensive search was conducted for literature related to attitudes of satisfaction and dissatisfaction amongst bowhunters. In terms of documented research, periodicals, microfilm data, and research abstracts, there was a scarcity of information. A few studies were found which pertained to bowhunting. However, only one study investigated satisfaction and dissatisfaction of bowhunters. The search was broadened to include all forms of hunting and as expected more literature was found. The more pertinent of this literature will be reviewed under the category "hunting literature."

The "hunting literature" presents a review of the multiple-satisfaction approach to sport hunting, since it was this concept that was the impetus for most of the studies covered in this review. Two elements of satisfaction are discussed in detail: (a) the actual killing and taking of a deer and (b) the viewing and enjoying nature while hunting. These two elements are

discussed to some degree in much or most of the literature. In addition, the management implications relating to these research findings are discussed in order to show the benefits or purpose of these studies and the multiple satisfaction approach to management.

Another category included within this literature review explains and defends the research method employed in this study. This category, "theory of reasoned action literature," explains the theoretical basis for Ajzen and Fishbein's (1980) Reasoned Action theory.

Hunting Literature

Hunting has changed dramatically since the beginning of this century. It used to be viewed as a food-producing activity which also provided certain recreational sport hunting enjoyment for a predominantly rural population. Today, however, it has become primarily a field sport for a predominantly urban nation (Hendee, 1974). During this period of transition, methods of game management changed and the hunter's attitude on the benefits of hunting changed. To the former hunter the ultimate enjoyment and benefit of hunting was bagging a large number of game. Management could estimate hunter satisfaction by calculating the average success rate amongst the

respective types of hunters. But the emphasis is changing. Today success (game bagged) is viewed by the hunter as only one of a multiple set of satisfactions derived from hunting (Potter, Hendee, & Clark, 1973).

Management is interested in providing human benefits from nonconsumptive uses as well as from consumptive uses (Hendee, 1969; Thomas & DeGraaf, 1973). Indeed, Hendee (1974) says wildlife management is no longer just game management; it involves stewardship of a valuable and limited public resource. Today the purpose of management is to provide benefits to people and still preserve the natural state of the ecosystem (Allen, 1973; Leopold, 1929, 1930). Thus, traditional game-bagged and days-afield methods of measurement are no longer adequate to assess the results of game management. A new method, multiple-satisfaction approach, must be employed to measure not only consumptive benefits, but also nonconsumptive benefits of hunting (Hendee, 1974).

Terms Defined

While examining the validity of concepts found in the multiple-satisfaction model Potter, Hendee, and Clark (1973) coined certain terms to aid in their explanation of the model. These terms were found in other studies as well and are important in the review of the literature.

The first term, elements, is used to describe the smallest components of hunter satisfaction or dissatisfaction within the hunting experience. For example, an individual hunter is believed to experience a variety of specific aspects of the hunting experience which are viewed by him/her as satisfying. This might include such things as being close to nature, getting away from civilization, just being outdoors, getting the bag limit, bagging more than other hunting friends, and taking a trophy animal. These then are elements which make up a hunter's general overall satisfaction with the hunt.

Another term, dimensions, is used to describe and group elements of the hunt. In some studies elements with similar meaning are grouped conceptually into several dimensions. Each dimension then represents a major aspect of the hunting experience. Using the example just discussed above, the elements, being close to nature, getting away from civilization, and just being outdoors are grouped into a dimension termed nature. Likewise, the elements, getting the bag limit, bagging more than other hunting friends, and taking a trophy animal are grouped into a dimension called harvest. In many of the studies the two terms are used interchangeably but elements where dimensions are mentioned is always the smaller of the two components.

The last term which causes considerable confusion is the word quality. Ream (1972) says researchers need to develop what constitutes quality hunting and determine how variations in quality affect the various satisfactions derived from hunting. To do this there must be a consensus opinion on how to define this concept. Wagar (1966) says quality is a human concept, dependent upon the fulfillment of needs. Along this line of thinking Stankey and Lucas (1973) believe in order to adequately describe hunting quality, researchers must first describe those elements of hunting that fulfill certain hunter needs and motivations. Hendee (1974) says quality is measured by satisfaction. In other words, quality of a hunting experience is determined by how well the hunter achieves a mix of satisfactions which s/he desires, including a reasonable probability of success. He goes on to say that quality of hunting has different meanings for every hunter. The real key to quality hunting he believes is that there be a reasonable probability of success along with a full continuum of opportunities for other satisfactions.

In the Potter, Hendee, and Clark (1973) study quality hunting is described as being achieved when the hunter experiences the desired dimensions of satisfaction, including a reasonable probability of success. They also

add another point within their definition which is of probable importance. Each dimension of satisfaction must reach the hunter's preferred form and intensity before it will add to the quality of the experience. Another aspect which should be considered are elements of hunter dissatisfaction that are quite likely to act as detractors. Very little was said in the literature about how these could affect quality hunting. This researcher suspects some elements of dissatisfaction such as increased hunting pressure, poorly developed hunting regulations, and confrontation with rural landowners may have dramatic effects on the quality of hunting.

Multiple-Satisfaction Approach

To define the multiple-satisfaction approach proposed by Hendee (1974) it is best to think of it as an alternative method to the "game bagged" and "days afield" management approaches. Hendee states that recreation resources offer an opportunity for a range of experiences which can give rise to various human satisfactions. These satisfactions then lead to benefits. In turn, the satisfactions, benefits, and the recreational experience can be shaped by managing the surrounding physical, biological, and social conditions. Within this definition he proposes three tenets.

The first tenet states that the most significant direct products of game management are hunting experiences which produce human satisfactions. Some game managers might take issue with this tenet arguing that the health and well-being of the hunted game animal comes before any provision for human satisfaction as the most significant product of their endeavors.

The second tenet states satisfactions are not benefits, but may lead to benefits. The ultimate goal, however, is the human benefits which the satisfactions produce.

The last tenet discusses the element of hunter success (bagging game) as a satisfaction. This tenet holds that success is only one (important) satisfaction. Indeed, some minimum level of success or probability of success is thought to be necessary to activate or enhance other hunting satisfactions. These tenets should always emerge when using this approach in game management (Hendee & Potter, 1971; Potter et al., 1973; Stankey et al., 1973).

In his explanation of this approach Hendee (1974) says, further, that experience is an important product of recreation and that quality experiences are a function of how well the desired multiple satisfactions are met or fulfilled. The basis for this concept of multiple

satisfaction rests on ideas conceptualized by Wagar (1966) while its theoretical base rests on psychology's expectancy-value theory (Lawler, 1973).

The purpose of the multiple-satisfaction approach (MSA) is to act as a conceptual tool which will enhance the game manager's ability to visualize new applications of existing knowledge and assume a new point of view on the management of sport hunting. For example, each hunter receives different degrees of satisfaction from the various elements and dimensions of satisfaction. Through MSA managers could focus on specific segments of clientele (trophy hunters, meat hunters, and nature solitude type hunters) and analyze their needs and desires. In most instances, hunters seeking the same prey receive the same dimensions of satisfaction which that kind of hunting best provides. Taking this into consideration and organizing dimensions into subcategories, much like is done with the Recreational Opportunity Spectrum (ROS), the game manager could better appraise the amount of resources dedicated to each segment. Managers who have this kind of information available to them could make more knowledgeable allocations to optimize resources and respond to legitimate demands quicker.

This approach used jointly with the ROS would provide an even clearer picture of existing resource allocation

and probably aid the manager in defining and setting standards to protect the natural resources as well as the quality of hunting. It might also help game management with an immediate problem, how to encourage the hunter's acceptance and use of doe permits in selected areas as well as motivating the hunter to move to new hunting areas where special bonus licenses are issued to reduce excessive herd size. In summary, this approach has considerable potential as a management tool for protecting wildlife resources and at the same time preserve or even improve the quality of hunting (Hendee, 1974; Potter, Hendee, & Clark, 1973).

Many game managers might argue that there is no real justification for the MSA and that present methods like "game bagged" and "days afield" are sufficient. Some might even question whether there is even proof that a multiple number of satisfactions exist within the hunting experience. Some of the literature provided answers for these arguments. Hendee contends traditional "game bagged" and "days afield" concepts are no longer adequate because they do not take into account any of the many aspects of hunting other than just number of game harvested (Hendee, 1974; Potter, Hendee, & Clark, 1973). Many previous studies (Hautaluoma & Brown, 1979) on hunter satisfaction were biased toward satisfactions of the

harvest, rather than considering the nonconsumptive satisfactions which can be identified in the MSA. In fact, prior to 1971 the concept that hunting provides multiple satisfactions which are independent or indirectly linked to success had received only limited attention (Crissey, 1971). There is now research data available which supports the belief that hunting satisfaction is complex and consists of many elements other than just harvesting game. Success (harvesting game) alone is not sufficient in describing satisfactions of the hunting experience (Potter, Hendee, & Clark, 1973; Stankey & Lucas, 1973). In addition and more importantly, Potter, Hendee, and Clark (1973) suggest that MSA has the potential to define in greater detail what quality is within the hunting experience.

There was very little literature which opposed the multiple-satisfaction approach as a game management tool. Nevertheless, there was one piece of literature in disagreement with its feasibility. McCullough (1984) contends the goal of MSA is laudable, but it has been, in most cases, difficult to implement because hunter satisfactions are complex and varied, making their identification and proper grouping nearly impossible. Further, few of the sources of satisfaction are dependent on the deer management program. Examples of these

nonmanagement satisfactions are: (a) escaping urban life, (b) selection of companionship, (c) viewing nature. As can be seen most satisfactions are dependent on field experiences of the individual hunter. Since management can control only a few variables involving the hunt itself, they should not be deluded about the extent to which they can influence hunter satisfaction. Nevertheless, elements of hunter satisfaction associated with variables under the control of management should be incorporated in their planning and decision making. Examples of controllable variables could be: (a) control of harvest rate through season length, (b) hunter density, (c) bag limits, and (d) designation of sex and age of legal deer.

McCullough (1984) views the wildlife manager's management role in a very narrow perspective. In the case of deer hunting management he believes the wildlife manager's role is limited only to immediate concerns of herd management. It is likely that divisional wildlife staff, responsible for management of sport hunting within Minnesota's Department of Natural Resources would unanimously agree with his. The educational background of most wildlife staff is in biology and wildlife studies. They have very little training or experience in the social sciences. In addition, the primary mission of wildlife

management is to manage the health and habitat of wildlife; any benefits afforded the hunter are viewed as secondary to the mission. For these reasons, it is not surprising that there would be little acceptance of the MSA amongst wildlife managers. However, due in part to strong lobbying by hunter organizations, wildlife managers are being forced to accept more responsibility for management concerns which involve hunter satisfactions. As the wildlife manager's role expands, greater acceptance of the MSA concept may increase.

Elements of Satisfaction

Dimensions and elements of satisfaction in much of the literature were ranked by importance according to the hunter's perception of what contributed most to the overall satisfaction of the hunt. There were two elements in particular which received considerable analysis and discussion. The first one was the actual harvest or taking of game and the second was viewing nature. Both of these contribute significantly and warrant some discussion in this literature review.

Harvest, the consumptive aspect of hunting, was ranked either as a positive attribute or neutral attribute in all the literature reviewed for this study (Hautaluoma & Brown, 1979; Jackson & Anderson, 1983;

Kennedy, 1970; More, 1973; Potter, Hendee, & Clark, 1973; Stankey & Lucas, 1973). In those studies (Jackson & Anderson, 1983; Kennedy, 1970) where it was ranked positively, it ranked very low and was definitely not in the top three. Stankey and Lucas (1973) contend the element of harvest or game bagged concept becomes more difficult to fulfill with increased hunting pressure and reduced habitat because these changes are generally followed by a decline in the success ratio. Therefore, they decided to investigate what role success (bagging game) played in definitions of hunting quality. Their findings stated that success represents a significant and major component of quality. Hunters must be insured with some reasonable expectation of success for hunting quality to exist or remain. They further believe that success acts as a catalytic function; its presence or absence will influence the type of additional satisfactions experienced and their relative ranking of importance to the hunter. Also, they believe success-dependent satisfactions are probably nonsubstituable. Although significance of other satisfactions might be heightened as success declines, a minimum threshold exists within the success element and once reached hunting would be discontinued.

Stankey and Lucas (1973) also investigated whether the relative significance of success varied between successful and unsuccessful hunters and between different types of successful hunters. They found that definitions of hunting quality between successful and unsuccessful as well as between different "types" showed no significant difference. Appeals of quality hunting, they suggest, have a broad, generic base and it is independent of an individual's success record.

The viewing nature dimension, mentioned previously, is termed a nonconsumptive form of satisfaction. Some studies (Hendee, 1974; Potter, Hendee, & Clark, 1973) indicated that although harvesting game contributes to satisfaction of almost all hunters, a majority of them cite other satisfactions as more important. Nature, escapism, companionship, and similar attributes were found to be of greater importance. In a Maryland study hunters valued such things as companionship, camping out, getting out of doors, getting away, and suspense and challenge of the hunt (Kennedy, 1970). In Massachusetts hunters scored high on aesthetic benefits, affiliations with people, and challenge of the hunt (More, 1973). In Arizona they found that bodily health was mentioned most often, while aesthetics, companionship, intellectual stimulation, character building, and religious factors were described

by a lesser number (Davis, 1967). Viewing nature as a dimension of satisfaction was probably afforded the highest ranking in most of these studies. The question to be asked is why would viewing nature have greater importance than the actual harvesting of deer. Possibly because there are more unsuccessful hunters than successful ones and the unsuccessful hunters feel a need to justify their hunting behavior by expressing greater satisfaction for a dimension they are more likely to experience.

Methods of Measuring Elements

The methods used in most of the hunter satisfaction studies were very similar. Elements of satisfaction and dissatisfaction were identified and selected by holding several brainstorming sessions with knowledgeable hunters as well as nonhunters. Pretests on hunters and nonhunters were given and a final list was then compiled. In the Potter, Hendee, and Clark (1973) study 73 elements were finally selected for use in the questionnaire. After data were received the elements were factor analyzed to group elements with similar conceptual meaning. This study as well as most of the other studies used a five or nine point Likert scale ranging from "extremely adds" to "extremely detracts" from the hunting satisfaction. One

study (Stankey & Lucas, 1973) used a little different approach. An open-ended question was asked, "In your own words, what does 'quality big game hunting' mean to you?" Up to three responses per individual were tabulated and grouped into five intuitively similar categories. Generally speaking, the five categories were similar to those identified in other studies (Davis, 1967; Jackson & Anderson, 1983; Kennedy, 1970; More, 1973; Potter, Hendee, & Clark, 1973): (a) bagging an animal, (b) seeing game, (c) exercise and escapism, (d) viewing nature, and (e) escaping mechanized vehicles. The measurement methods used in these studies were, generally, constructed to measure how important the hunter thought each element was in relationship to the overall hunting satisfaction or quality of the hunting experience. They did not measure any relationship between the actual behavior of hunting and the respective elements of satisfaction. Also, not investigated was how social factors influence the hunter's thinking on elements of satisfaction and the hunting behavior.

