

HUNTER ATTITUDE TOWARD DEER HARVEST
IN ARIZONA

by

Don R. Miller

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SIGNED:

Don R. Miner

APPROVAL BY THESIS DIRECTOR

This thesis has been approved on the date shown below:

Lyle K. SOWLS

LYLE K. SOWLS
Unit Leader, Cooperative
Wildlife Research Unit

May 19, 1969

Date

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ABSTRACT

The problem of non-acceptance by hunters of scientific deer harvest regulations is reviewed. To examine the attitudes of deer hunters, a fifteen question attitude questionnaire was developed around a general theoretical model of attitude. Details of the questionnaire construction are given. The responses of 895 deer hunters to the questionnaire are examined, revealing a cross-section of responses to various deer harvest issues. The best nine questions of the questionnaire separated groups of 50 from each end of the scale above the .95 confidence level.

Three supporters of sound deer harvest regulations and three opposers of sound deer harvest regulations were interviewed and given information, background, and psychological questionnaires. The three supporters of sound deer harvest regulations received higher information scores and indicated better adjusted personalities than the opposers. The thesis is discussed and a five-step plan of action suggested.

INTRODUCTION

In 1957, H. G. Lumsden of the Ontario Lands and Forests Department published his paper, "Some Public Relations Problems in Deer Management" (Lumsden 1957). He suggested that there was a need in the wildlife profession for more understanding of the psychological barriers to attitude change. This paper, along with my own experience and observations, stimulated my interest in the problem of hunter attitude toward deer harvest. As a student in Fisheries and Wildlife at Michigan State University, and later as a wildlife manager for the Arizona Game and Fish Department, I wondered why wildlife management based on a scientific approach was often unacceptable to deer hunters. While employed by the Arizona Game and Fish Department, I began to formulate my ideas into a definite project wherein I could explore this vexing problem. This paper describes my goals, my methods, and the conclusions which I reached after the completion of the study.

The Deer Harvest Dilemma

Arrangements for the removal of large numbers of deer by hunters is a principal responsibility of most state game departments. Hunter opposition to deer harvest programs

is often encountered, and the conflict over harvest programs which game biologist consider sound is both puzzling and frustrating to the biologist and to the hunter. These conflicts over harvest tend to follow the pattern outlined in the following paragraphs.

(1) Period of deer increase. Over a period of years, the number of deer increases while each year there is an inadequate harvest. The result is too many deer for the carrying capacity of the range. Palatable browse plants show severe damage due to overuse by deer. Young deer begin dying of starvation (Leopold, Sowls, and Spencer 1947). Inadequate harvest is usually due to strong hunter opposition to the taking of female and young deer and the effects of this opposition on harvest regulations. Seldom can enough deer be removed by hunting only the bucks.

(2) First antlerless harvest. Wildlife management personnel finally manage to secure regulations allowing the harvest of a large number of female and young deer or antlerless deer, large at least in comparison to the harvest of the previous years. This antlerless harvest is usually not adequate to turn back the population increase. Nevertheless, large numbers of hunters protest strongly that the harvest is excessive. By this time, deer have destroyed their best browse plants, and are now using inferior browse for food.

(3) Continued increase. Earnest opposition to adequate deer harvest crystallizes following the sensible but controversial large harvest of antlerless deer. In this third stage, token or occasional adequate antlerless harvests are maintained, accompanied by loud public protest as each hunting season goes by. The opposition to sound harvests results in inadequate harvest and continued build-up of deer numbers. The deer have now used up the inferior browse plants and begin eating plants without food value.

(4) Severe range damage and starvation. The continued overuse of the deer food plants has by now produced severe destruction of the deer habitat. Finally a hard winter comes, or some other additional stress on the herd occurs, and there is a severe loss of deer of all ages from starvation or malnutrition.

(5) Lasting decrease of deer. A decrease in deer numbers of a nearly permanent nature has now occurred. It seems that many hunters simply do not believe deer starve to death, especially those hunters who are opposed to antlerless hunting. They had been saying all along that all the deer were being killed off; now the deer are less plentiful, so they conclude that antlerless hunting is to blame for the loss of deer. Biologists may explain that range damage caused the loss of deer but unfortunately, it appears

that the people who oppose sound harvest regulations generally regard range damage as, at best, a pathetic alibi. It appears that the unhappy hunters feel that the confusing concepts of carrying capacity and range damage, as well as the unacceptable claim of starvation, are brought forth mainly to conceal the "mistake" of taking antlerless deer.

(6) Range recovery. Now the hunters venture out to their old hunting grounds and find fewer deer. Many hunters feel deer numbers have been disastrously reduced because of excess harvest. Then, what does the wildlife biologist recommend the next year--another despised antlerless deer hunt! The outraged opposition to the hunt is rarely moved by biologists' claims of the need for range recovery. To those who oppose the sound harvest regulations, the solution is now obvious; stop hunting antlerless deer and there will be more deer. The biologist knows, of course, that unless deer numbers are reduced by increased harvest, including numbers of antlerless deer, the range will probably continue to produce fewer deer. Each year the same arguments are repeated; on one side, "you must not kill antlerless deer" and on the other, "you must kill antlerless deer". Many states are in this range recovery stage or have local deer areas with such problems.

Finally, the biologist and a portion of the hunters seem to be at permanent odds. The arguments go on, like a broken record, year after year. The biologists despair of ever achieving range recovery, and the hunter opposition despairs of the "misguided" biologists ever coming to their senses. However, through all this, keep in mind that another portion of the hunters agree with the harvest regulations.

There has been a serious lack of research programs in the information-education area of game management. Although estimates of hunter attitude toward deer harvest regulations often influence the final deer hunt recommendations, these estimates of opinion have seldom been documented. McFadden, Ryckman, and Cooper (1964:192) surveyed some opinions of Michigan sport fishermen and pointed out that, "Unbiased estimates of public opinion, which can be obtained through properly designed surveys, are certainly preferable in a democratic society to the biased estimates provided by many avenues of personal and group expression." Regarding the usefulness of measuring fisherman attitude toward various fish conservation practices, they conclude that, "Most respondents are probably not well enough acquainted with prospective '...future fish needs...' to make a meaningful judgement in this context--but their answers do

reflect current attitudes toward the fisheries activities listed. Such attitudes are persistent and consequently the data obtained provide a reliable basis for future planning." As Schoenfeld (1957:70) wrote: "The development of a favorable climate of public opinion must accompany or even precede the management of game."

From experience and training, I felt there might also be social-psychological differences between the hunters supporting sound deer harvest regulations and those opposing the regulations. Finally, I decided to conduct a research program to gather information that might reveal social-psychological differences between groups of hunters. I hoped to find differences between those who opposed sound deer harvest regulations and those who supported them that would be useful to information-education programs. The research program was begun in September 1964. The project tried to answer the following questions:

1. Can hunter attitude toward deer harvest be readily measured?
2. Are there measurable social-psychological differences between those hunters who approve of sound deer harvest regulations and those who do not?

3. Are there any such social-psychological differences in hunters which might be of use to information-education programs or which seem to merit further investigation?