Hautaluoma and Brown (1979) took hunter satisfaction a step further by typing groups of hunters according to their score on the various elements of satisfaction. Using Potter, Hendee, and Clark's (1973) study of Washington deer hunters they performed Key-Cluster

analysis on the Likert scale responses to the elements of satisfaction. By so doing they were able to divide respondents into different types or groups of hunters who could be distinguished by their unique responses to the various elements of satisfaction. In the findings of their study they identified 10 distinct types of hunters. The types were then evaluated to see which elements of satisfaction contributed most. Interestingly, nature or viewing nature contributed the most to hunter satisfaction. All the groups saw harvest as less important, but in no case did it detract from the experience for any group; three groups saw it as important, several were neutral toward it, and the rest fell somewhere in between.

Bowhunter Studies

Bowhunters in most states are viewed as a subset of the general population of hunters within the states. Consequently, much of the research done on bowhunters has been done with bowhunters included as a subset of the overall deer hunting population, which is made up of gunhunters primarily. Relatively few studies on bowhunters as a separate population of hunters have been done even though they have become one of the larger subsets amongst the various types of hunters within a

state. The studies that were done are social or demographic type studies such as Klessig and Hale (1972) where they described characteristics of deer-bowhunters in Wisconsin along with other hunter groups. Likewise, Garland (1972) in Vermont and Croft (1963) in Georgia reported on the hunting activities, economics, and recreational aspects of bowhunters. McDowell (1980) continued this line of study by interviewing wives and mothers amongst New Jersey bowhunters. And lastly, Stormer, Kirkpatrick, and Hoekstra (1979) did a comparative study on wounding of white-tail deer by archers and gunhunters.

There was one study found, however, that was particularly pertinent to this study. Jackson and Anderson (1983) did a comparative study on the characteristics and behavior of Wisconsin bowhunters and gunhunters. Jackson and Anderson's staff contacted 286 bowhunters in the field while they were hunting. The bowhunters were asked how they would rate their hunt that particular day--excellent, good, fair, or poor. The same question was put to waterfowl hunters and deer-gunhunters, and then compared with bowhunter responses. Interestingly, the greater percentage of bowhunters indicated their hunt was <u>good</u> whereas both the waterfowl and gunhunter stated their hunt was <u>poor</u>. In a post season phase of the study,

100 of the original 286 bowhunters contacted in the field were interviewed in their home. This was a more indepth interview process. One of the purpose of this indepth post season interview was to comparatively evaluate hunter attitudes, motivations, and satisfactions. Twenty-one factors from Hendee's (1974) multiple-satisfaction studies were used and again a five-point Likert scale was used with both hunting groups--deer-bowhunter and deer-gunhunters. Table 1 shows the compartive findings of his study. Jackson and Anderson (1983) found that 11 of the 21 factors had a significant difference in mean ratings. The satisfactions given significantly higher mean ratings by bowhunters included: (a) shooting the bow or firearm, (b) solitude, and (c) having the best of equipment. In contrast, gunhunters gave significantly higher satisfaction ratings to: (a) seeing deer, (b) exercise and outdoor activity, (c) escape from routine, (d) companionship with friends, (e) getting shooting opportunities, (f) companionship with family members, (g) killing a deer, and (h) providing food.

Satisfaction was further explored by asking the following open-ended question: "Think back and name the most satisfying aspect of the past bow or firearm seasons." Jackson and Anderson found that 95% of the satisfactions cited could be classified into four major

Table 1

Jackson and Anderson's Findings of Wisconsin Deer Hunters: Rank and Mean Rating of Hunting Satisfactions

Satisfaction factor	Bowhunter	Gunhunter
Nature appreciation	1 (4.41)	3 (4.35)
Utilizing hunting skills (anticipating deer movement, etc.)	2 (4.38)	2 (4.38)
Seeing deer	3 (4.14)	1 (4.50)**
Shooting with a bow/high-powered rifle	4 (4.14)	16 (2.83)**
Exercise and outdoor activity	5 (4.08)	4 (4.35)*
Solitude	6 (3.93)	11 (3.56)**
Marksmanship	7 (3.93)	7 (4.01)
Outdoor skills (challenge of the environment)	8 (3.79)	9 (3.72)
Escape from routine	9 (3.77)	5 (4.09)*
Telling hunting stories and experiences	10 (3.58)	14 (3.34)
Companionship--friends	11 (3.41)	6 (4.07)**
Having the best of hunting equipment	12 (3.23)	19 (2.69)**
Getting shooting	13 (3.15)	10 (3.58)**
Companion--family	14 (2.98)	8 (3.80)**
Killing a deer	15 (2.96)	13 (3.39)**
Trophy	16 (2.94)	18 (2.81)

(table continues)

Table 1 (continued)

Satisfaction factor	Bowhunter	Gunhunter
Provision of food	17 (2.83)	12 (3.42)**
Watching hunting movies or TV programs	18 (2.73)	17 (2.83)
Show game I bagged to family and friends	19 (2.68)	15 (2.88)
Competitive shooting (league, field, etc.)	20 (2.29)	20 (2.27)
Using special equipment you own (off road vehicle, etc.)	21 (1.70)	21 (1.71)

Note: Rank order: 1-21

Mean rating: 5.00 = extremely satisfying to
1.00 = slightly satisfying

**p < .01, *p < .05, comparing bow and gun means for significant difference

categories: (a) seeing game, (b) bagging game, (c) companionship, and (d) nature, escape, and solitude. Bowhunters were most likely to rank seeing game (34.4%) first; the second ranking of satisfaction was bagging game (27.8%). Bagging game was a composite of marksmanship, stalking, and the kill itself. Companionship and things associated with nature, escape, and solitude were ranked third and fourth (16.6% and 15.6%, respectively).

Comparisons in satisfaction and dissatisfaction profiles were made between successful and unsuccessful bowhunters. No significant difference was found for expressed dissatisfaction between the two groups. In contrast, the differences were significant for expressed satisfactions ($\chi^2 = 10.94(4)$, $p < .05$). Bagging game was cited by 48.1% of the successful hunters compared to 16.9% for those who were unsuccessful. A higher percentage of unsuccessful bowhunters recalled companionship, nature, and seeing game. Jackson and Anderson believe the unsuccessful hunter uses these elements of satisfaction as compensating factors to offset the failure to harvest a deer.

Jackson and Anderson identified many other characteristics of the bowhunter in their study, but they will not be reviewed here because they do not directly relate to this study. One other point should be made concerning Jackson and Anderson's discussion of their

findings. They observed that the bowhunters' most salient characteristic was their intensity and dedication to the sport. Again and again the interviewed bowhunters referred to and described the challenges intrinsic to the sport. Many of the bowhunters who were divorced attributed their divorce to the time-consuming addiction of bowhunting. As Jackson and Anderson's study suggests, the challenge leads to an even greater involvement with year around activities of pre- and postseason scouting, target practice, and league shooting; and with each of these subactivities comes greater satisfaction. Indeed, each of these activities will, eventually, become intrinsically satisfying in itself.

Theory of Reasoned Action Literature

Much of the literature on attitudes of satisfaction and dissatisfaction is based on the "other variables" approach. This concept is based on the theory that attitude is only one of a number of factors that influence behavior, and other variables must also be taken into account. This is probably the most popular view present today. However, this approach does have one major flaw. There is no systematic way of choosing which "other variables" are relevant to the given behavior (Ajzen &

Fishbein, 1980). In other words, there is no empirical way to test whether there is a relationship between attitude and behavior. Nevertheless, these attitudinal variables are often discussed by investigators who failed to demonstrate, empirically, this relationship. Their findings are usually used as plausible anecdotes to final discussion of findings. Including them in the discussion does make things clearer, but it does little to prove a relationship (Wicker, 1969).

Ajzen and Fishbein (1980) have proposed and tested a method for indirectly identifying the relationship of a person's behavior with their behavioral intention, attitude, and beliefs. The theory is called "Reasoned Action" and is based on a small number of concepts imbedded within a single theoretical framework. Within the model there are a series of hypotheses linking attitudes and beliefs to behavior. Each hypothesis requires empirical verification. Supposedly, this theory accounts for the relationship between any external variables (other variables) and any kind of behavior. The goal of Reasoned Action is to understand a person's behavior by identifying the determinants of intention to perform the behavior. To understand intentions, they contend that a person's intentions are determined by their

attitudes and the attitudes, in turn, are determined by their beliefs.

This method will be used in this study as an alternative method for measuring hunter satisfaction. Details of this method and its strengths and weaknesses will be explained in Chapter 3.

Chapter 3

METHOD

Description of Subjects

The population for this study is 1984 licensed deer-bowhunters who are residents of Minnesota. There were approximately 60,000 resident bowhunters who purchased an archery deer license for the 1984 season. The sale and record keeping of these licenses is administered by the counties within the state. They retain carbon copies of all licenses sold in their county. The first license out of every packet of 10 that the county sells is forwarded to the Minnesota Department of Natural Resources (DNR). A random sample for this study was drawn from the licenses retained at the DNR headquarters. The selection process was handled by Division of Wildlife staff who are responsible for investigative research on hunters. According to them the random selection process of those licenses which are mailed to them from the counties is considered an acceptable random sampling method. They have used it in previous studies and found it to be valid and reliable.

Therefore, the assumption is made by this researcher that this method of random selection of respondents is acceptable for this study. The total for the selected sample population in this study is 499 resident bowhunters.

Research Design

Formula--Ajzen and Fishbein Model

Ajzen and Fisbhein's (1980) theory of "Reasoned Action" is used in this study as a method for measuring attitudes of satisfaction and dissatisfaction. The salient behavioral beliefs within this study are comparable to elements or attributes of satisfaction found in other studies done on hunters (see Figure 1). This method uses the expectancy-value model to measure attributes of bowhunting (satisfactions/dissatisfactions) and measures the relationship between the bowhunters' behavior and the attributes (behavioral beliefs) of bowhunting.

According to the theory, a person's intention to perform a particular behavior is determined by two main factors: (a) a personal or "attitudinal" factor and (b) a social or "normative" factor. The model is expressed algebraically as follows:

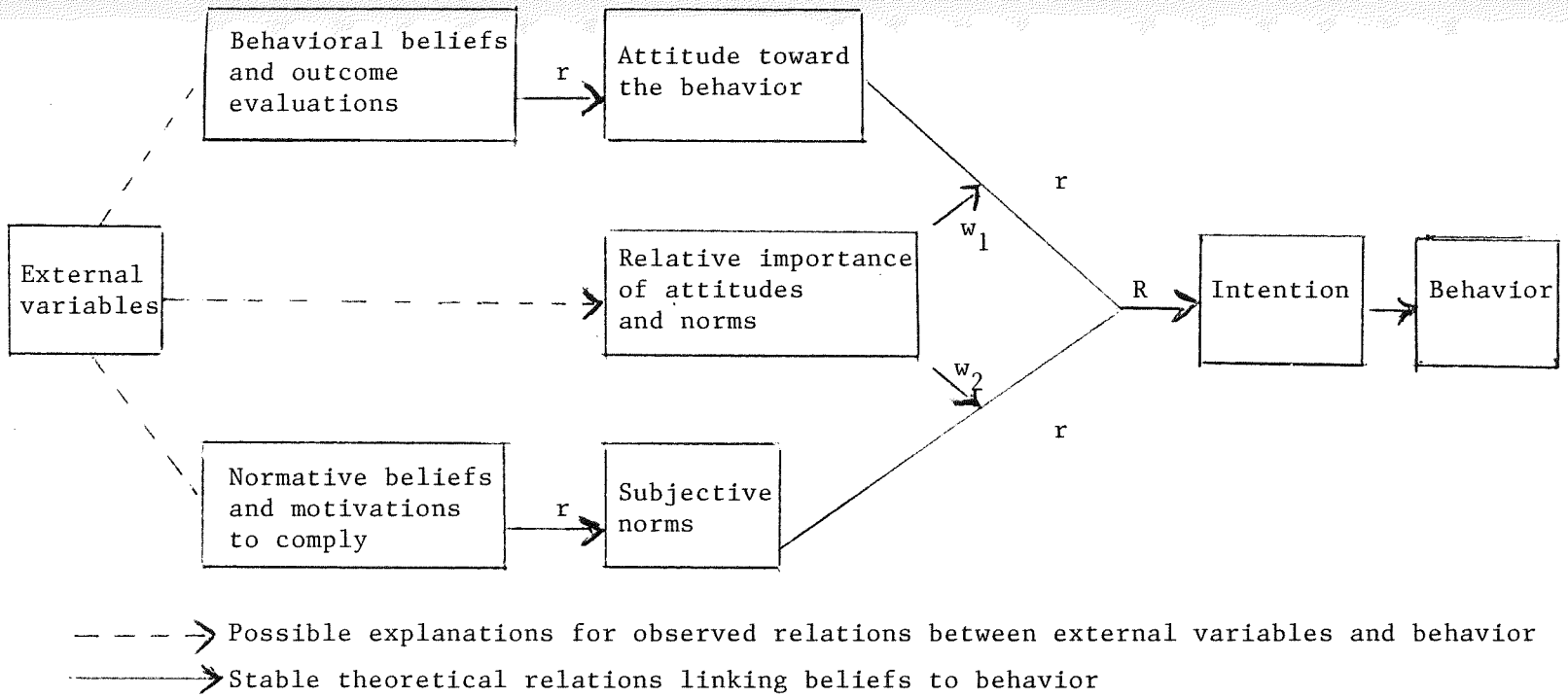


Figure 1. Ajzen and Fishbein Model (1980). Relations among beliefs, attitude, subjective norm, intention, and behavior.

$$B \sim BI \approx [w_1]\ A_B + [w_2]\ SN$$

where B = overt behavior; BI = behavioral intention; A_B = the attitude toward performing the behavior; SN = subjective norms; and w_1 and w_2 = theoretical parameters (derived through multiple regression) reflecting the relative importance of each component in determining BI.

The model further predicts that (a) a person's attitude toward performing a particular behavior is a function of his/her beliefs about the consequences of performing that behavior and his/her evaluations of those consequences:

$$A_B \approx \sum_{i=1}^{n} b_i e_i$$

where A_B = the attitude toward the behavior; b_i = the behavioral belief that performing the behavior will lead to some consequence of i; e_i = the value of consequence i to the individual, and n = the number of salient beliefs. And (b), person's subjective norm is determined by his/her beliefs about what referent others think s/he should do and his/her motivation to comply with those referents:

$$SN \approx \sum_{i=i}^{n} b_j m_j,$$

where b_j = the normative belief, i.e., the perceived prescriptions of referent j; m_j = the motivation to comply with referent j; and n = the number of relevant referents.

In addition, the theory states that all "other variables" (personality traits, demographic characteristics) are "external" to the model and affect behavioral intentions and behavior only to the extent that they are mediated by the normative and attitudinal components of the models, as shown in Figure 1. Thus the theory provides a framework for analyzing the effects of external variables on a given intention.

There is a fundamental assumption within the theory which says, "Reasoned Action is based on the assumption that people are usually quite rational and make systematic use of the information available to them." Fishbein and Ajzen (1975) do not believe behavior is controlled by unconscious motives or overpowering desires, nor is it capricious or thoughtless. They point out further, people do not necessarily consciously and systematically scrutinize every determinant of behavior. Rather, it's an unconscious, automatic, or implicit process. Rarely, do people become fully aware of these processes. Probably the only time they become aware is when they are asked to explain their intentions of behavior. Also, greater

experience with the activity may lead to a greater likelihood that people will consciously recognize this process and consciously make these decisions and understand them.

Identify and Measure Behavioral Intention

The ultimate goal of this theory is to predict and understand an individual's behavior. The first step is to identify and measure the behavior of interest. Once the behavior has been clearly defined, the second step is to investigate what determines the behavior.

Here again a fundamental assumption is made; most actions of social relevance are under volitional control and a person's intentions to perform (or to not perform) a behavior is the immediate determinant of the action.

This does not mean, however, that there will always be perfect correspondence between intention and behavior. Generally, if there are no unforeseen events the person will follow his or her intention. When an appropriate measure of intention is obtained it will provide the most accurate prediction of behavior. It should be noted here that external variables like personality traits, demographic characteristics, and other factors can influence behavior and have some potential importance, but

they are not an integral part of this theory. External variables and their affect will be discussed in greater detail later.

Measures of behavioral intention (BI) will not always be an accurate predictor of behavior (B). A number of factors influence the strength of the relationship between intention and behavior. First, there must be an acceptable degree of correspondence between intention and behavior. Correspondence occurs when the elements of intention and behavior are identical. The elements or behavioral criterion consist of action, target, context, and time elements. For example, in this study the identified behavior is "Bowhunting deer in Minnesota in the next five years." "Bowhunting" is the action, the target which the action is directed toward is "deer," the given context is "in Minnesota," and it occurs during a particular time period--"next five years." Therefore, the behavioral intention would read as follows: "I intend to bowhunt deer in Minnesota in the next five years."

All the questions pertaining to Ajzen and Fishbein's model must correspond to this behavior except the normative component of motivation to comply. This component is measured on a more general level and is not specific to the specified behavior in the study (see Ajzen & Fishbein, 1980).

The second factor which may influence the behavior-intention relationship is the stability of intention over time. The expressed behavioral intention must remain stable over time. In other words, the degree of correspondence between intention and behavior should not have changed prior to the actual performance of the behavior. If there is a change, correspondence then does not exist and an accurate prediction of behavior cannot be made. The best way to overcome this potential problem is to ask the question of intention just prior to the execution of the behavior. The greater the time interval between the question of intention and performance of the behavior, the greater the potential for error. Sometimes there is a need to investigate long-range predictions which could present a problem given the instability of intentions over time. However, long-range studies are usually used to forecast, predict behavioral trends in aggregate populations rather than individual projections. And, aggregate intentions are usually more stable over time than are individual intentions. There is one exception. In some cases an external event might change the intentions of the population. For example, if the bowhunters expressed their intention to bowhunt in the next five years and the DNR then closed the season, an

accurate prediction could not be achieved. However, this scenario, like many others, is not likely to happen.

The third factor which could conceivably alter prediction is the moderating effects of other variables. Unforeseen events that change intention before the behavior is performed will weaken the intention-behavior relation. The best solution to this problem is to measure intention after these unforeseen events have occurred or taken them into account when preparing the question of intention. An example of this might be where an inexperienced person expresses positive intentions to bowhunt, but upon performing the behavior finds the necessary skill level too difficult to achieve and thus quits.

Identify Determinants of Behavioral Intention

Having identified and measured the behavior of interest, the next step is to investigate what determines behavioral intention. There are two determinants, one is an attitude component and the other is a social (or normative) component. In Figure 1, "Attitude toward the behavior" (A_B) is the attitudinal component and "Subjective norm" (SN) is the social component. Just as the measure of intention must correspond to the

behavioral criterion, so also must attitude (A_B) and subjective norm (SN) correspond to intention in action, target, context, and time elements. Both of these components of the Reasoned Action model are meaningless without a significant correlation between intention and behavior. In other words, the ability of attitudinal and normative components to predict behavior depends on the strength of the intention-behavior relation. Thus any effects of the two are mediated by the behavioral intention. To identify which of these determinants (attitude or subjective norm) will have greater influence on the behavioral intention, a weighting factor is used. Through the use of Multiple Regression each component is given a weight reflecting its relative importance to intention. For some behaviors attitudinal considerations are more important in determining intentions, in other cases the normative component is more important.

Generally speaking, attitude can be defined as an index of the degree to which a person likes or dislikes an object, action, institution, or policy. As was mentioned earlier many investigators attempt to include a variety of variables within their definition of attitude such as perceptions, beliefs, motivation, intention, etc. Ajzen and Fishbein (1980) believe no useful purpose is served by treating these reasons for and the consequences of a

person's evaluation as part of attitude. Rather, they prefer to treat each of these variables as separate concepts that can be related to attitudes. They contend that attitude toward an object can predict only the overall pattern of behavior and that attitude does little to predict or understand a particular action with respect to the object. Thus, they define, "Attitude toward the behavior" as a person's judgment that performing the behavior is either good or bad. This concept or definition was founded on the previous studies of Campbell (1963), Doob (1947), and Thurstone and Chave (1929).

The social component, Subjective Norm, deals with the influence of the social environment on intentions and behaviors (Ajzen and Fishbein, 1980). It's defined as a person's perception that most people who are important to them think they should or should not perform the behavior in question. In fact, the more a person perceives that important others think s/he should perform the behavior, the greater the likelihood s/he will intend to do so. Defined another way, it is a person's perception of the social pressures put on him/her to conform to the will of those people who are important to them.

For a more complete understanding of intentions it is necessary to explain why people hold certain attitudes and subjective norms. To do this we must look at behavioral

and normative beliefs. According to the model (see Figure 1) attitude toward the behavior and subjective norm are functions of beliefs. For example, a person who, generally speaking, believes bowhunting leads to mostly positive experiences and outcomes will hold a favorable attitude toward participating in future seasons. The beliefs which underlie this favorable attitude are termed behavioral beliefs. The beliefs underlying subjective norms are termed normative beliefs and they are beliefs of a different kind. Normative beliefs are similar to subjective norms except that they involve specific individuals or groups rather than a generalized term "important others." For example, they are the bowhunter's beliefs that specific individuals or specific groups think s/he should or should not bowhunt. Just as "attitude toward the behavior" and "subjective norm" were mediated by intention in predicting behavior, so also are behavioral beliefs and normative beliefs mediated by "attitude toward the behavior" and "subjective norm" respectively. This means, in other words, beliefs cannot directly predict behavioral intention or behavior. They can only predict attitude and subjective norm respectively. Pearson's correlation is used to test this relationship.

Eliciting Salient Beliefs

Predicting attitude toward the behavior from behavioral beliefs requires the completion of several steps. The first step is to elicit salient beliefs from a sample population. A small representative sample of the population is polled and asked what they see as the advantages and disadvantages of performing the behavior in question. Next, the elicited responses with similar meanings or outcomes are grouped together and the frequencies of the consolidated responses are counted. Those responses with the highest frequency are selected as salient beliefs to be used in the model. Finally, the questionnaire is prepared and each of the salient beliefs are worded so that they correspond in action, target, context, and time elements with the stated behavior.

To identify and select the behavioral and normative beliefs which are to be tested in this study, a preliminary survey was prepared (see Appendix A) and completed by 60 Minnesota bowhunters. These bowhunters were contacted by visiting six indoor archery lanes located in the various geographical areas of the Twin City Metropolitan Area. It is believed they were a good mix of experienced and inexperienced bowhunters and are quite likely to be fairly representative of the Minnesota bowhunter.

In this preliminary survey, open-ended questions were used asking respondents to list advantages and disadvantages of bowhunting. The responses to these were consolidated and used as the behavioral beliefs within the study (see Appendix B, Questions 11 through 25). Normative beliefs were obtained in the preliminary survey by asking respondents to list those people who approve or disapprove of their bowhunting deer. Again the responses are consolidated and used in the questionnaire as the normative beliefs within the study (see Appendix B, Questions 41 through 48).

The elicited beliefs were tallied by grouping together beliefs that refer to similar outcomes and the frequency with which each outcome in a group was elicited. The most frequently mentioned outcome within a group was used to represent the belief within this study. The belief outcomes with the highest frequency were then selected as salient behavioral beliefs to be used in the study model. Only 15 were selected due to size limitations on this study.

One salient belief which was included in the final survey instrument, but did not receive a significantly high frequency rating in the preliminary survey was the two deer limit season (one with gun tag and one with bow tag). This was included because DNR wildlife managers

wanted to know how the bowhunter felt about the idea of being able to take two deer in this state. Interestingly, the legislature passed such a bill on a limited or trial basis while this study was being conducted. In talking with wildlife managers about this bill, it was discovered that they, as managers of sport hunting, have been receiving political pressure from state archery associations not to implement such a plan. Executive members of the associations believe it will encourage other hunters to take up bowhunting who are inept, undedicated, and often violate game laws. This, in turn, would cause Minnesota bowhunters to lose their generally good public image.

All other salient beliefs listed in the questionnaire are advantages of bowhunting except the following three: "Conflicts with other things--too time consuming," "See others who haven't the commitment to hunt properly," and "Increased hunting pressure." These three elicited beliefs were listed as disadvantages of bowhunting. In addition, the salient belief, "Long bow season" may seem confusing, but to the bowhunter it is quite clear. Most bowhunters are also involved in other types of hunting and they see the long bow season as an advantage over other forms of hunting.

The steps involved in predicting subjective norm from normative beliefs are somewhat similar to those described in predicting attitude toward the behavior from behavioral beliefs. The first step is to elicit salient normative beliefs from a representative sample of the population. The sample group is asked to list persons or specific groups of people who would approve of their performing the given behavior. In a second question they are asked to list persons or specific groups who disapprove of their performing the behavior. The elicited responses of referents are then grouped and counted. The responses with the highest frequency are selected as the salient referents for use in the model. And finally, a question is prepared for each of the salient referents to be included in the final questionnaire.

The normative responses pertaining to referent others in this study were calculated in the same manner as the behavioral beliefs (see Appendix B, Questions 41 through 48). The selected referents are fairly explicit and should be easily understood. It should be noted that some referents will not be applicable to all hunters. Consequently, a "NA" was included in the scaling of these responses in the questionnaire (see Appendix B, Questions 41 through 56).

Questionnaire Construction

Components of Ajzen and Fishbein's Model

The questions pertaining to the model (see Appendix B, Questions 6 through 56) were closed-ended and measured the components of the model in the following order: (a) a measure of intention to bowhunt within the next five years (Behavioral Intention--BI), (b) three questions measuring attitude toward bowhunting within the next five years (Attitude/Bowhunting--A_B), (c) a measure of subjective norm or how important others feel about their bowhunting within the next five years (Subjective Norm--SN), (d) 15 salient beliefs about the consequences of bowhunting within the next five years (b_i) followed by 15 evaluations of the corresponding beliefs (e_i), (e) eight normative beliefs (b_j), and (f) eight corresponding motivation to comply measures (m_j).

Standards for constructing measures of the Ajzen and Fishbein model have been developed previously (see Ajzen & Fishbein, 1980). For the present study the following examples illustrate the measures that were used:

Behavioral intention.

I intend to bowhunt deer in Minnesota in the next five years. LIKELY - UNLIKELY

Attitude toward performing the behavior.

My bowhunting deer in Minnesota in the next five years is (or would be) IMPORTANT - UNIMPORTANT, GOOD IDEA - BAD IDEA, NICE - AWFUL

Subjective norm.

Do most people who are important to you feel you should or should not bowhunt deer in Minnesota in the next five years? SHOULD - SHOULD NOT

Behavioral beliefs about the consequences of performing the behavior.

How LIKELY or UNLIKELY are you to observe or experience the following things while bowhunting deer in Minnesota in the next five years? (Long bow season, etc.)

Evaluation of the consequence.

How GOOD or BAD do you feel each of the following are? (Long bow season, etc.)

Normative beliefs.

Do the following people feel you SHOULD or SHOULD NOT bowhunt deer in Minnesota in the next five years? (Wife/Husband, etc.)

Motivations to comply.

How LIKELY or UNLIKELY are you to follow the wishes of the following people? (Wife/Husband, etc.)

All of these measures are scored on a seven point Likert scale from +3 to -3 with the exception of the motivation to comply component, which was scored from 7 to 1 (Extremely likely - Extremely unlikely).

To measure the strength of a person's belief they are asked, within the questionnaire, two separate questions pertaining to the same salient belief outcome (see Appendix B, Questions 11 through 40). The questions are constructed with a bipolar scale so that both positive and negative outcomes can be weighted. The first question asks them to indicate the likelihood that performing the behavior will result in the given belief outcome (likely/unlikely). Second, they are asked to evaluate the consequences (good/bad) of the given belief outcome. These two answers are multiplied together and the products of the total set of salient beliefs are summed together. The summed total of all the belief products is then correlated with attitude toward the behavior. The calculated correlation indicates the strength of the relationship between attitude and beliefs. In summary, attitude is based on the total set of a person's salient

beliefs. Their attitude toward the behavior corresponds to their evaluation (good/bad) of the total set of consequences, each weighted by the strength of the person's beliefs that performing the behavior will (likely/unlikely) lead to each of the consequences.