METHODS USED IN STUDYING HUNTER ATTITUDES

In order to study hunter attitudes, I used methods developed in the social sciences. I chose a combination of methods fitted to the limited scope of this investigation. Primarily, I wanted to probe several areas to find out if there were some factors that might merit more careful examination.

Attitude Questionnaire

I developed an attitude questionnaire in order to secure a more concrete conception of hunter attitudes toward deer harvest. I looked for a method that could serve to distinguish between those hunters who supported and those hunters who opposed sound deer harvest regulations (hereafter called supporters and opposers). An attitude scale required calibrating and testing beyond the scope of this investigation. The questionnaire which I finally developed consisted of fifteen attitude questions and eleven demographic questions. One thousand six hundred fifty questionnaires were mailed, 901 were returned and 895 returns were used in the study.

Scores were assigned to each respondent on the basis of his answers to the attitude questionnaire. Respondents

were selected for interview according to their scores. The complete questionnaire, as mailed, appears in pocket.

Intensive Interviews

I interviewed three deer hunters from the supporter end of the scores, and three from the opposer end. These persons were chosen from the extreme ends of the scores in order to take full advantage of the assumed distinctions made by the questionnaire.

I looked for basic social-psychological differences between opposers and supporters in the six interviews. The subjects answered a fifteen question information test, which covered various aspects of the deer harvest and deer biology. They completed a twenty-four item background questionnaire regarding the way they learned about deer harvest. Eleven questions on the original mail questionnaire were also used in forming a picture of the social and informational aspects of these hunters' attitudes. Additionally, the final five questions given each hunter interviewed were direct questions about range damage and sound harvest regulations, and were intended to secure his stand on those crucial areas in the deer harvest dilemma. The crucial issue questions appear in the Appendix.

The effect of the subject's personality on his perception of deer harvest was probed through the use of

three instruments: (1) Bell's Adult Form Adjustment Inventory, (2) the Taylor Manifest Anxiety Scale, and (3) the Misanthropy Scale. These items are in pocket.

CONSTRUCTION OF THE ATTITUDE QUESTIONNAIRE

To secure a gross picture of an attitude, investigators usually construct an attitude scale and use it to sample the attitude of the chosen universe of people. Due to limited finances and the resulting limitations on time, I looked for a simple, rapid; yet valid method to construct such a scale.

Usually the construction of attitude scales require three steps: (1) A group of attitude statements are written which describe various positions that might be taken, relevant to the psychological object under consideration. (2) These statements are submitted to a selected group of respondents for replies. (3) The replies are examined to determine those statements which seem to be the most effective in revealing positive or negative attitudes.

The process of attitude scale construction is often expensive and lengthy. At that point, I began to feel that it was unlikely that an attitude scale could be constructed or that the study could be conducted within the concurrent restrictions of money and time. I then formed two questions:

1. Can an attitude scale be constructed based simply on the intrinsic properties of an attitude?

2. What are the intrinsic properties of an attitude?

To answer these questions, it was necessary to describe the characteristics of an attitude. In Opinions and Personality, Smith, Bruner, and White (1956:5) examined the attitudes of ten mature men, and concerned themselves with the development of the theory of attitudes. The book is a study of the psychological processes involved in forming and holding opinions, and offered a general theoretical model which I felt could be utilized in this study.

Their study was focused on attitudes toward Soviet Russia. They noted that on the issue of Russia, attitudes were "generally well crystallized, yet controversial"; an issue that generated "a certain amount of affect or anxiety"; and having "chronic rather than transitory" interest. The topic of sound deer harvest regulations can be similarly described.

The authors stated that the object of an attitude is the way that a certain topic appears to a man, as differentiated from the topic as a whole. In my study, for example, the topic was deer harvest but the psychological object of a person's sentiment would be "deer harvest-as-it-exists-for-him." The object may bear scant resemblance to the topic.

In the study by Smith et al. (1956), the object of a person's attitude was described as having five characteristics. These characteristics were carried out by action and resulted in preferences on given issues. The characteristics were differentiation, saliency, time perspective, informational support, and object value. Let us examine each one briefly in reference to hunters' attitudes toward deer harvest.

(1) Differentiation. The complexity of the person's attitude may vary from one considering many aspects of deer harvest to one considering only a few. The organization may also be vastly different. For example, one person may organize around the social aspects of deer hunting, the condition of the range in his deer hunting area or perhaps the size of the trophy he hopes to find there. Another's attitude may center only on killing a deer each year. The feeling about deer harvest then can be highly differentiated or it can be amorphous.

(2) Saliency. The concern which the person gives to the object of sentiment in his everyday life is indicated here. To one person, deer hunting may be a one-weekend yearly experience. To another, deer harvest could be a topic of discussion and action throughout the year. Also, various aspects of the attitude, as differentiated by the subject, may carry varying degrees of saliency.

(3) Time perspective. The temporal frame of reference in which the subject places his attitude is difficult to describe. It may be adequate to refer to it as the historical viewpoint in which the subject views happenings impinging upon the object. For example, one hunter may see those things which happen on the weekend on which he hunted as obscuring all other deer harvest results and range trends, past and present. Another may be assessing the same weekend on the basis of hunts over a period of years and range conditions over a wide area, and be tying such trends together through the medium of his experience.

(4) Informational support. The amount of information a person is capable of bringing to bear on events is not a part of the object, but is the fluid in which the object is supported. There is a close connection between differentiation and informational support, but not a necessary one. For example, many hunting seasons of experience may support highly differentiated as well as amorphous attitudes.

(5) Object value. This is the way the object appears to the person. Here is where the object is judged to be disagreeable, pleasant, or neutral to the person. One must also describe fully the affective or emotional qualities linked here; for example, the depth of feeling that the object evokes in the person. Smith, Bruner, and White (1956) felt that all the above characteristics represent a minimum set of variables to use in describing an object.

Next come the manifestations of the characteristics of the object: orientation and policy stand.

(1) Orientation. Smith, et al. (1956) break down the action tendencies aroused by the object in the person into three groups; approach, avoidance, and hostility. Approach may mean attempts to understand deer harvest regulations and their effect on deer populations. Avoidance might mean disinterest in anything to do with construction of regulations. Hostility could be indicated by saying things which might cause others to mistrust and dislike sound harvest regulations.

(2) Policy stand. The preference exhibited toward action programs is influenced by the orientation. The two positions need not be at all identical. For example, a person may take the policy stand that he favors a "buck only" deer harvest, when what he would really like (his orientation) is to close the deer season for two years.

The findings of Smith, et al. (1956) suggested to me a quick way to write an attitude scale. I wrote statements with the intent of sampling a subject's opinion in the area of each of the five characteristics. I felt that fitting the statements closely to the theoretical model of an attitude would yield a discriminating set of questions. These questions, because of lack of testing, were not

strictly an attitude scale, so I called the completed set of questions an attitude questionnaire.

With the theoretical base for the attitude questionnaire in place, I was able to progress rapidly on construction of the questionnaire. Statements were written under the supervision of Dr. William J. MacKinnon of the Department of Psychology, University of Arizona. The form of the statements followed that of Glover (1964). Payne (1951) provided much useful information about statement construction such as vocabulary level, check lists of considerations and general questioning techniques. Edwards (1957) gave procedures for the construction of the questionnaire along "response methods" lines.

Numerous restrictions on form and content confront the writer of attitude statements. In order to secure a good return of usable questionnaires, I gave particular attention to the dictates of sound statement construction. Each statement was checked against more than one hundred considerations.

Some of the effects of these considerations on the statements are given below. In the fifteen attitude statements, there are no words of more than two syllables. I avoided complex sentences as much as possible, although there is a total of eight commas in the statements. The

longest statement contains twenty-four words. The response blanks were reversed on each succeeding question so that the subject would need to re-examine them each time; an attempt to reduce any response set to a particular blank. Technical words were avoided. Special effort was made to obtain a good understanding and careful response on the part of the respondent. Of the 901 questionnaires returned, two were unusable. The questionnaire and the covering letter are in pocket at the end of the thesis.

The split ballot questionnaire technique consists of posing a question in a positive way and then a negative way or vice-versa, in an attempt to balance possible bias resulting from wording. I made an effort to utilize this technique. Rather than rewording the statement, one positive statement was written in the area of a certain characteristic of the object of sentiment; a negative statement relating to the same characteristic was placed elsewhere. Thus, I felt that a two-way pull would be exercised on the score of the subject and help to reveal more conclusively his attitude.

I wrote each of the fifteen statements to represent a positive or negative aspect of the five characteristics of the psychological object and the two action tendencies. The odd statement results from the three statements, rather than two, related to the orientation aspect; one

each for approach, avoidance, and hostility. A summary of the opposition of the entire set of statements is found in Table 1. The opposition of the statements is not exact, but gives only an amount of counterweighting to each person's responses in each area of his attitude.

Table 1. Opposition of statements for the split-ballot technique.

<u>Statement Number</u>	<u>Paired With</u>
1. Positive differentiation	15
2. Negative orientation (hostility)	8
3. Positive informational support	7
4. Negative orientation (avoidance)	8
5. Negative object value	12
6. Positive time perspective	9
7. Negative informational support	3
8. Positive orientation (approach)	2 & 4
9. Negative time perspective	6
10. Negative policy stand	14
11. Negative saliency	13
12. Positive object value	5
13. Positive saliency	11
14. Positive policy stand	10
15. Negative differentiation	1

Rationale of Attitude Statements

I will further explain the reasoning behind the questionnaire to offer the reader a better understanding of the instrument. To be sure, some of the statements are moot and alternate statements could be written. However, any attitude scale uses only certain statements from a universe of possible statements, as did this attitude questionnaire. I hope that discussion of the questionnaire at hand will assist those who wish to do similar work on attitudes. Therefore, my exact goal in placing each statement on the questionnaire will be given, as nearly as possible, so that its desirability may be judged. Each statement is given below, followed by the reasons for its use.

1. Four hunting partners go to their hunting areas each spring to see if there is plenty of food for the deer to eat.

Could this help their fall deer hunt?

Strongly disagree () Disagree () Between () Agree ()

Strongly agree ()

Positive differentiation. Paired with statement fifteen.

The statement was designed to elicit acknowledgment of the multitude of factors affecting deer harvest.

Disagreement was judged to indicate an amorphous conception of deer requirements.

2. Thomas R. says that he hunts for a good buck, and that hunters should not kill does or fawns.

Do you agree?

Negative orientation (hostility). Paired with statement eight.

A person supporting this statement would likely be indicating a hostile and negative orientation toward sound harvest regulations, which usually depend on an antlerless harvest.

3. Louis A. says a hunter should learn many things about deer each year to be a good hunter.

Do you agree?

Positive informational support. Paired with statement seven.

Agreeing with this statement may indicate that a person is open to new or additional information on the topic of deer harvest. Opposition might indicate a closed conception of deer harvest, where a fluid viewpoint would better comprehend changing yearly conditions.

4. Robert K. hunts deer every fall. He says reading about deer hunting or going to sportsmen meetings is a waste of time.

Do you agree with his point of view?

Negative orientation (avoidance). Paired with eight.

Agreeing with this statement may indicate an overall attitude which would contribute to the long range deterioration of the sport of deer hunting.

5. Frank B. says he is sure that all we need to do to solve our deer hunting problem is to kill only buck deer.

Do you agree with this point of view?

Negative object value. Paired with statement twelve.

Supporting this stand may well indicate an attachment to an object of sentiment which would have strong negative effect on sound harvest regulations.

6. David O. says deer have winter and spring food problems that hunters should learn about.

Do you agree?

Positive time perspective. Paired with statement nine.

Affirmation of this statement could be taken to indicate that the subject understands that deer

management is a long term activity with year-round conditions which must be considered and understood.

7. Howard C. says that if a hunter can get his deer, he has learned what a hunter needs to know about deer.

Do you agree?

Negative informational support. Paired with statement three.

Agreement with the statement might be taken as an indication that the subject may not seek to learn new information which might be necessary to understand sound deer harvest regulations.

8. Arthur P. says sportsmen should find out what the sport of deer hunting needs for the future.

Do you agree?

Positive orientation (approach). Paired with statements two and four.

Support of this statement might indicate that the individual will do what he can to aid the deer hunting sport.

9. Allan D. feels that, unless we are very careful, the deer hunting laws will let hunters kill too many deer.

Do you agree with this point of view?

Negative time perspective. Paired with statement six.

Support of this statement might be taken to indicate a short term climatic point of view which omits many aspects of deer population dynamics, and is focused on harvest and its immediate effects (not to mention that hunting laws rarely, if ever, produce the harvest of too many deer).

10. Leonard V. likes to shoot trophy bucks, and tells his friends that killing any other kind of deer is harmful.

Do you agree with his point of view?

Negative policy stand. Paired with statement fourteen.

Agreement with Leonard V. could well be taken to indicate support of a policy highly detrimental to sound harvest regulations and sustained yield of deer.

11. Four deer hunting friends agree that they all want to go deer hunting and leave any other deer problems to the experts.

Do you agree with this point of view?

Negative saliency. Paired with statement thirteen.

Support of statement eleven may indicate the subject accords low salience or prominence to the formulation of sound harvest regulations.

12. William F. will only hunt deer where he can shoot the first deer he comes to, whether buck, doe, or fawn.

Do you agree with this point of view?

Positive object value. Paired with statement five.

Support of this statement may indicate support for the majority of sound harvest regulations.

13. Raymond J. tries to go to all the public meetings where deer hunting laws are put together.

Do you think he is helping the sport of deer hunting by going to these meetings?

Positive saliency. Paired with statement eleven.

Agreement with Raymond J's. actions may indicate that the subject allows harvest regulations a prominent place in the over-all health of the sport.

14. John G. tells his friends they should help make deer hunting laws better every year.

Do you agree?

Positive policy stand. Paired with statement ten.

Support of the statement may indicate an interest in the establishment of harvest regulations as well as an acknowledgement that the regulations can be changed.

15. John A. says that the main deer problem is that too many doe deer are being killed.

Do you agree?

Negative differentiation. Paired with statement one.

At this point in the questionnaire, agreement with John A. may well indicate that the subject will isolate this one factor in the complex of factors surrounding deer production and harvest rather than giving consideration to the whole of the situation.