According to Ajzen and Fishbein (1980) this expectancy-value model of attitude has several interesting implications. First, two individuals who associate the same set of consequences with performing the behavior may hold different attitudes toward the behavior if they evaluate the consequences (good/bad) differently or if the strength of their beliefs (likely/unlikely) differs. Second, people who have different sets of salient behavioral beliefs (i.e., associate different consequences) may nevertheless have the same attitude. The third implication is that a few of the person's beliefs could change and yet their attitude may remain the same. The final implication relates to the fact that salient beliefs, in the model, are not weighted for their importance in determining attitude. Ajzen and Fishbein assume that all salient beliefs are important, and any differences in their degree of importance is taken into account by the measures of belief strength and outcome evaluation.

This expectancy-value model within the theory of Reasoned Action is similar to the expectancy-value model found in Rosenberg's (1956) studies. Rosenberg showed that a person's evaluation of an object is strongly related to expectation or belief about the behavioral outcome. His model then describes the relationship between effect and cognition. Some researchers would argue this expectancy-value model is incomplete because it does not include a separate assessment of cognition, affect, and conation. However, Ostrom's (1969) findings showed that a separate assessment of these factors did not improve prediction of behavior. McCool, Stankey, and Clark (1984) contend the expectancy-value model is based upon the idea that recreation participation is a behaviorally founded production process and rests upon the idea that human behavior is rational. They appear to question the validity that human behavior is rational. However, in defense of the expectancy-value model they say that it has been a good tool for identifying systematically critical elements of recreation. But, it simply does not adequately cope with the complex choice behavior process. They end their argument by stating that even though the expectancy-model has faults in predicting behavior it should not be rejected.

Subjective norm is predicted from normative beliefs in a somewhat similar manner to predicting behavioral attitude from behavioral beliefs (see Appendix B, Questions 41 through 56). Two sets of questions are organized for each of the salient referents. The first question asks the respondent whether they feel the identified referent thinks they should or should not perform the given behavior. And the second question asks how likely or unlikely are they (the respondents) to comply with the identified referent. The answers for the two questions are then multiplied together and the products of the total set of salient referents are summed together. The summed total of all the referents or normative beliefs is then correlated with subjective norm. The calculated correlation indicates the strength of the relationship between subjective norm and normative beliefs. In summary, subjective norm is based on the total set of a person's beliefs about the influence of certain salient referents. The person's subjective norm corresponds to his/her evaluation of what each referent thinks and this is weighted by the person's willingness or unwillingness to comply with that referent.

Ajzen and Fishbein (1980) are not at all certain that the measure of subjective norm proposed here is the best way to directly assess perceived social pressure to

perform or not perform a behavior. They are convinced, however, that it must be taken into account in order to explain social behavior. The issue is with the concept of motivation to comply. In the present model they conceptualized and measured motivation to comply at a very general level. For example, in this study the question is as follows: "Generally speaking, how likely or unlikely are you to follow the wishes of the following people?" No mention of the behavior, bowhunting, is made because Ajzen and Fishbein want to know in very general terms the respondent's willingness to comply or not comply. Some researchers argue that the question should be asked as specific to the behavior. The question would probably then read: "How likely or unlikely are you to follow the wishes of the following people with regards to your bowhunting deer in Minnesota in the next five years?" Fishbein and Ajzen (1975) argue that this normative belief measure is similar to the weight of the subjective norm component which is also behavior-specific.

Another method might be to measure the motivation to comply at the intermediate level, that is, at the level of complying with a referent within a behavioral domain. For example, an intermediate level question might read: "How likely or unlikely are you to follow the wishes of the following people with regards to recreational pastimes

such as hunting?" Still other researchers (Pomazal & Jaccard, 1976; Schwartz & Tessler, 1972) argue that in addition to perceived social pressures, it is important to take into account the respondent's own feeling of moral obligation or responsibility to perform the given behavior. This will not be tested in this study, but it does warrant further investigation in terms of hunting behavior.

According to Ajzen and Fishbein (1980) the motivation to comply component should be treated as a unipolar concept in order to force a bipolar response. In this study questions with similar scaling methods were grouped for purposes of clarity and brevity. Also, beliefs were condensed to short phrases to save space and improve clarity. These changes were made in hopes of improving the questionnaire return rate. Lastly, slang expressions were used in some places. This was done only where the slang expression would convey the thought to the behavior more efficiently.

As was stated previously, external variables such as personality traits or demographic characteristics are not a part of the Reasoned Action model. Fishbein and Ajzen (1975) have stated that external variables have some potential importance, but they are <u>not</u> an integral part of this theory. External variables may influence the beliefs

a person holds or indirectly affect the relative importance s/he attaches to attitudinal or normative components. External variables do not, however, have consistent effects on behavior like other factors in the model, specifically, beliefs, attitudes, subjective norm, and intention. Indeed, Fishbein and Ajzen found that all external variables are mediated by the other factors within the model. Therefore, any change in behavior due to external variables will be reflected in the beliefs, attitudinal or normative component of the model. Thus any effects external variables have on the determinants of behavior have very little bearing on the validity of this theory. Reasoned Action deals mainly with factors that intervene between external variables and behavior. This does not mean it is not beneficial to investigate external variables. They can, in fact, enhance the understanding of behavior.

Loken and Fishbein (1980) investigated the effects of occupational variables (external variables) on childbearing intentions. The findings confirmed Fishbein and Ajzen's (1975) theories on external variables. They found although many external variables were related to intentions, knowledge of these "external" variables did not improve prediction of the intention (to have a child) over and above that provided by a consideration of

corresponding attitudes and subjective norms. The mediating effects of external variables on the components underlying the model was also supported by their data. As expected, external variables that significantly correlated with intentions were also significantly related to attitudes, norms or both. Equally important, external variables that related to attitudes and norms also related to the beliefs, evaluations, normative beliefs, and motivations to comply underlying these components. Inversely, those that were nonsignificantly correlated to intention were, in general, unrelated to attitudes, norms, and the underlying components of the model. Loken and Fishbein contend the best method for measuring the influence of external variables is to study the relationship of salient behavioral beliefs and normative beliefs with the respective external variables.

To summarize, Ajzen and Fishbein's model (1980) has different levels of explanation. At the most global level, the bowhunter's behavior is assumed to be determined by his or her intention to bowhunt in the next five years. At the next level, intention is itself determined by attitude toward the behavior and subjective norms. The third level is comprised of beliefs about the consequences or outcomes of bowhunting and about the social influence felt by bowhunters from relevant others. In the final

analysis the bowhunter's behavior will be explained by describing his or her underlying beliefs. This does not mean, however, that there is a direct link between beliefs and behavior. Beliefs influence attitude and subjective norms; these two components influence intentions; and intentions influence behavior.

General Questions About the Bowhunter

The questionnaire begins with these questions because they were easy and probably less objectionable for the hunter to answer. Questions 1 through 5 plus Questions 57 and 58 are concerned with the general characteristics of the Minnesota bowhunter (see Appendix B). How many seasons they hunted and in how many of these seasons have they taken a deer? What is the average number of days they spend afield? What percentage of time do they spend hunting alone or with a group? And finally, what age did they start hunting and what is their age and sex presently? Some of these questions may show some interesting characteristics when compared with the findings in the Ajzen and Fishbein model.

Distribution of Questionnaire

The questionnaire was mailed with a cover letter (see Appendix C) and a stamped return envelope. The cover letter explained the purpose of the study, the importance of their response, and the assurance of complete confidentiality. Reference was not made to DNR's involvement in this study because some hunters have negative feelings about the DNR's management method and may fail to complete the questionnaire. Lastly, a copy of the results was offered to them in hopes that this would further encourage them to complete the questionnaire.

One week after the questionnaire was mailed a postcard was sent to all subjects (see Appendix D). The postcard was to act as a reminder to complete and return the questionnaire. Also, they were invited to call for a replacement in the event the questionnaire was misplaced or not received.

Three weeks after the postcard was mailed a follow-up letter with another questionnaire enclosed was sent to those who had not yet returned the questionnaire (see Appendix E). This letter strongly emphasized that their individual response is important and that it will affect the outcome of this study. Some questionnaires were returned by the postal service because of no forwarding

address. Attempts were made to find the subjects' new address through a variety of methods. Many of these new addresses were located and a questionnaire was forwarded to them. Four weeks after the follow-up letter was mailed the returns slowed to about one return per week so data collection was discontinued. Three additional questionnaires came after the cut-off date and were not included in the study. The inclusion of them in the study would have added little, if any, significance to the findings of this study.

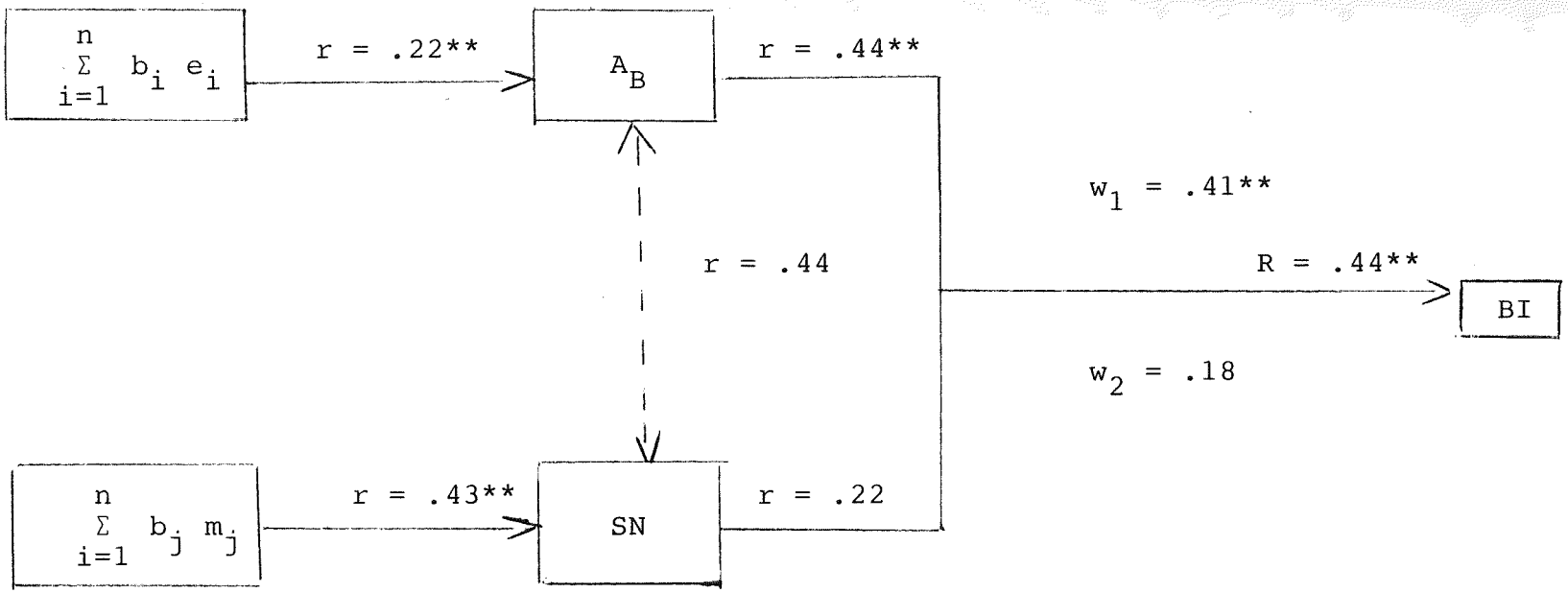
Analysis Methods

Ajzen and Fishbein Analysis

The first step is to test the relationship of behavioral intention (BI) as the dependent variables with attitude toward the behavior (A_B) and subjective norm (SN) as the independent variables (see Figure 2). Multiple Regression is used and again the formula is stated as follows:

$$B \sim BI \approx [w_1]\ A_B + [w_2]\ SN$$

If a significant correlation is found, both variables will be checked to see how much they contributed. Assuming they both contribute significantly to the behavioral



**p < .01

- - - → Not part of model, but is statistically interesting

——→ Stable theoretical relations linking beliefs to behavior

Figure 2. Correlations (R, r) and Beta weights (w) for the model: Minnesota bowhunters.

intention, then Pearson's correlation will be performed on the beliefs that underlie them.

It should be noted here that a semantic differential attitude scaling method is used to measure attitude toward the behavior (A_B). This is why there are three questions (see Appendix B, Questions 7, 8, 9) which evaluate attitude). The sum of these three scores provides a single score which indicates the respondents' overall feeling toward the behavior. This single score is used in the multiple regression formula.

To obtain $b_i\ e_i$ (Behavioral Belief), the score for each belief statement is multiplied by the score for the corresponding evaluation, and summed for all beliefs. Similarly, $b_j\ m_j$ (Normative Belief) is obtained by multiplying the score for each normative belief by the score for motivation to comply with the corresponding referent group or individual. The formula for both of these again are as follows:

$$A_B \approx \sum_{i=1}^{n} b_i\ e_i \quad \& \quad SN \approx \sum_{i=1}^{n} b_j\ m_j$$

If significance is found between attitude toward the behavior and its respective behavioral beliefs, further investigation will be made on how each belief contributes to the attitude. Likewise, the same analysis will be done

with the relationship between subjective norm and normative beliefs.

Comparative Analysis

The salient behavioral beliefs in this study are comparable to other attitude studies done on the satisfaction and dissatisfaction of hunting. The mean rankings of the various behavioral beliefs in this study will be compared with mean rankings found in Jackson and Anderson's (1983) study on Wisconsin bowhunters.