MAIL QUESTIONNAIRE MECHANICS

After the questionnaire was developed, it was printed; a sample was selected, an address list was developed and the questionnaires were mailed. These steps involved the items given in Table 2.

Selecting the Sample Size

In a study of hunters in Ohio, Peterle (1961) used a one percent sample size that seemed to me to produce a good cross section of response. I secured an estimate from Kirkpatrick (personal communication, 1964) that 95,000 deer licenses or tags were sold during the fall of 1964. I decided to try for a sample of one percent or 950 returned questionnaires.

The return figures of the Peterle study showed a very good return of 60 percent of those deliverable. Peterle used an initial mailing plus three follow-up letters, including a second questionnaire, to non-respondents. That questionnaire took about 30 minutes to complete.

The questionnaire in this study was designed with ease of completion in mind. Limitations of funds for the project prohibited follow-up letters to non-respondents.

To calculate initial mailing size, I made an estimate of returns. I balanced Peterle's return figures, the relative ease of completion of the two questionnaires, and the similarity of the groups involved, and projected the following estimates. I expected that 1650 questionnaires would produce a response of 950 or 58 percent. Ninety-two percent would be delivered and 34 percent or 568 would not respond. I estimated that 62 percent of the delivered questionnaires would be returned.

Sampling

The universe to be surveyed was limited to deer hunting license purchasers. All people who hunt deer in Arizona are required to purchase a deer tag to validate their hunting license for the taking of deer. Other persons were excluded in order to sample only the actual participants in the harvest of deer.

The Arizona Game and Fish Department gave me access to the address stubs of deer tags sold the previous fall. The thirty-nine boxes of deer tags were numbered and five were selected randomly. The tags in all the boxes had arrived and were placed in the boxes in a largely random manner (Smith, personal communication, 1964) and any given person had equal chance to be selected.

The tags were in books of five. The top address only from each book was typed onto perforated address label sheets. I retained carbon master copies of the sheets as a reference address list. One thousand six hundred and fifty addresses were obtained.

Printing the Questionnaire

Seventeen hundred copies of the questionnaire were multilithed on 8½"X 11" canary yellow paper, which the printer recommended as having produced a higher response in another instance than white paper. After being multilithed, a sequential number was printed by machine at the bottom of the first page of each questionnaire. The questionnaire number was recorded on the master list next to the address to which the questionnaire was sent. This key would allow subjects to be contacted further, if desired.

The covering letter was printed on 8½"X 11" white paper. The letterhead was reduced to include only the name and address of the Unit. The co-operators' names were omitted. I hoped that if the co-operators' names (The Arizona Game and Fish Department and the United States Bureau of Sports Fisheries and Wildlife) were removed, the response would be greater. For illustration, see questionnaire in pocket.

Assembling and Mailing the Questionnaire

The questionnaire packet consisted of five items; the mailing envelope, the return envelope, the covering letter, and the two pages of the questionnaire.

An address label was stuck to the mailing envelope. The address of the Arizona Cooperative Wildlife Research Unit was stamped on the return envelope. A five-cent stamp was applied to the return envelope because complicated postal regulations made the use of a postage meter impractical. This return postage, amounting to eighty dollars, was paid by the Arizona Game and Fish Department.

I signed each covering letter in the hope of increasing the number of returns. The three pages of the mailing (the letter to the hunter and the two page questionnaire) were machine folded. An open fold was used that allowed rapid assembly of the items for mailing. The covering letter and the questionnaire were placed together. The questionnaire number and address label were matched on the basis of the sequence of address on the master list. The return envelope was folded and all four items placed in the mailing envelope, which was left unsealed.

The questionnaires were mailed in batches of five hundred. The questionnaires were run through a postage

meter and also automatically sealed. They were mailed on 19 January through 21 January, 1965. The questionnaire, as mailed, appears in pocket. Time involved in questionnaire mechanics is shown in Appendix A.

CONDUCTING INTENSIVE INTERVIEWS

After I had the questionnaire information, I wanted to determine if there were social-psychological differences between supporters of sound deer harvest and the opposers. I decided to contact several of the subjects to probe their attitude toward deer harvest more deeply. I constructed and selected several tests for this more intensive examination. I interviewed eight subjects. Four were hunters whose questionnaire scores indicated they supported sound deer harvest. Four opposers were interviewed. Of these eight interviews, three each of supporters and opposers were used in this study; two being dropped due to incomplete testing.

Test Construction and Selection

To probe the informational components of the attitude, the subjects took a fifteen question information test. The final five questions, which I read to the subjects, were designed to elicit exact replies on certain critical issues. In the process, the information component of the hunter's attitude was also tested. Answers were recorded verbatim on those "crucial issues" questions.

Some of the social components of the attitude were sought through two different devices. First, the mail questionnaire carried nine questions largely related to the social factors which might impinge on the attitude (questions 16-26). Secondly, I asked the subject questions about the social setting of his attitude. These questions are found in pocket.

I wanted to see if the hunters might have personality troubles. If so, these might be projected into the often emotionally-charged issue of deer harvest. To touch on the projective components of the attitude, I used three instruments. The first test I gave was the Misanthropy Scale for measuring a person's liking for people; developed from the ideas of Sullivan and Adelson (1954;246-250). Second, the subject took a Taylor Manifest Anxiety Scale. Finally Bell's Adult Form Adjustment Inventory was completed by the hunter. With these three tests, I was also looking for indications of personality differences between supporters and opposers. All the intensive interview items are included in pocket.

Choosing Intensive Interview Subjects

The range of possible scores on the questionnaire was 15 to 75. The sample range was from 31 to 74. I conducted four interviews with subjects scoring under 39 on the questionnaire, and four interviews with subjects scoring over 70. I finally used six interviews in the study; two being dropped due to incomplete tests.

My primary concern was with testing the hypothesis that there were no social-psychological differences between sound supporters and opposers as differentiated by the questionnaire. Consequently, my concern was mainly with getting the subject with a score toward an end of the distribution.

Location was not considered in the selection of the hunters. Those on the negative side were from Prescott, Casa Grande, and St. David. The subjects on the positive side were from Phoenix, Tucson, and Benson.

Administering the Intensive Interviews

Subjects were contacted at their home or place of business. If possible, the questions were asked immediately.

The tests were given in the order presented below:

Information test

Social setting questionnaire

Crucial issues questions

Taylor Manifest Anxiety Scale (modified)

Misanthropy Scale

Bell Adjustment Inventory

The whole procedure took about one to one and one-half hours. After identifying myself, I told the hunters that I would appreciate their further help with my study of deer hunting. I advised them that they would now be asked very personal questions. With their consent granted, effort was made to complete all the procedures on that occasion. No one refused to be interviewed. Sometimes it was necessary to leave the three personality items for completion at a later date and submission by mail. All the tests are in pocket.

RESULTS

Attitude Questionnaire

The deer hunter attitude questionnaire was mailed 19, 20, and 21 January, 1965. Returns reached 40 percent on 25 February, 1965. Returns dropped sharply about six weeks after the initial mailing. On 15 April, 1965, I cut off response at N=895. This allowed a return of 57 percent of the initial delivered mailing.