Stronger Intenders versus Weak Intenders

The sample population within this study was divided into two groups. Following Ajzen and Fishbein's (1980) method, the population is usually divided into intenders and nonintenders. However, because the sample population for this study is comprised of licensed bowhunters only, there will be few, if any, nonintenders. Therefore, the population was divided into strong intenders and weak intenders. Those respondents who score a combined score of 6.00 for behavioral intention and attitude toward the behavior will be considered strong intenders (see Appendix B for scaling method). Any respondents who score a combined score of 4.99 or less for behavioral intention

and attitude toward the behavior are to be considered weak intenders. Those falling in the 5.00 to 5.99 area are not included and are considered a buffer between the two groups. T-tests on the means ($BI + A_B$) of the strong and weak intender groups will be performed to assess whether there is a significant difference between them. Assuming significance is found, t-tests will be performed on the product means for behavioral and normative beliefs. Again assuming significance is found, t-tests will be performed on the means for individual behavioral beliefs, the outcome evaluations, individual normative beliefs, and motivations to comply. In addition, the means of the two groups will be compared with respect to the following bowhunter characteristics: (a) number of seasons hunted, (b) number of deer taken, (c) average number of days hunted in a season, (d) age started hunting, and (e) percentage of time spent hunting alone, with one other person and with a group.

General Characteristics

The entire sample population as a group will be analyzed as well. Mean, standard deviation, and ranges will be calculated for the following characteristics: (a) age, (b) sex, (c) seasons hunted, (d) number of deer taken, (e) average days hunted, (f) age started

bowhunting, and (g) time spent hunting alone, with one other person, and with a group.

Chapter 4

FINDINGS

Return Rate

The return rate for this study was quite good. From the 499 questionnaires that were sent 407 were returned. Two of these were discarded because of improper data which left 405 with usable data. This is an 80% return rate. A few respondents failed to complete the questions on motivation to comply, but it should not significantly affect the findings. In these few cases the normative component was also excluded because in the Ajzen and Fishbein (1980) model both components are necessary in order to correlate it properly with the subjective norm.

There were 29 questionnaires returned from the postal service for which forwarding addresses could not be found. Also, there were three completed questionnaires received after the cut-off date which were not included in the analysis. Adding these three would not have significantly altered the findings; therefore, the decision was made not to include them. Finally, out of the original 499 questionnaires only 60 questionnaires are unaccounted for or still outstanding.

Model Tests--Main Components

Before investigating the questions stated in Chapter 1 (page 8), it is necessary to verify whether Ajzen and Fishbein's (1980) model is significant in predicting behavioral intention (see Figure 1, page 47 and Figure 2, page 74). The multiple correlation coefficient between behavioral intention (BI) to bowhunt within the next five years and the attitude toward the behavior (A_B) and the subjective norm (SN) components was .44 ($p < .01$), accounting for 19.7% of the variance in intention (see Figure 2).

In the model the Beta weights of the main components, attitude toward the behavior (A_B) and subjective norm (SN), in a multiple regression equation indicate the relative importance of these on intention (see Figure 2). These weights were: (A_B) $w_1 = .41$, $p < .01$, and (SN) $w_2 = .18$, $p = .52$. The zero-order correlation among variables were: BI - A_B, .44; BI - SN, .22; A_B - SN, .44. BI is largely determined by the A_B with considerably less contribution by SN. The SN contribution to the multiple R was not statistically significant.

Attitudinal considerations, therefore, are probably more important determinants of intentions to bowhunt than are normative considerations. It is unknown why the

normative component was not found significant. There is, however, a possible explanation for why the SN coefficient was low.

Generally it has been found that the normative components are more important in behaviors like camping where cooperation is required. Bowhunting, on the other hand, appears to be a more competitive, individualized behavior, and Ajzen and Fishbein (1980) have found the attitudinal component (A_B) to be more important where competitive forms of behavior are concerned.

The multiple correlation, .44, between intention and the other two components, attitude and subjective norm, is considered of moderate magnitude in terms of social science research. Why there was only moderate magnitude is difficult to determine. Possibly it is due to the fact that the total sample population was predisposed to performing the behavior which probably caused the responses to lie within a restricted range. The frequencies of responses were checked and it was found that only one respondent expressed a negative intention to bowhunt. All other responses ranged between +3 and +1. This explanation is further confirmed by Young and Kent (1985). They suggest, based on other studies, that the Ajzen and Fishbein model is best suited to situations where both participants and nonparticipants are surveyed. Thus using

only bowhunters as the sample population in this study may be the cause of the low prediction rates.

To test the concept that b_i e_i is highly predictive of attitude and b_j m_j is highly predictive of SN, zero-order correlations between these variables were obtained. The correlation between the measure of attitude (A_B) and its proposed determinants (b_i e_i) was $r = .22$, $p < .01$, not highly significant. The correlation between the subjective norm measure (SN) and its determinants, normative beliefs b_j m_j, was $r = .43$ ($p < .01$). This was of moderate significance.

In summary, Ajzen and Fishbein's model of behavioral intentions was supported in this study; the major proportion of variance in BI is accounted for by the attitude component A_B. The social component, subjective norm, probably contributes very little and statistically was not found to be significant. Therefore, the determinants of subjective norm, normative beliefs, will not be reviewed here, but rather, will be discussed in the supplemental analysis section within this chapter.

Behavioral Beliefs

Reviewing the behavioral belief findings helps to further explain the attitude and intention components of the model. In this study the belief outcomes that were

identified as positive outcomes in the preliminary survey were rated as much more likely consequences of bowhunting than the negative outcomes (see Table 2). For example, the respondents believed they were extremely likely to see deer, view nature, and experience the challenge and excitement of the hunt. They believed it was quite likely they would experience peace, quiet and relaxation, good companionship, a long bow season, good weather during the early season, and would get a deer. On the other hand, they believed it was only slightly likely that they would see improvement in the deer herd, increase in license fees, an increase in hunting pressure or observe poor behavior of uncommitted bowhunters in the next five years. For the topics of getting a trophy deer or finding bowhunting too time consuming they expressed neutrality, neither likely nor unlikely to experience them.

The mean rankings for the outcome evaluations reflected the ratings of the preliminary survey (see Table 2). Seeing deer was extremely good and had the highest mean ranking. Other outcomes which were rated as extremely good were viewing nature, experiencing the challenge and excitement of the hunt as well as enjoying the peace, quiet, and relaxation associated with the hunt. Topics rated as quite good were experiencing good companionship, enjoying the long bow season with its early

Table 2

Behavioral Belief Means for Minnesota Bowhunters

Belief	Belief strength	Outcome evaluations	Product
See deer	2.81	2.80	8.00
Viewing nature	2.63	2.67	7.30
Challenge and excitement of the hunt	2.68	2.57	7.26
Peace, quiet, and relaxation	2.44	2.66	6.78
Good companionship with hunting friends	2.16	2.29	5.77
Long bow season	2.05	2.30	5.40
Good weather during early season	1.90	1.85	4.44
Two deer limit season (one gun tag and one bow tag)	1.44	1.45	4.20
Improvement in size and health of deer herd	1.42	2.11	3.64
Get a deer	1.53	1.93	3.60
Get a big or trophy size buck	.36	1.50	1.62
Conflicts with other things--too time consuming	.15	-.48	.82
Increased cost in license fees	1.23	-.53	-.11

(table continues)

Table 2 (continued)

Belief	Belief strength	Outcome evaluations	Product
Increased hunting pressure	1.25	-.59	-.56
See others who haven't the commitment to hunt properly	.88	-1.20	-.87

Note: Belief strength: 3.00 = extremely likely to
-3.00 = extremely unlikely

Outcome evaluations: 3.00 = extremely good to
-3.00 = extremely bad

season good weather, and getting a deer, maybe even a trophy buck, as well as seeing an improvement in the deer herd size. Again they expressed neutrality on the issue of bowhunting being too time consuming. Rated as slightly bad were increased license fees and increased hunting pressure as well as seeing other uncommitted bowhunters.

Question 1

As discussed in Chapter 1 of this study, there are several questions that can be explored. The first question was whether the belief products in this study model are similar to elements of satisfaction found in previous hunter attitude studies and how do they compare in their order of ranked importance. Table 1 (page 39) shows the mean ranking for hunting satisfactions of bow and firearm deer hunters within Jackson and Anderson's (1983) study and Table 2 shows the mean rankings of belief products within this study. In Table 3 the beliefs from this study and satisfactions from Jackson and Anderson's study which are thought to be comparable are ranked according to the findings of the respective studies. The exact words or phrases may differ slightly, but their general meanings are the same. The first two rankings are

Table 3

Comparative Rankings--Beliefs and Satisfactions

Belief rankings for Minnesota bowhunters
1. See deer
2. Viewing nature
3. Peace, quiet, and relaxation
4. Good companionship with hunting friends
5. Get a deer
6. Get a big or trophy size buck

Jackson and Anderson's satisfaction rankings for Wisconsin

Bowhunters	Gunhunters
1. Nature appreciation	1. Seeing deer
2. Seeing deer	2. Nature appreciation
3. Solitude	3. Companionship--friends
4. Companionship--friends	4. Solitude
5. Killing a deer	5. Killing a deer
6. Trophy	6. Trophy

the same for the respondents of this study, Minnesota bowhunters, and the Wisconsin gunhunter. However, the Wisconsin bowhunter reverses them listing "nature appreciation" first and "seeing deer" second. The third and fourth rankings are the same for both the Minnesota bowhunter and Wisconsin bowhunter. But, the gunhunter reverses them listing companionship first and then solitude. Interestingly, the last two rankings, five and six, are identical for all three groups.

A multiple comparison of means was performed using a one-way ANOVA to determine whether there was a significant difference among the means in Table 3. All belief means listed in Table 3 were significantly different using LSD (least-significant difference) criteria.

Question 2

The second question to be investigated is how bowhunters with strong and weak intentions differ in their beliefs pertaining to bowhunting. Table 4 lists the findings on belief differences. First, the two grand product means (3.37 and 4.09) are significantly different ($p < .01$) indicating a difference in overall belief strength between weak and strong intenders. Second, the strong intenders scored toward the extremes of the bipolar

Table 4

Means Beliefs, Evaluations, and Products of Weak Intenders and Strong Intenders--Minnesota Bowhunters

	Beliefs		Evaluations		Products	
Beliefs	Weak	Strong	Weak	Strong	Weak	Strong
See deer	2.65	2.89**	2.69	2.86**	7.11	8.32**
Challenge and excitement of the hunt	2.42	2.80**	2.24	2.70**	6.00	7.82**
Viewing nature	2.40	2.72**	2.49	2.75**	6.38	7.70**
Peace, quiet, and relaxation	2.11	2.53**	2.44	2.73**	5.71	7.14**
Good companionship with hunting friends	1.81	2.27**	2.01	2.42**	4.42	6.28**
Long bow season	1.89	2.21*	2.00	2.46**	4.29	6.10**
Good weather during early season	1.70	2.00*	1.77	2.03	4.12	4.86
Two deer limit season (one gun tag and one bow tag)	1.56	1.43	1.30	1.51	4.16	4.18
Get a deer	1.09	1.76**	1.73	2.04*	2.76	4.12**

(table continues)

Table 4 (continued)

Beliefs	Beliefs		Evaluations		Products	
	Weak	Strong	Weak	Strong	Weak	Strong
Improvement in size and health of deer herd	1.49	1.36	2.12	2.13	3.57	3.67
Get a big or trophy size buck	.18	.45	1.39	1.50	1.52	1.76
Conflicts with other things--too time consuming	.61	-.07**	-.18	-.56	.57	1.15
Increased cost in license fees	1.10	1.17	-.63	-.46	.01	-.06
Increased hunting pressure	1.12	1.41	-.48	-.59	-.41	-.68
See others who haven't the commitment to hunt properly	.67	.95	-.76	-1.29**	.21	-1.07**
Total					3.37	4.09**

Note: Beliefs: 3.00 = extremely likely to -3.00 = extremely unlikely
Evaluations: 3.00 = extremely good to -3.00 = extremely bad

**p < .01, *p < .05

scale. For example, strong intenders expressed a greater likelihood that they would see deer and that seeing deer was extremely good. On the other end of the scale, they expressed greater dissatisfaction with seeing other hunters who haven't the commitment to hunt properly.

The rank order of two belief products--challenge and excitement of the hunt and viewing nature--were reversed for weak intenders. This changed ranking is principally due to their evaluation of the consequences--how good or bad the outcome ranks. Looking at Table 4 under evaluations it can be seen they ranked viewing nature second followed by peace, quiet, and relaxation and then ranked challenge and excitement next. The weak intender's stronger desire for the aesthetic, peaceful aspects of bowhunting very likely act as a substitute for challenge of the hunt which requires considerable commitment and competitive drive. Jackson and Anderson (1983) found a similar pattern of compensation for bowhunters who did not get a deer.

The behavioral belief outcomes in Table 4 were rank ordered according to product means of strong intenders. The first six means were significantly different for strong and weak intenders. Two others--"Get a deer" and "See others who haven't the commitment to hunt properly" were also significantly different. Both groups seem to

have the same basic pattern of belief strengths and outcome evaluations. They only differed on the degree to which they believe or perceive these things.

To investigate possible social influences on the two groups the percentage of time they spent hunting alone, with one other person, and with a group were compared between the two groups. There was no significant difference between them. On the average both groups spend 55% of their time hunting alone, 34% hunting with one other person, and the remaining 11% hunting with a group.

Other characteristics of hunting were significantly different between the two groups. The strong intenders had an average of seven years bowhunting experience, the weak intenders had five. Strong intenders tended to hunt more days per season (21) than weak intenders (13). The deer harvest rate for each group was quite different as well. In a 10 year period, the average strong intender takes two deer and the weak intender one.

Question 3

The final question asked for a general characterization of the total sample population. The group was 95% male and ranged in age from 15 to 73. The mean age was 33. The age at which they began bowhunting

varied from 10 to 70 with an average of 25. The number of seasons hunted ranged from zero to 40 seasons with an average of six seasons. Average number of days hunted in a season was 18 with a range of zero to 77 days.

Given the number of seasons hunted the numbers of deer taken with the bow was quite interesting. The range was zero to 22 with a mean of 1.51. However, 57% of the respondents had never taken a deer. Approximately 32% had taken one to four deer and only 11% had taken five or more deer. Interestingly, 61% of all the deer harvested were taken by the 11% group who had harvested five or more deer. This tends to support the belief held by some bowhunting experts that the majority of deer taken with the bow are harvested by a small elite group of bowhunters. They further believe that this elite group is highly skilled and spends considerable time hunting and scouting each year.

Two Deer Limit

The salient belief of taking two deer per season (one with the bow and one with the gun) is discussed here separately because it did not meet all the requirements of a salient belief. Although it was identified by respondents in the preliminary survey as an advantage or

in some cases disadvantage to bowhunting, the frequency of this response was not as high as other resources mentioned but not included in the study. Therefore, it could not be viewed as an acceptable salient belief for the Ajzen and Fishbein model. However, it was included in the questionnaire to assist the DNR wildlife staff in future management decisions on this controversial issue.