The outcome of the mailing is given below.

	Number	Percent
Initial mailing	1650	100
Delivered	1568	95
Undeliverable	82	5
Returns	895	54
Non-respondents	663	40

Scoring the Questionnaire

Values were assigned to each of the five responses to a questionnaire statement. Each most negative response received a value of one; the most positive response a value of five. Accidentally, the place to mark a negative response to each statement was always on the left; the

positive on the right. This sequence allowed the questionnaire to be scored rapidly. However, it would probably be desirable to avoid such positioning of responses, because of the possibility of revealing the valuation of the questionnaire to the subject.

Returned questionnaires were placed in order according to the address list. The scores were transferred to data processing sheets for use in punching IBM cards. All tests were scored before any of the cards were punched.

With a half-hour's familiarization, one examiner could score a questionnaire in four minutes. Two people, one reading and one tabulating could process a questionnaire in two and one-half minutes.

Data Processing

Mr. Jack E. Gaines of the Numerical Analysis Laboratory, Systems Engineering Department, University of Arizona, was the project advisor for the data processing program.

I was trained by Gaines in the use of the IBM card sorting machine. The information from the data summary sheets were transferred to IBM cards by N.A.L. key-punch operators. The operators recorded three questionnaires per minute; in a total of five hours all cards were punched.

A program was devised by Gaines to total the score on each card. The cards were then run through the IBM 1401 computer which totaled the scores and punched a complete new deck of 895 cards. The total time of computer use was ninety seconds.

Questionnaire Data

The possible range of the 15 statement questionnaire scores was 15 to 75. Fifteen represented a highly negative attitude toward sound deer harvest and 75 was at the positive end. The range of response of the sample was from 31 to 74. I determined the total number of subjects choosing each given response on all 26 items on the questionnaire with the use of an IBM card sorter. The results from the attitude statements are given in Table 2.

The personal data questions were then sorted and mean scores derived for each response in items 16 to 26. The results are given in Table 3. These data seem to indicate a lack of significance of any particular factor, with the possible exception of item 26. Those who respond that they do not read about deer hunting have a mean score which is one standard deviation below the mean of the questionnaires.

The mean score for all subjects was 55. The median score was 55. The standard deviation from the mean was 7.44. The total sample scores are graphed in Figure 1. Skewness was equal to zero.

The responses to the statements of the 50 high scoring supporter subjects and the 50 low scoring opposer subjects were compared. The "t" score of each statement is given in Table 4. The rank of the differences of the means of the two groups is given in Table 5. The demographic information for the 50 high supporters and the 50 low opposers are shown in Table 6.

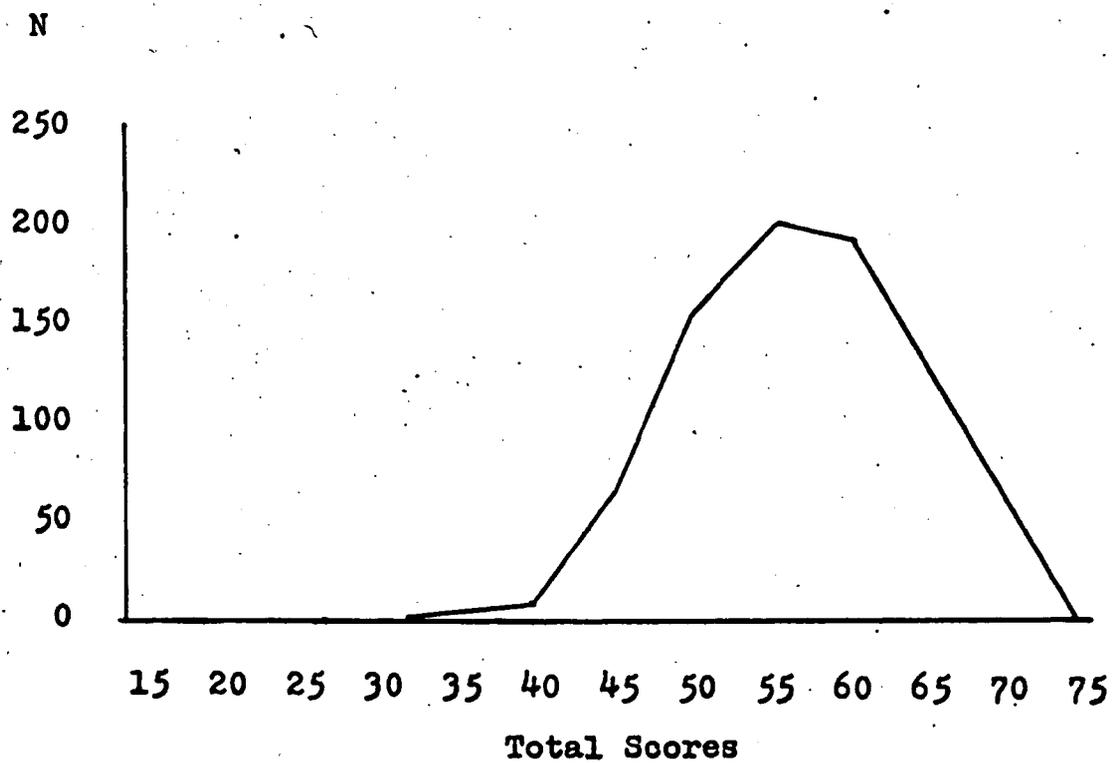


Figure 1. Distribution of total scores on the attitude questionnaire.

$N=895$ $\bar{X} = 55$ $S = 7.44$

Table 2. Responses to questionnaire

1. Four hunting partners go to their hunting areas each spring to see if there is plenty of food for the deer to eat.

Could this help their fall deer hunt?

Strongly disagree (50-6%) Disagree (95-11%) Between (111-12%) Agree (438-49%) Strongly agree (201-22%)

Opposers 17%

Supporters 71%

2. Thomas R. says that he hunts for a good buck, and that hunters should not kill does or fawns.

Do you agree?

Strongly agree (251-28%) Agree (176-20%) Between (92-10%) Disagree (229-25%) Strongly disagree (146-16%)

Opposers 48%

Supporters 41%

3. Louis A. says a hunter should learn many things about deer each year to be a good hunter.

Do you agree?

Strongly disagree (30-3%) Disagree (38-4%) Between (49-5%) Agree (457-51%) Strongly agree (321-36%)

Opposers 7%

Supporters 87%

4. Robert K. hunts deer every fall. He says reading about deer hunting or going to sportsmen meetings is a waste of time.

(Table 2 continued) Responses to questionnaire

Do you agree with his point of view?

Strongly agree (38-4%) Agree (45-5%) Between (85-9%)

Disagree (373-42%) Strongly disagree (354-40%)

Opposers 9%

Supporters 82%

5. Frank B. says he is sure that all we need to do to solve our deer hunting problem is to kill only buck deer.

Do you agree with this point of view?

Strongly agree (102-11%) Agree (98-11%) Between

(94-11%) Disagree (306-34%) Strongly disagree (295-33%)

Opposers 22%

Supporters 67%

6. David O. says deer have winter and spring food problems that hunters should learn about.

Do you agree?

Strongly disagree (28-3%) Disagree (29-3%) Between

(84-10%) Agree (501-56%) Strongly agree (253-28%)

Opposers 6%

Supporters 84%

7. Howard C. says that if a hunter can get his deer, he has learned what a hunter needs to know about deer.

Do you agree?

Strongly agree (30-3%) Agree (16-2%) Between (43-5%)

(Table 2 continued) Responses to questionnaire

Disagree (402-45%) Strongly disagree (425-47%)

Opposers 5%

Supporters 92%

8. Arthur P. says sportsmen should find out what the sport of deer hunting needs for the future.

Do you agree?

Strongly disagree (16-2%) Disagree (9-1%) Between

(43-5%) Agree (402-45%) Strongly agree (425-47%)

Opposers 3%

Supporters 92%

9. Allan D. feels that, unless we are very careful, the deer hunting laws will let hunters kill too many deer.

Do you agree with this point of view?

Strongly agree (215-24%) Agree (283-32%) Between

(73-8%) Disagree (218-24%) Strongly disagree (106-12%)

Opposers 56%

Supporters 36%

10. Leonard V. likes to shoot trophy bucks, and tells his friends that killing any other kind of deer is harmful.

Do you agree with his point of view?

Strongly agree (31-3%) Agree (34-4%) Between (43-5%)

Disagree (404-45%) Strongly disagree (383-43%)

Opposers 7%

Supporters 88%

(Table 2 continued) Responses to questionnaire

11. Four deer hunting friends agree that they all want to go deer hunting and leave any other deer problems to the experts.

Do you agree with this point of view?

Strongly agree (17-2%) Agree (54-6%) Between (66-7%)

Disagree (442-49%) Strongly disagree (316-35%)

Opposers 8%

Supporters 84%

12. William F. will only hunt deer where he can shoot the first deer he comes to, whether buck, doe, or fawn.

Do you agree with his point of view?

Strongly disagree (489-55%) Disagree (254-28%) Between

(61-7%) Agree (35-4%) Strongly agree (56-6%)

Opposers 83%

Supporters 10%

13. Raymond J. tries to go to all the public meetings where deer hunting laws are put together.

Do you think he is helping the sport of deer hunting by going to these meetings?

Strongly disagree (15-2%) Disagree (25-3%) Between

(114-13%) Agree (410-46%) Strongly agree (331-37%)

Opposers 5%

Supporters 83%

14. John G. tells his friends they should help make deer hunting laws better every year.

(Table 2 continued) Responses to questionnaire

Do you agree?

Strongly disagree (17-2%) Disagree (23-3%) Between
(71-9%) Agree (460-51%) Strongly agree (324-36%)

Opposers . 5%

Supporters 87%

15. John A. says that the main deer problem is that too many doe deer are being killed.

Do you agree?

Strongly agree (201-22%) Agree (173-19%) Between
(127-14%) Disagree (258-29%) Strongly disagree
(137-15%)

Opposers 41%

Supporters 44%

 N=895

Table 3. Demographic questions and mean scores by category.

Question Number					
16.	Age	Under 12 yrs. 7-55.3	13 to 18 154-54.6	19 to 24 116-53.5	Over 24 618-55.3
17.	Sex	Male 834-54.9	Female 61-56.3		
18.	Have you spent most of your life in Arizona?				
	Yes	No			
	568-53.3	327-56			
19.	Have you spent most of your life in the West?				
	Yes	No			
	686-54.4	209-55.7			
20.	Did you grow up in a city?		Yes	No	
			318-55.5	577-54.4	
21.	Work experience	0 to 4 yrs. 169-55.3	5 to 8 114-55.2	9 to 12 112-54.5	
		13 to 16 72-56.3	More than 16 428-54.7		
22.	Years in school	0 to 4 yrs 14-51.6	5 to 8 117-52.1	9 to 12 456-52.7	
		13 to 16 204-56.3	More than 16 104-55.2		
23.	Do you belong to a sportsmans' club?		Yes	No	
			162-56	733-54.7	
24.	Do you belong to <u>any</u> group that holds regular meetings?				
			Yes	No	
			395-55.5	500-54.2	
25.	Have you gone on five or more deer hunts?		Yes	No	
			754-55.1	141-54.7	
26.	Do you read about deer hunting?		Yes	No	
			829-55.2	66-48	

Table 4. Statements ranked according to "t" scores.

Statement number	$s_{\bar{X}}^*$	$s_{\bar{Y}}^{**}$	s_{DIFF}	t	Level of significance	Rank
15	2.66	1.51	.44	7.45	.0000006	1
9	4.11	1.69	.63	4.54	.0000006	2
5	4.45	4.51	.90	3.73	.00023	3
2	4.72	1.44	.69	3.45	.00058	4
12	3.21	1.40	.50	3.10	.0019	5
6	5.00	3.25	.86	2.21	.027	6
10	5.00	3.44	.87	2.18	.029	7
13	4.91	3.35	.84	2.12	.034	8
1	4.62	3.11	.79	2.10	.036	9
3	4.87	3.67	.78	1.85	.064	10
7	4.82	3.65	.86	1.65	.100	11
4	4.86	3.04	.82	1.46	.145	12
14	4.96	3.84	.90	1.42	.155	13
8	4.95	3.93	.90	1.24	.216	14
11	4.74	3.84	.87	1.24	.216	15

* $s_{\bar{X}}$ = Positive \bar{X} , N=50, w=67 to 74 (supporters)

** $s_{\bar{Y}}$ = Negative \bar{X} , N=50, w=31 to 43 (opposers)

Table 5. Ranking of statements according to differences of mean scores of negative and positive groups.

Statement Number	Positive \bar{X} *	Negative \bar{Y} **	Difference $D=X-Y$	Rank
5	4.98	1.62	3.36	1
15	4.62	1.32	3.28	2
9	4.38	1.52	2.86	3
2	4.66	2.28	2.38	4
10	5.00	3.10	1.90	5
6	4.86	2.96	1.90	6
13	4.90	3.12	1.78	7
1	4.56	2.90	1.66	8
12	2.82	1.28	1.54	9
7	4.80	3.38	1.42	10
3	4.86	3.44	1.42	11
14	4.96	3.68	1.28	12
4	4.02	2.82	1.20	13
8	4.94	3.72	1.12	14
11	4.68	3.60	1.08	15

* \bar{X} = Positive \bar{X} , N=50, w=67 to 74 (supporters)

** \bar{Y} = Negative \bar{X} , N=50, w=31 to 43 (opposers)

Table 6. Responses to questionnaire demographic questions by supporting and opposing groups. $N_S=50$ $N_O=50$

16. Age	Under 12 yrs. S-0 0-0	13 to 18 S-2 0-14	19 to 24 S-5 0-6	Over 24 S-43 0-30
17. Sex	Male	S-45 0-48	Female	S-5 0-2
18. Have you spent most of your life in Arizona?	Yes	S-27 0-38	No	S-23 0-12
19. Have you spent most of your life in the West?	Yes	S-39 0-41	No	S-11 0-9
20. Did you grow up in a city?	Yes	S-23 0-17	No	S-27 0-35
21. Work experience	0 to 4 yrs. S-5 0-8	5 to 8 S-4 0-6	9 to 12 S-6 0-10	
	13 to 16 S-7 0-0	More than 16 S-28 0-26		
22. Years in school	0 to 4 yrs S-0 0-2	5 to 8 S-4 0-7	9 to 12 S-17 0-33	
	13 to 16 S-17 0-5	More than 16 S-11 0-3		
23. Do you belong to a sportsman's club?	Yes	S-11 0-3	No	S-39 0-47
24. Do you belong to <u>any</u> group that holds regular meetings?	Yes	S-23 0-14	No	S-27 0-36
25. Have you gone on five or more deer hunts?	Yes	S-49 0-40	No	S-1 0-10
26. Do you read about deer hunting?	Yes	S-49 0-41	No	S-1 0-9

Intensive Interviews

The information test questions and answers and the results of the test are given in Table 7. The total scores at the bottom seem to indicate a degree of difference between the information level of the supporters and the opposers.