The findings are quite interesting given that the two state archery associations representing many of the state archers oppose the idea. The respondents, as a group, believe it is slightly likely that this law will exist within the next five years and they consider it to be a slightly good idea. This may not seem significant, but when the frequencies within the bipolar scale are evaluated the picture becomes much clearer. The group appeared to be slightly polarized toward the ends of the scale on this issue. For example, when asked about the likelihood of seeing this in effect within the next five years, 80% said it is likely to occur, 14% said it was unlikely, and 6% were neutral on the issue. When asked whether this was a good or bad idea, 75% felt it was a good idea, 15% felt it was a bad idea, and 10% were neutral. It would appear that a majority of the Minnesota bowhunters are in favor of a two deer per season law in contrast to the state archery associations.

Supplemental Analysis

This section is included to cover analyses that either do not fit the Ajzen and Fishbein (1980) model or were not originally planned for this study. Because a significant correlation was not found between behavioral intention and subjective norm, the findings on normative beliefs were not discussed. This was done to be consistent with Ajzen and Fishbein's model. However, the normative beliefs findings will be reviewed here because they may be of some interest. Also, correlational analysis was done between attitude toward bowhunting and the various behavioral beliefs.

Normative Beliefs

The Pearson correlation between the subjective norm (SN) and the product of normative beliefs and motivation to comply ($SN = b_j\ m_j$) was found to be significant ($R = .43$, $p < .01$). The correlation between behavioral intention and subjective norm was not significant (see Figure 2, page 74). Therefore, the normative beliefs in this study are not considered determinants of the behavioral intention, to bowhunt in the next five years.

Nevertheless, the findings warrant some review. Table 5 shows the mean responses for the total sample

Table 5

Normative Belief Means for Minnesota Bowhunters

Referent group	Normative belief	Motivation to comply	Product
Hunting friends	2.70	5.08	14.14
Wife/husband or girl/ boy friend	2.10	5.13	11.74
Parents	2.08	4.53	10.26
Children	1.94	4.49	9.91
Farmers and rural landowners	1.54	5.16	8.73
Other family relations	1.91	3.80	7.98
Nonhunting friends	.81	3.10	3.74
Antihunters	-1.52	1.93	-1.79

Note: Normative beliefs: 3.00 = definitely should to
-3.00 = definitely should not

Motivation to comply: 7.00 = extremely likely to
1.00 = extremely unlikely

population. The normative belief column displays the respondents' beliefs of whether or not referents think they should or should not bowhunt in the next five years. Respondents believe that their referent hunting friends think they definitely should hunt. Spouse (or girl/boy friend), parents, children, family relations, and rural landowners were rated slightly less positive, indicated by probably should hunt. Nonhunting friends were rated one step lower but still positively. The only referent group perceived as being against their hunting was antihunters.

Respondents showed only moderate willingness to comply with the identified referents. This is an indication that social pressure has little bearing on their decision to hunt or not hunt in the next five years. Their greatest willingness for compliance was with farmers and rural landowners. This may indicate the respondents' willingness to abide by the wishes and rights of landowners. However, they were only slightly likely to comply with this referent group. The same was true for spouse (or girl/boy friend), hunting friends, and parents. They were neutral on their response for children and other family relations. As might be expected, they expressed negative compliance for nonhunting friends and antihunters. They were slightly unlikely to comply with nonhunting friends and quite unlikely to comply with antihunters. In

general, bowhunters appear to be a rather independent group.

The normative belief components were also assessed for the subgroups--strong and weak intenders (see Table 6). The two grand product means (6.80 and 9.51) were significantly different ($p < .01$) for weak and strong intenders. The product means indicate that the greatest influence comes from hunting friends while the least influence comes from antihunters. The normative belief column in Table 6 indicates the respondent's perception of whether these referents think they should or should not bowhunt. Strong intenders perceived that all referents, except antihunters, think the bowhunter should hunt. This perception was significantly more positive for the strong intenders than the weak intenders and is the major factor contributing to the product mean differences between the two intender groups.

There is little difference between the two groups in their willingness to comply. Both groups showed only moderate willingness to comply. A significant difference between the two groups, however, was found with regard to spouse (or girl/boy friend) and children. Strong intenders expressed a stronger willingness to comply.

These findings are paradoxical in one sense. According to Ajzen and Fishbein (1980), respondents who

Table 6

Mean Normative Beliefs, Motivations to Comply, and Products of Weak Intenders and Strong Intenders--Minnesota Bowhunters

	Normative beliefs		Motivation to comply		Products	
Referent group	Weak	Strong	Weak	Strong	Weak	Strong
Hunting friends	2.38	2.81**	5.00	5.12	12.79	14.60*
Wife/husband or girl/boy friend	1.73	2.30**	4.71	5.29*	9.12	13.11**
Parents	1.62	2.28**	4.31	4.59	8.19	11.20**
Children	1.37	2.20**	3.92	4.67*	6.95	11.08**
Farmers and rural landowners	1.18	1.75**	5.00	5.28	6.58	10.09**
Other family relations	1.59	2.12**	3.71	3.87	6.87	8.89*
Nonhunting friends	.46	.98*	3.12	3.13	2.69	4.42*
Antihunters	-1.19	-1.65	2.28	1.83	-1.80	-1.56
Total					6.80	9.51**

Note: Normative beliefs: 3.00 = definitely should to -3.00 = definitely should not
Motivation to comply: 7.00 = extremely likely to 1.00 = extremely unlikely
**p < .01, *p < .05

are participating in competitive forms of behavior tend to be less compliant with referent others. In this study strong intenders expressed greater satisfaction with the challenge of the hunt and harvested twice the number of deer. These two factors might be construed as displaying a greater affinity toward competitiveness. And yet, the strong intenders in this study displayed a greater willingness towards compliance with referent others than did the weak intenders. Ajzen and Fishbein also stated that individuals high in authoritarianism may place more weight on the normative component than individuals low in this trait. It may be that strong intenders tend to be more authoritarian in nature than weak intenders.

Behavioral Beliefs and Attitude Correlated

In the Ajzen and Fishbein model, salient behavioral beliefs are not weighted for their importance in determining attitude toward the behavior. Some researchers would argue that, in addition to obtaining measures of probability and evaluation, each outcome should be rated for its importance. One way to do this would be to measure the correlation between the attitude means and each of the belief means (see Table 7). Ajzen and Fishbein have found that including such measures of

Table 7

Ranking of Correlations between Behavioral Belief Product Means and Attitude for Minnesota Bowhunters

Item	Correlation
Challenge and excitement of the hunt	.330**
Get a deer	.250**
See deer	.249**
Good companionship with hunting friends	.226**
Long bow season	.224**
Viewing nature	.201**
Peace, quiet, and relaxation	.153**
Conflicts with other things--too time consuming	.069
Get a big or trophy size buck	.065
Improvement in size and health of deer herd	.041
Two deer limit season (one gun tag and one bow tag)	.029
Good weather during early season	.114*
Increased cost in license fees	-.010
Increased hunting pressure	-.018
See others who haven't the commitment to hunt properly	-.126**

**p < .01, *p < .05

importance in the prediction of attitude actually lowers the accuracy of the prediction. They contend it is redundant to take any independent assessment of importance into account. They assume that all salient beliefs are important, and any differences in degree of importance is assessed by the measures of belief strength and outcome evaluation. Nevertheless, weighting the beliefs for their importance on attitude produced a different rank order for the salient behavioral beliefs (see Table 7). The rank of the product means in Table 2 differ from the rank of correlations in Table 7. The positive belief products are significantly correlated with attitude. This tends to confirm Ajzen and Fishbein's hypothesis that weighting the beliefs is redundant. However, the surprising aspect is that the rank order of these positive beliefs changes and logical groupings appear. For example, the first three beliefs are challenge of the hunt, getting a deer, and seeing deer. The second grouping is the long bow season, viewing nature, and enjoying peace, quiet, and relaxation. These three also display similar relationship to each other. This change in the rank order of the behavioral beliefs is interesting, but whether it offers anything significant to the study of the bowhunter's behavior is unknown at this point.

Chapter 5

SUMMARY, CONCLUSIONS, RECOMMENDATIONS

Purpose of Study

Previous hunter attitude studies were conducted to determine elements of hunter satisfaction. Knowledge of these satisfaction elements could then be used to implement the multiple satisfaction approach to managing sport hunting. In those studies attitudinal attributes were ranked according to their perceived importance or degree to which they contribute to a quality hunting experience. Those studies suggested a causal relationship between positive elements of attitudinal satisfaction and the act or behavior of hunting. They did not, however, empirically test or prove this causal relationship.

In this study an attempt was made to empirically test this relationship. The behavior was bowhunting deer in the next five years and the elements of satisfaction and dissatisfaction were the salient behavioral beliefs found within the model. Also included were the subjective norm and normative beliefs which took into consideration the

social influence from important referents. It is believed by some researchers that this normative component also influences the relationship between attitude and behavior. Previous studies discussed in the review of literature did not include this factor in their analysis.

Ajzen and Fishbein's Reasoned Action model (1980) was used to assess the influence of salient attributes of satisfaction and dissatisfaction on the behavioral intention (to bowhunt deer in the next five years). If the model analysis was found significant, several aspects were to be explored. First, determine whether elements of satisfaction in previous studies were similar to behavioral beliefs in this study and assess how they compare or differ. Next, divide the sample population into strong and weak intender groups. Those with strong intentions to bowhunt were termed strong intenders. Weak intenders were those who indicated only moderate intention to bowhunt. These two groups were then compared to study their differences and similarities. Lastly, statistical averages and ranges were computed on general bowhunter characteristics to further develop a better understanding of the bowhunter's attitude and behavior.

Methods and Recommendations for Improvement

The population for this study were bowhunters who hunt deer in Minnesota. A sample population of 499 subjects were randomly selected from the 1984 resident archery deer licenses. An 80% return rate was achieved with 405 questionnaires actually being used in the study. This was considered a good return rate.

The Reasoned Action model used in this study seems rather complicated at first glance, but in reality it was a rather simple straightforward method. The model identifies and measures the behavior of interest and then investigates what determines the behavior. In identifying the behavior there must be proper correspondence between the various questions pertaining to intention, attitude, and beliefs. For example, if the behavioral criterion of action, target, context, and time do not correspond between the behavior and the questions in the questionnaire, the theory of reasoned action does not hold true.

In this study correspondence appears to be good. In terms of the time factor there was a short period of time between the expressed intention, August, and the opportunity to execute the bowhunting behavior, September. Also, there appears to have been no unforeseen events

before the 1985 season which might have altered the respondents' expressed intention to hunt.

Application of this model provided several benefits. It illustrated the relationship between intentions, attitudes, beliefs, and social influence with respect to the recreational behavior--bowhunting. It organized seemingly unrelated factors of recreational behavior into a systematic format which increased the investigator's ability to interpret and explain the underlying factors which influences the bowhunter's behavior. To do this a series of linked hypotheses were used. Each linked hypothesis was empirically tested through the use of multiple-regression or simple Pearson's correlation. If any link within the sequence was found nonsignificant all links subordinate to it were rejected and were not considered a part of the finding's explanatory model.

Just such a case was found with the subjective norm within this study. The subjective norm did not significantly contribute to behavioral intention. Why this occurred is not known. However, if this method were used again on hunting behavior, two things should probably be changed within the normative component. First, the normative belief should be asked at the intermediate level. Instead of asking, "How likely or unlikely are you to follow the wishes of the following

people?" it should read "How likely or unlikely are you to comply with the wishes of the following people with regards to recreational activities which are similar to bowhunting?" This would have provided a more accurate assessment of the influence of specific important referents. Second, a question of general moral obligation or responsibility to perform or not perform the bowhunting behavior should have been included as well. In meeting with numerous bowhunters it appears the bowhunter is quite sensitive to the moral issue of killing or crippling an animal. This issue warrants further investigation as to its affect on hunting behavior.

The Reasoned Action model has several levels of explanation which can be studied in Figures 1 and 2. At the most global level, the bowhunter's behavior is assumed to be determined by his or her intention to bowhunt. At the next level, intention itself is determined by attitude toward the behavior (A_B) and subjective norm (SN). The third level is comprised of belief strengths and evaluations as well as normative beliefs which are felt influences from relevant referents. This belief level of the model includes an expectancy-value model which is based on Lawler's (1973) expectancy-value theory. The concept of the theory is that people have preconceived expectations about

performing a behavior. How well these preconceived expectations are met during the execution of the behavior determines the quality of the experience. In this study, for example, respondents were asked how likely they were to experience a particular belief outcome and then evaluate whether they felt the outcome was good or bad. This method of measuring beliefs about the satisfactions or dissatisfactions with a particular recreational activity or behavior seems to provide a more comprehensive assessment of the respondents' attitude especially when it is used in conjunction with the other parts of the Reasoned Action model. Indeed, the expectancy-value model is probably a good tool for systematically measuring critical elements within a variety of recreational activities.

After having reviewed the return data, it appears the methodology used in constructing the questionnaire was quite acceptable. The questionnaire was concise which undoubtedly contributed to the good return rate. Also, it was easily understood as evidenced by the verbal responses from bowhunters who pretested the questionnaires. However, questions with similarly scaled answers were consolidated in the questionnaire for purposes of clarity and brevity and these grouped questions may have caused a slight problem. A few respondents scaled all their

answers the same within a grouped category of questions. These respondents apparently did not take the time to evaluate each item. To prevent this in a future study each question could be stated individually followed by its own individually scaled answer. In addition, all the questions from the various levels of the model could be intermixed. These changes would increase the size and length of the questionnaire and probably reduce the return rate. Nevertheless, the trade-off might be worthwhile to alleviate the problem of patterned response.

Findings

Model--Main Components

Within the Reasoned Action model two major factors determined behavioral intentions: (a) an attitudinal component and (b) a social or normative component. The multiple regression between these two independent variables and the dependent variable--behavioral intention was found to be significant (Figures 1 and 2). However, its ability to predict what is taking place was of moderate magnitude. The cause or causes for this low predictive power are not known. However, one speculation is that the restricted range of responses was the cause. The range was restricted because nonbowhunters were not

included in the study group. Young and Kent (1985) reviewed the Reasoned Action model in terms of its ability to predict recreational behavior. In their review they suggest the model is probably best suited to research studies where both participants and nonparticipants are surveyed. However, it is often difficult to find ready access to a random sample made up of both participants and nonparticipants. Such was the case in this study. Therefore, another alternative would be to modify the model so that a single group could be used to produce a higher predictive correlation. If that is not possible, then the only other alternative is to accept the lower correlation coefficient and assume it still provides meaningful findings at a lower statistical power of prediction.