I examined the sociological setting of the attitudes of the interview subjects with the questions presented as Table 8. I noted no significant differences between the responses of supporters and opposers.

The results of the various personality tests are given in Table 9.

I modified the Taylor Manifest Anxiety Scale slightly from a student oriented form to the more general form of address suited for this study. The scores showed no apparent differences between supporters of sound deer harvest and opposers.

The Misanthropy Scale splits the two groups fairly well. The plus scores indicate a greater degree of dislike for people in the opposers of sound deer harvest than for the supporters with their minus scores.

The Bell Adult Form Adjustment Inventory norms give the unsatisfactory total adjustment category as ranging from 48 to 60. The supporters all fall in the lower

half of the average category, indicating good adjustment. The opposers fall respectively into the high average category, and the very unsatisfactory category. The subject O-3 might be judged extremely maladjusted, scoring "very unsatisfactory" in each of the five categories of the Inventory.

Crucial Issues Questions

At the conclusion of the interview, I asked the subject five questions on issues crucial to deer management. They are given below, with selected answers from interviewees.

1. Do you think damage to the deer range can result from too many deer in an area?
S-1 "Oh yeah. Look at the Kaibab".
O-1 "No, I don't. Cause they can take care of themselves; they can move off."
2. Do you think enough deer can be killed without killing does?
S-2 "No, I don't believe so".
O-2 "Right".
3. Were does taken legally last year in the area you hunted?

4. Why do you think the regulations were set up that way?
S-3 "Control overpopulation of deer in certain areas".
O-2 "I don't know. Kill off all the does".
5. What do you say to the idea that as many does as bucks can be killed yearly, without harm to the deer herd?
S-3 "I think as many does can be killed as bucks without harming them."
O-2 "I say it's a bunch of baloney. You can't kill does and have deer next year. Can't kill off women and have babies".

Table 7. Interview subjects information test scores.

1.	The main problem that deer have is deer hunting.	T	<u>F</u>
	S-1 F S-2 F S-3 F O-1 T O-2 T O-3 T		
2.	There is no deer-food problem.	T	<u>F</u>
	S-1 F S-2 F S-3 F O-1 T O-2 T O-3 F		
3.	There is a yearly surplus of deer.	<u>T</u>	F
	S-1 T S-2 T S-3 T O-1 F O-2 F O-3 F		
4.	There is usually room for more deer.	T	<u>F</u>
	S-1 T S-2 T S-3 F O-1 F O-2 T O-3 T		
5.	Deer can damage the plants that they eat.	<u>T</u>	F
	S-1 T S-2 T S-3 F O-1 T O-2 F O-3 T		
6.	Hunters kill only surplus deer.	<u>T</u>	F
	S-1 F S-2 F S-3 T O-1 F O-2 F O-3 F		
7.	Enough deer can be killed without killing does.	T	<u>F</u>
	S-1 F S-2 F S-3 F O-1 F O-2 T O-3 F		
8.	Some areas have too many deer.	<u>T</u>	F
	S-1 F S-2 T S-3 T O-1 F O-2 F O-3 F		
9.	Deer eat mostly grass in the winter.	T	<u>F</u>
	S-1 F S-2 F S-3 F O-1 F O-2 F O-3 T		
10.	Adult deer have starved to death in Arizona.	<u>T</u>	F
	S-1 T S-2 T S-3 T O-1 F O-2 F O-3 T		
11.	How many deer in Arizona?		
	a. 125,000		
	b. 250,000	S-1 a	S-2 b S-3 c
	c. 500,000	O-1 a	O-2 - O-3 a

* S-1 represents supporter number one's responses, etc.
O-1 represents opposer number one's responses, etc.

(Table 7 continued)

12. Most deer fawns are born--
 a. in June and July.
 b. in January and February. S-1 a S-2 a S-3 c
 c. in August and September. O-1 a O-2 a O-3 b
13. Take 100 deer fawns born. About how many will live to
 be three months old?
 a. 95
 b. 75 S-1 b S-2 b S-3 o
 c. 55 O-1 b O-2 - O-3 b
14. The most deer are killed by
 a. predators.
 b. hunters. S-1 c S-2 c S-3 o
 c. natural causes. O-1 b O-2 b O-3 b
15. In the areas that you, yourself, hunt--
 a. too many deer are being killed.
 b. not enough deer are being killed. (15 not scored)
 c. the deer kill is about right.

S-1 c S-2 a S-3 c
 O-1 a O-2 a O-3 c

Total Scores

S-1	12	O-1	6
S-2	13	O-2	4
S-3	13	O-3	5

*
 S-1 represents supporter number one's responses, etc.
 O-1 represents opposer number one's responses, etc.

Table 8. Background and sociological questions given to intensive interview subjects.

-
1. How many deer seasons have you hunted? _____
 2. At what age did you begin to hunt with a gun? _____
 3. About how old were you when you went on your first deer hunt? _____
 4. Who took you on your first deer hunting trip?
 - Went alone
 - With a friend
 - With friends
 - With father
 - With brother
 - With other relatives
 - Other _____
 5. Did you first learn about deer hunting
 - from own experience? _____
 - from a relative? Who _____
 - from a friend? _____
 - from friends? _____
 - from reading? _____
 - Other _____
 6. Did you kill a deer on your first deer hunting trip?

Yes No
 7. Did you first learn about deer hunting mostly from friends?

Yes No
 8. Do you mostly hunt deer
 - alone now?
 - with friends?
 - with relatives?
 9. From 7 to 20, did you live most of the time
 - on a farm?
 - in a small town?
 - in a small city?
 - in a large city?

(Table 8, continued)

- | | | |
|--|--------------|----|
| 10. Do you belong to <u>any</u> group that holds regular meetings? | Yes | No |
| 11. Do you belong to a sportsman's club? | Yes | No |
| 12. Do you ever discuss deer hunting with friends? | Yes | No |
| 13. How many of your friends hunt? | | |
| None | Some of them | |
| Very few | Most of them | |
| 14. In general, do your friends feel as you do about deer hunting? | Yes | No |
| 15. Also, in general, do your deer hunting companions feel as you do about deer hunting? | Yes | No |
| 16. How many deer have you killed? | _____ | |
| 17. Have you killed all sexes and ages? | Yes | No |
| 18. Do you ever read stories about deer hunting? | Yes | No |
| 19. Have you ever read a book about deer hunting? | Yes | No |
| 20. Do you read any sportsmen's magazines? | Yes | No |
| 21. What areas do you hunt in mostly? | _____ | |
| <hr/> | | |
| 22. Do you attend sportsmen's meetings? | Yes | No |
| 23. Do you attend meetings where deer hunting laws are discussed? | Yes | No |
| 24. Do you speak out about your opinion of deer hunting laws? | Yes | No |

Table 9. Scores of interviewed subjects on personality tests.