In summary, the model was moderately supported with the major proportion of variance in behavioral intention accounted for by the attitude component. The subjective norm appears to have contributed little and its correlation coefficient was found to be nonsignificant.

A zero-order correlation between attitude (A_B) and subjective norm (SN) was obtained (see Figure 2). This coefficient (r = .44) was of the same magnitude as the multiple regression coefficient (R = .44**) for the behavioral intention component. It might be possible that

this proportionately large correlation between attitude and subjective norm has some detracting effect on the multiple regression coefficient for behavioral intention. This is, however, only speculative.

Behavioral Beliefs

The behavioral beliefs provided the greatest insights into the bowhunters' attitude and behavior. As would be expected the positive belief outcomes were rated as much more likely consequences of bowhunting than the negative outcomes. Evidence of this is shown in Table 2 under the belief strength column. Likewise, the outcome evaluation column displayed a similar pattern which indicates positive outcomes were rated as good and negative outcomes were rated as either bad or neutral.

It was surprising, given the comments from those bowhunters surveyed in the preliminary survey, that the negative outcomes--increased hunting pressure and observation of uncommitted bowhunters--were not rated more negatively. The difference may be explained by the past experiences of the two groups. Existing hunting pressure throughout Minnesota, the probable basis for lower evaluations, is probably minimal given the current density of hunters in Minnesota. Indeed, Minnesota's neighboring state of Wisconsin had some 200,000

bowhunters for the 1984 season while Minnesota had only 60,000. Further, bowhunters who participated in the preliminary survey were from the metropolitan area and have probably experienced greater hunter densities than the average Minnesota bowhunter because they are more likely to have hunted the more crowded public lands near the metropolitan area.

A number of the behavioral beliefs within this study (Table 3) were comparable to Jackson and Anderson's (1983) findings on bowhunters in Wisconsin. Wisconsin bowhunters reversed the first two beliefs, seeing deer and viewing nature, but the Wisconsin gunhunter ranked them the same as the Minnesota bowhunter. In another section of Jackson and Anderson's study where open-ended questions assessed attitudes of satisfaction and dissatisfaction, seeing deer was rated first. It would appear that there is some question as to which of these satisfiers is more important, seeing deer or viewing nature.

In this study on Minnesota bowhunters T-tests were performed on the behavioral beliefs means and a significant difference was found between the two beliefs, seeing deer and viewing nature. Therefore, on the basis of the findings in this study as well as Jackson and Anderson's findings this researcher believes that seeing deer is probably the most important element of

satisfaction within the bowhunting experience and absolutely essential for the bowhunting behavior to continue. Seeing deer provides that needed incentive which offsets the continuous hardships and occasional boredom of bowhunting. Seeing deer heightens the bowhunter's expectation for success which in turn stimulates the challenge and excellent element of the hunt. Viewing nature, on the other hand, probably provides some incentive and excitement, but it is not sufficient to offset the pain of sore muscles from hours of posting or the adverse weather conditions that are often endured while bowhunting. In addition, nature can be viewed and enjoyed without the hardships of hunting.

If the element of seeing deer were not present, two other elements would not be present. They are enjoying the challenge and excitement of the hunt and bagging or taking a deer. Obviously these three behavioral beliefs are closely related and are elements which are specific to the hunting behavior. Also, these three were ranked first, second, and third when correlated with attitude (see Table 7). Beliefs such as viewing nature, solitude, and good companionship, on the other hand, are more general in nature and can be found as elements of satisfaction in a variety of outdoor recreational activities. Thus, wildlife managers responsible for

bowhunting in Minnesota should be concerned first with the elements specific to bowhunting which is what they appear to be doing as evidenced by their efforts to maintain a viable deer herd. Equally important, should be the effort to minimize the negative elements of the hunting experience. Indeed, further research is needed to determine whether the negative elements have begun to interfere with the overall enjoyment of the bowhunting experience.

The challenge and excitement of the hunt is an interesting element. Jackson and Anderson found in their oral interviews with bowhunters that they were a very intense and dedicated group and that they had a real infatuation with the challenge which is so intrinsic to the sport. Jackson and Anderson said bowhunters kept expressing again and again how great the challenge of the experience is to them. This element, challenge and excitement of the hunt, ranked third in this study and was found to be a positive determinant of the attitude toward bowhunting in the next five years.

The use of a rather limited weapon is probably the key to this challenge element. The limitation of the weapon forces bowhunters to perfect their shooting skills on a continual basis. In addition, the deer must be at close range and unobscured by vegetation for an effective

shot to be taken. This close proximity puts the bowhunter within range of the deer's exceptionally keen sense of sight, sound, and smell. This presents a further challenge to the bowhunter: How to mask scent and visual appearance as well as minimize any noise or movement while moving through the deer's home territory. Obviously, knowledge of the deer's physiology and behavior is needed. Equally important, the bowhunter must have mastered the physically and mentally demanding hunting skills necessary to overcome the odds of the deer's superior senses and speed.

For behavioral scientists and recreation researchers this challenge element might be an aspect of human behavior that warrants further research and experimentation. Here is a group of recreational participants who intentionally lower their potential odds for success (bagging a deer) just to heighten the challenge element of the activity. Introduction of this concept into other recreational pastimes might produce some very positive benefits just as it has for the bowhunter.

Both seeing deer and the challenge and excitement of the hunt are probably acting as catalytic elements. Their presence or absence will likely have considerable effect on the degree of hunting satisfaction. If deer are not

seen, even the most experienced bowhunter will experience considerable discouragement because not seeing deer tends to preclude any reasonable expectation of success. Stankey and Lucas (1973) and Hendee (1974) argue that a reasonable probability of success is undoubtedly necessary to activate or enhance other hunting satisfactions even though the actual taking of a deer has been ranked low in most studies. This researcher agrees with Stankey and Lucas and believes there is a strong interrelationship among seeing deer, challenge and excitement of the hunt, and reasonable probability of success. These elements of satisfaction and their interrelationship warrant further investigation.

Another issue that pertains to the ranking of these beliefs or elements is whether the bowhunter has been successful or unsuccessful in seeing and bagging a deer. Jackson and Anderson found that successful hunters expressed higher satisfaction with companionship, nature, and seeing other game. They believe that the unsuccessful hunter uses these elements as compensating factors to offset their inability to bag a deer. This appears to be consistent with other studies on human behavior where the person feels an inner need to justify their continued behavior, and therefore, expresses greater satisfaction

for those aspects or elements of the experience that are more likely to occur.

Similar results were found in this study when comparing strong and weak intenders. In Table 4 under the evaluations column the weak intenders reversed the rank order of the following beliefs: challenge and excitement of the hunt, viewing nature, and peace, quiet, and relaxation. It appears they have a higher evaluation of the aesthetic, peaceful aspects of bowhunting. Whether they really do appreciate these things more than the challenge of the hunt or whether they are unknowingly justifying their inability to master the challenge is not known. However, this would probably be another interesting topic to pursue in future research.

The review of the behavioral beliefs for the strong and weak intenders showed only a few differences between the two (see Table 4). Both groups had the same basic belief strengths and outcome evaluations. They only differed on the degree, positive or negative, to which they believe or perceive these things. Strong intenders tended to be more polarized in their responses--positive outcomes were more positively rated and negative outcomes were rated more negatively. These findings may indicate that the strong intenders are more polarized because they possess more years of experience and a more

conscious understanding of the sport. If attempts were made to change weak intenders to strong intenders, the most productive route would be to convince the weak intenders that the positive belief outcomes discussed here hold greater benefits than they presently realize. Given time and dedication on the part of the bowhunter these consequences or outcomes are the ones most likely to occur and provide the greatest rewards.

Normative Beliefs

In the Reasoned Action model normative beliefs correlated significantly with the subjective norm (see Figure 2). They were, however, not included in the model analysis, because subjective norm did not correlate significantly with behavioral intention. Nonetheless, they were included in a supplemental analysis in hopes of providing some speculative information on the social influence felt by the bowhunter. A few respondents failed to complete the last section (Questions 49-56) which deals with compliance. However, it did not alter the findings sufficiently to make a statistical difference.

Respondents in this study felt all referents except possibly nonhunting friends and antihunters (Table 5) would approve of their bowhunting. Greatest approval they felt would come from hunting friends, spouse (or girl/boy

friend), and parents, which are the major people within a person's immediate support group. However, the bowhunters' willingness to comply with these referents was quite another thing. Respondents showed only a moderate willingness to comply with the referents listed in Table 5. Their lack of compliance could mean several things. Bowhunters are not easily swayed by social pressure; they put bowhunting needs before social needs; and/or they have little concern for the need to comply with referent others.

The ranking of referents in the compliance factor was interesting. It would seem natural that the bowhunter would rank hunting friends or spouse at the top of their list. However, they ranked farmers and rural landowners first. It would seem that even though the bowhunter is moderately compliant they do wish to comply with the wishes of rural landowners. Possibly they have a sincere respect for the rights of the landowner. If this is the case, wildlife managers could use this positive quality as an introductory stepping stone to establishing better relations between the bowhunters and landowners.

Little difference in normative beliefs was found between strong and weak intenders. Beliefs that the referents (Table 6) approved of their bowhunting was significantly higher for the strong intender. Both intender groups displayed about the same moderate

willingness to comply with referents. The major difference appears to be that the strong intenders believe that the important referents in this study are strongly supportive of their bowhunting deer.

General Characteristics

Probably the most interesting aspect of the hunting characteristics in this study was the harvest rate. It was surprising to learn that over 61% of the deer harvested by respondents was done by that small 11% group of skilled hunters. This may be of interest to wildlife managers who are faced with the problem of poor harvest rates by bowhunters. Many managers believe, based on past performance, that bowhunters are not an effective hunting group for controlling deer herd size. To increase bowhunter harvest many discuss the idea of lengthening the season. However, based on the findings in this study, another alternative might be to allow the bowhunter to take more than one deer per season. If the findings in this study hold true then the harvest rate for bowhunters would, very likely, increase dramatically.

There was considerable difference in the hunting characteristics of strong and weak intenders. Although strong intenders had hunted, on the average, only two more years than the weak intenders, they have harvested nearly

twice as many deer. It should be noted, however, that they spent almost twice as many days afield per season. This means the strong intender dedicates more of his or her free time to bowhunting. Spending more days afield is also probably a factor in the increased harvest rate. An interesting study would be to investigate whether the days afield factor or the achieved skill level factor has greater impact on the success of harvesting a deer.

Management Implications

Multiple Satisfaction Approach

What implications does the Multiple Satisfaction Approach (MSA) hold for game and wildlife managers? According to some investigators, the results of studies on MSA hold important clues for the management of sport hunting. A primary goal of this approach is to show the manager how social and psychological measurements of satisfaction can provide valuable information in the management of environmental resources.

The recent growth of hunting coupled with an inability to increase amount of game and/or amount of huntable land, indicates the numbers of hunters will have to be managed very carefully. In addition, the multiple satisfaction model indicates hunter satisfactions may

decline before either the amount of game or sheer physical space becomes a limiting factor (Potter, Hendee, & Clark, 1973). This being the case, the present policy of unlimited access to the sport of hunting may cause a sharp decline in overall quality of hunting. At the very least it will cause a change in the traditional styles of hunting (Stankey & Lucas, 1973).

Hendee (1974) contends that wildlife managers should produce those elements of satisfaction which are unique to the hunting experience and are not readily obtainable from other forms of recreation. Equally important, they should identify the necessary form and intensity of each element and act to maintain it or increase it. If this is not done, many of these elements will likely disappear (Potter, Hendee, & Clark, 1973). The cluster-analysis used by Hautaluoma and Brown (1979) would be very helpful in this endeavor. It would even be possible to predict which types of hunters would be attracted to the various hunting areas with each area providing a different kind of experience. Finally, Hendee says in order to achieve the potential for a high quality hunting experience game and land managers must work together cooperatively. This researcher would also contend that, in the future, with increased scarcity of public land, private rural landowners will also have to join forces with public land

managers to achieve this goal. According to Stankey and Lucas (1973) wildlife managers should provide a wide mix of satisfactions that hunters attribute to quality hunting. In addition, they should initiate a diversity of management programs which would deal with such issues as alterations in land management practices, variations in hunting seasons, and control of hunter numbers. In summary, all of the above management goals are probably much more achievable through the use of the multiple satisfaction approach to wildlife management.

This Study's Implications

The Ajzen and Fishbein model used in this study has been used extensively in the marketing of commercial products. It is used to define and measure desired attributes of products (activities, services), and primary attention is focused on salient consequences or outcomes of the product that are desired and expected. In this way managers define product quality as perceived by the consumer. Using these definitions of quality as a foundation, they set acceptable operating standards and make effective allocation of their limited resources.

Knowing the elements of bowhunter satisfaction and their order of ranked importance could be equally useful for establishing standards for a quality bowhunting

experience. In addition, the findings of this study and others like it in the multiple satisfaction approach could be used in conjunction with the Recreation Opportunity Spectrum and Wilderness Opportunity Zoning to improve the efficient allocation of scarce natural resources. Studies for each type of hunting group (gunhunter, bowhunter, etc.) or specific studies for different regions of the country are not immediately necessary because common patterns exist between groups and regional locations. Using these common patterns or multiple satisfiers, managers could design a quasi-marketing approach to sport hunting management which would attempt to satisfy the desires of various hunting groups. Following this initial grand market approach further research could be designed to aid in the development of smaller marketing approaches that could provide for unique geographical areas and target the desires unique to the various types of hunting groups.

For example, seeing deer was a key element of satisfaction found in this study, but the harvesting of deer was rated low. If taking a deer was the only element considered, then managers could assume deer herd size is not critical and could reduce the herd size to a lower level where domestic crops would not be threatened. However, managers must continue to maintain herd size so

that the hunter can at least see deer which in turn creates challenge and excitement as well as giving the bowhunter some feeling that the potential at least exists for taking a deer. In fact, it might be said that seeing deer provides the continued incentive to bowhunt and bagging a deer is only an illusive reward which is seldom achieved.

Another element of satisfaction was the long bow season. Many gunhunters would sooner see the early season bowhunt eliminated. Gunhunters believe the spookiness of deer on opening morning of the rifle season is due primarily to the early season bowhunt. Were the early season eliminated, the quality of the bowhunting experience would be altered drastically according to the findings of this study. Not only was the length of the season important, but the good weather in the early season was important as well.

The two deer limit issue in this study probably has the most immediate implications for management. Not only were the majority of respondents of this study in favor of taking two deer per season, one with the bow and one with the gun, but they also believed it would be in effect within the next five years. This is interesting because although the Minnesota legislature passed such a regulation on a trial basis it was not publicized prior to

the mailing of the questionnaires for this study. Also, many authorities on Minnesota bowhunting were of the opinion that Minnesota bowhunters would be vehemently opposed to such a regulation.

Wildlife managers will always be concerned with production and preservation of the deer herd. Any provision for human benefits such as sport hunting will always be a secondary objective for them. However, wildlife managers are experiencing greater public pressure and are in the public eye more today than ever before. Concerned hunters, environmentalists, and preservationists all have a greater awareness and concern for issues relating to management of sport hunting. Because of this managers can ill afford to make management decisions which could later be perceived as poor management decision making. The ability to produce a deer population for harvest in sport hunting which yields important human satisfactions is a difficult task. Hopefully, the findings of this study and others like it which have investigated the elements and dimensions of the multiple satisfaction approach will provide new insights into the management of sport hunting. The day may soon come when the multiple satisfaction approach will be as popular amongst wildlife managers as the approaches that preceded it--game bagged and days afield.

In conclusion, the bowhunting experience in Minnesota has provided considerable recreational enjoyment for many Minnesotans as evidenced by the strong responses in this study. The quality of that experience should be preserved and passed on to future generations. Hopefully, this study has contributed to the future quality and preservation of bowhunting in Minnesota.

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APPENDIX A

PRELIMINARY SURVEY

[Letterhead]
University of Minnesota--Twin Cities
Division of Recreation Park and Leisure Studies
School of Physical Education Recreation and
School Health Education
Cooke Hall
1900 University Avenue S.E.
Minneapolis, Minnesota 55455

Fellow Bowhunters,

With the financial support of Minnesota Bowhunters Incorporated, and the Minnesota State Archery Association, we are conducting a research study on bowhunters in Minnesota who hunt deer. We want to find out how they make decisions to bowhunt and what kinds of information they use in making these decisions.

We would like you to complete the following questionnaire on the advantages and disadvantages of bowhunting deer in Minnesota in the next five years. This is not a "test" so there are no right or wrong answers. Your answers will be strictly confidential and your name will not be given out to anyone in connection with this project. It is important that you answer each item carefully and honestly. The results of this survey will be consolidated and used as preliminary data for the development of a state wide bowhunter survey to be mailed out in August. If you have any questions, please feel free to ask them. I can be reached at (612) 373-4226 (work) or (612) 631-1291 (home).

We think this research is very important to the future success and enjoyment of bowhunting here in Minnesota. Thank you for your support and assistance.

Sincerely,

George Arimond

George Arimond
Project Director

In your opinion, what are the advantages of your bowhunting deer in Minnesota in the next five years? Write down each of the advantages that occur to you on a separate line. If necessary, you may also use the back of the page for more space.

In your opinion, what are the disadvantages of your bowhunting deer in Minnesota in the next five years? Write down each of the disadvantages that occur to you on a separate line.

Is there anything else that you associate with bowhunting deer in the next five years?

What persons or groups of people would probably approve of your bowhunting deer in Minnesota in the next five years? Name of the person is not necessary, only their relationship to you, for example, your wife/husband, hunting friends, nonhunting friends, etc. List three persons or groups below.

What persons or groups of people would probably disapprove of your bowhunting deer in Minnesota in the next five years? List these persons or groups below.

In general, when it comes to bowhunting deer, is there anyone else or any other group whose advice you would follow? List these persons or groups below.

APPENDIX B

QUESTIONNAIRE

DEER BOWHUNTER QUESTIONNAIRE

First, we would like to know something about your bowhunting experience.

1. How many seasons have you bowhunted deer in Minnesota? ____seasons

2. In how many of these seasons did you kill a deer with the bow? ____seasons

3. What is the average number of days you go bowhunting in a season? ____days

4. How old were you when you first started bowhunting deer? ____years old

5. What percentage of time do you spend bowhunting deer alone, with one other person, with a group (Fill in each space.)

____% alone ____% one other person ____% group

In the following questions you are to indicate your opinion by circling a number on a seven place rating scale. Please be sure to answer all the items and do not circle more than one number for each item.

		Extremely	Quite	Slightly	Neither	Slightly	Quite	Extremely	
6. I intend to bowhunt deer in Minnesota in the next five years.	LIKELY	+3	+2	+1	0	-1	-2	-3	UNLIKELY
7. My bowhunting deer in Minnesota in the next five years is	IMPORTANT	+3	+2	+1	0	-1	-2	-3	UNIMPORTANT
8. My bowhunting deer in Minnesota in the next five years is a	GOOD IDEA	+3	+2	+1	0	-1	-2	-3	BAD IDEA
9. My bowhunting deer in Minnesota in the next five years would be	NICE	+3	+2	+1	0	-1	-2	-3	AWFUL

		Definitely	Probably	Slightly	Neither	Slightly	Probably	Definitely	
10. Do most people who are important to you feel you should or should not bowhunt deer in Minnesota in the next five years?	SHOULD	+3	+2	+1	0	-1	-2	-3	SHOULD NOT

We want to find out more details about how you feel about bowhunting.

First, how LIKELY or UNLIKELY are you to observe or experience the following things while bowhunting deer in Minnesota in the next five years? (Circle the appropriate number for each statement.)

	Extremely	Quite	Slightly	Neither	Slightly	Quite	Extremely
	LIKELY				UNLIKELY		
11. Long bow season	+3	+2	+1	0	-1	-2	-3
12. Increased hunting pressure	+3	+2	+1	0	-1	-2	-3
13. Peace, quiet & relaxation	+3	+2	+1	0	-1	-2	-3
14. Good companionship with hunting friends	+3	+2	+1	0	-1	-2	-3
15. Good weather during early season	+3	+2	+1	0	-1	-2	-3
16. Challenge & excitement of the hunt	+3	+2	+1	0	-1	-2	-3
17. Conflicts with other things - too time consuming	+3	+2	+1	0	-1	-2	-3
18. Increased cost in license fees	+3	+2	+1	0	-1	-2	-3
19. See others who haven't the commitment to hunt properly	+3	+2	+1	0	-1	-2	-3
20. Improvement in size & health of deer herd	+3	+2	+1	0	-1	-2	-3
21. Viewing nature	+3	+2	+1	0	-1	-2	-3
22. Two deer limit season (1 gun tag & 1 bow tag)	+3	+2	+1	0	-1	-2	-3

	Extremely	Quite	Slightly	Neither	Slightly	Quite	Extremely
	LIKELY				UNLIKELY		
23. Get a deer	+3	+2	+1	0	-1	-2	-3
24. See deer	+3	+2	+1	0	-1	-2	-3
25. Get a big or trophy size buck	+3	+2	+1	0	-1	-2	-3

Next, how GOOD or BAD do you feel each of the following are? (Circle the appropriate number for each statement.)

	Extremely	Quite	Slightly	Neither	Slightly	Quite	Extremely
	GOOD				BAD		
26. Long bow season	+3	+2	+1	0	-1	-2	-3
27. Increased hunting pressure	+3	+2	+1	0	-1	-2	-3
28. Peace, quiet & relaxation	+3	+2	+1	0	-1	-2	-3
29. Good companionship with hunting friends	+3	+2	+1	0	-1	-2	-3
30. Good weather during early season	+3	+2	+1	0	-1	-2	-3
31. Challenge & excitement of the hunt	+3	+2	+1	0	-1	-2	-3
32. Conflicts with other things - too time consuming	+3	+2	+1	0	-1	-2	-3
33. Increased cost in license fees	+3	+2	+1	0	-1	-2	-3
34. See others who haven't the commitment to hunt properly	+3	+2	+1	0	-1	-2	-3
35. Improvement in size & health of deer herd	+3	+2	+1	0	-1	-2	-3
36. Viewing nature	+3	+2	+1	0	-1	-2	-3
37. Two deer limit season (1 gun tag & 1 bow tag)	+3	+2	+1	0	-1	-2	-3
38. Get a deer	+3	+2	+1	0	-1	-2	-3
39. See deer	+3	+2	+1	0	-1	-2	-3
40. Get a big or trophy size buck	+3	+2	+1	0	-1	-2	-3

We want to find out how other people feel about your bowhunting.

First, Do the following people feel you SHOULD or SHOULD NOT bowhunt deer in Minnesota in the next five years? (Circle the appropriate number for each. If any person or group does not apply to you, circle "NA".)

	Definitely	Probably	Slightly	Neither	Slightly	Probably	Definitely	
	SHOULD				SHOULD NOT			
41. Wife/Husband or Girl Friend/Boy friend	+3	+2	+1	0	-1	-2	-3	NA
42. Parents	+3	+2	+1	0	-1	-2	-3	NA
43. Children	+3	+2	+1	0	-1	-2	-3	NA
44. Other Family Relations	+3	+2	+1	0	-1	-2	-3	NA
45. Hunting Friends	+3	+2	+1	0	-1	-2	-3	NA
46. Non-Hunting Friends	+3	+2	+1	0	-1	-2	-3	NA
47. Farmers and Rural Landowners	+3	+2	+1	0	-1	-2	-3	NA
48. Anti-Hunters	+3	+2	+1	0	-1	-2	-3	NA

Generally speaking, how LIKELY or UNLIKELY are you to follow the wishes of the following people? (Circle the appropriate number for each. If any person or group does not apply to you, circle "NA".)

	Extremely LIKELY	Quite LIKELY	Slightly LIKELY	Neither	Slightly UNLIKELY	Quite UNLIKELY	Extremely UNLIKELY	
49. Wife/Husband or Girl Friend/Boy Friend	+7	+6	+5	+4	+3	+2	+1	NA
50. Parents	+7	+6	+5	+4	+3	+2	+1	NA
51. Children	+7	+6	+5	+4	+3	+2	+1	NA
52. Other Family Relations	+7	+6	+5	+4	+3	+2	+1	NA
53. Hunting Friends	+7	+6	+5	+4	+3	+2	+1	NA
54. Non-Hunting Friends	+7	+6	+5	+4	+3	+2	+1	NA
55. Farmers or Rural Landowners	+7	+6	+5	+4	+3	+2	+1	NA
56. Anti-Hunters	+7	+6	+5	+4	+3	+2	+1	NA

Lastly, we would like the following general information.

57. Your sex __Male __Female (Check the appropriate space.)

58. What is your age? _____years

APPENDIX C

COVER LETTER

[Letterhead]
University of Minnesota--Twin Cities
Division of Recreation Park and Leisure Studies
School of Physical Education Recreation and
School Health Education
Cooke Hall
1900 University Avenue S.E.
Minneapolis, Minnesota 55455

Some Minnesotans have traditionally found the deer bowhunting season very appealing. A bill was passed recently that will permit deer hunters in certain areas to take two deer per year. One option will permit taking one deer with a firearm and one with a bow. These changes could greatly affect the bowhunting of deer in Minnesota. However, no one really knows the kind of bowhunting people like yourself want. The only way we know to find out is to ask you.

You are one of a small number of people who are being asked to give your opinion about bowhunting deer in Minnesota. Your name was drawn from a random sample of the 1984 bowhunting licenses for the entire state. The information you provide will be used to help improve Minnesota's bowhunting for you and your fellow bowhunters. In order that the results will truly be representative of Minnesota bowhunters it is important that each questionnaire be filled out completely and returned. We would like you to fill out the questionnaire whether you have hunted or not. It will only require 5-10 minutes of your time.

You may be assured of complete confidentiality. The questionnaire has an identification number for mailing purposes only. This is so that we may check your name off of the mailing list when your questionnaire is returned. Your name will never be placed on the questionnaire.

The results of this research will be made available to State officials and State bowhunter associations. You may receive a summary of results by writing "copy of results requested" on the back of the return envelope, and printing your name and address below it. Please <u>do not</u> put this information on the questionnaire itself.

I would be most happy to answer any questions you might have. Please write or call. The telephone number is (612) 373-4264. Remember, the information you provide is important in helping improve Minnesota's bowhunting. Thank you for your assistance.

Sincerely,

George Arimond

George Arimond
Project Director

APPENDIX D

FOLLOW-UP POSTCARD

Last week a questionnaire seeking your opinion about Minnesota bowhunting was mailed to you. Your name was drawn in a random sample of 1984 Minnesota licensed bowhunters.

If you have already completed and returned it to us please accept our sincere thanks. If not, please do so today. It was sent to only a small random sample of licensed bowhunters. Therefore, it is extremely important that yours also be included whether you have hunted or not. Without yours the results will not accurately represent the opinions of licensed bowhunters.

If by some chance you did not receive the questionnaire, or it was misplaced, please call me right now, collect (612-373-4264) and I will mail another one to you immediately.

Sincerely,

George Arimond

George Arimond
Project Director

APPENDIX E

FOLLOW-UP LETTER

[Letterhead]
University of Minnesota--Twin Cities
Division of Recreation Park and Leisure Studies
School of Physical Education Recreation and
School Health Education
Cooke Hall
1900 University Avenue S.E.
Minneapolis, Minnesota 55455

August 27, 1985

About three weeks ago I wrote to you seeking your opinions on bowhunting deer in Minnesota. As of today we have not yet received your completed questionnaire.

We have undertaken this study because of the belief that DNR does not know the general consensus opinions of Minnesota bowhunters and that our sharing this information will aid in improving the quality of bowhunting here in Minnesota.

I am writing to you again because of the significance each questionnaire has on the usefulness of this study. Your name was drawn through a scientific sampling process in which every 1984 licensed bowhunter had an equal chance of being selected. This means that only about one out of every 150 bowhunters are being asked to complete this questionnaire. In order for the results of this study to be truly representative of the opinions of all licensed bowhunters it is essential that each person in the sample return their questionnaire. As mentioned in our last letter, we would like you to fill out the questionnaire whether you have hunted or not. Again, it will only require 5-10 minutes of your time.

In the event that your questionnaire has been misplaced, a replacement is enclosed.

Cordially,

George Arimond

George Arimond
Project Director