Taylor Manifest Anxiety Scale

S-1	27	O-1	32
S-2	30	O-2	24
S-3	29	O-3	30

Misanthropy Scale

S-1	-35	O-1	+25
S-2	0	O-2	+17
S-3	-34	O-3	+2

Bell Adult Form Adjustment Inventory*

	Home	Health	Social	Emotional	Occupational	Total
S-1	4	5	9	8	1	27
S-2	3	1	14	4	0	22
S-3	0	0	<u>17</u>	3	7	27
O-1	2	<u>14</u>	11	6	12	45
O-2	6	2	<u>23</u>	10	5	48
O-3	<u>22</u>	<u>18</u>	<u>21</u>	<u>22</u>	<u>22</u>	<u>105</u>

*Unsatisfactory adjustment scores are underlined.

DISCUSSION

The questionnaire was inexpensive to produce (ten cents per copy, exclusive of salaries) and seems to give a measure of the attitude of Arizona hunters toward deer harvest. The best nine statements of the questionnaire separated the 50 strongest sound deer harvest supporters from the strongest opposers, beyond the .95 confidence level (see Table 4). The response distribution curve in Figure 1 is heavy on the right. Perhaps a more regular distribution would be achieved through use of only the ten most discriminating statements. A ten question instrument might be useful to sample the attitude of specific groups, or as a year to year check on attitude change in a given area or population. In any event, I hope that the thesis illustrates a simple and usable method for the construction of an attitude questionnaire or scale.

The questionnaire was not returned by 41 percent of the people who received it. Additional mailings might well have revealed some interesting facts about the non-respondents. In my judgment, the study represents a good sample of deer hunter attitude.

Examination of the exploratory intensive interview data may indicate several areas needing further research (see Tables 7 and 9). Two of those areas seem very important. First, the basic facts regarding the justifications and goals of deer harvest seem to be poorly understood by the hunters. Secondly, there is indication that some of the most stubborn opposition to sound deer harvest regulations may be from persons with poorly adjusted personalities. Both of these areas seem to deserve more extensive investigation. Results of such investigations could result in more effective information programs.

Study of the responses to the questionnaire statements (Table 2) gives an indication of public feeling on various deer harvest issues. For example, statement 15 shows an almost even split of the respondents, with 41 percent feeling that too many doe deer are being killed. It seems to me that there are two very poorly understood areas revealed by this questionnaire. First, the idea that deer hunters are taking a surplus seems to be poorly understood. Or, to put it differently, there is low acceptance of the idea that there can be too many deer in an area. Secondly, the responses I have examined in this study indicate to me that the hunters do not generally accept the fact that proper harvest cannot usually be achieved without taking antlerless deer.

Investigation of the information possessed by a given group of deer hunters might reveal where emphasis of information programs should be placed. As an example, I asked the six intensive interview subjects if it were true that hunters kill only surplus deer. Five said that it was not true. Of the 26 supporters of sound deer harvest scoring 70 or above, only seven were members of sportsman's clubs. More study of the thesis may reveal items of interest to the reader.

Dealing with informational deficiencies of the hunters and overcoming opposition which may be partly based on maladjusted personalities is no simple matter, as many game departments have discovered. Of course, there is no panacea. Based on this thesis and my personal training and experience, I will venture to suggest an outline of action.

(1) The deer harvest program should be re-examined.

Is the program of harvest sound? Are the methods least objectionable to the hunters being used to achieve the proper harvest?

(2) Some assessment of acceptance and opposition should be made. Documented judgments of persons closely connected with the situation or surveys might serve as guides for reaching a good level of acceptance of the harvest program.

If opposition to the program seems to be serious, the whole situation may require further evaluation. An amount of objective examination of the informational and social-emotional aspects of the situation may allow a sound harvest program. Asking what support is needed or what is the nature of the opposition, may produce new ways of securing acceptance of the needed harvest. Table 2 gives an example of one way to examine public sentiment.

(3) A program for producing acceptance of sound harvest regulations should be designed. The program may have to deal with problems of attitude change which may call for trained social scientists, either as permanent employees or as consultants. At any rate, the information and education program should be specifically pointed through the use of an assessment of the opposition to the deer harvest program.

(4) The program must be carried out. This may call for the efforts of the whole resource organization. This usually means that the man in the field will be carrying out the plans and his work will often decide the success or failure of the plan. Special in-service training may be required.

(5) Long term programs should be instituted. Table 6 gives several indications that younger people and less

educated people tend to be opposers of sound deer harvest. If population dynamics and carrying capacity are part of the standard elementary and high school curriculum, this problem might be alleviated, I believe.

I hope that further investigation will be carried on for the use of information-education personnel. The outstanding effort of these people in dealing with the deer harvest dilemma might be more fruitful if their path were lighted by focused research programs.

Clement (1966) has warned us that submitting to unfavorable trends, rather than changing them, can produce defeat in our attempts at managing the resource we are charged with conserving. I think that the progress of the information-education research effort will largely indicate the chances of changing hunter attitude toward deer harvest.

Appendix A. Time required to complete various phases of work on mail questionnaire.

<u>ACTIVITY</u>	<u>HOURS</u>
Typing mailing list	40
Envelopes stamped	12
Envelopes addressed	12
Return addresses stamped	8
Letters signed	3
Preparing questionnaire copy	3
Printing arrangements	4
Folding envelopes	5
Assembling questionnaires for mailing	40
Matching addresses to questionnaire numbers	3
Assisting with mailing questionnaires	3
Scoring and recording returns	50
Opening questionnaires and reading remarks	4
Placing responses in numerical order	10
Sorting replies into categories	9
IBM 1401 Computer summary	1
Sorting for mean scores in each category	10
Compiling mean scores	10

LITERATURE CITED

- CLEMENT, R. C. 1966. Dangers of pessimism in conservation. Trans. N. Am. Wildl. Conf. 31:378-381.
- EDWARDS, A. L. 1957. Techniques of attitude scale construction. Appleton-Century-Crofts, Inc. New York. 256 pp.
- GLOVER, L. E. 1964. How do you feel about sex? Fawcett Publications Inc., Greenwich, Conn. 208 pp.
- KIRKPATRICK, R. J. 29 Oct. 1964. Personal communication. Estimate of expected deer tag sales.
- LEOPOLD, A., L. K. SOWLS, AND D. L. SPENCER. 1947. A survey of over-populated deer ranges in the United States. J. Wildl. Mgmt. 11 (2).
- LUMSDEN, H. G. 1957. Some public relations problems in deer management. Mimeographed publication, Ontario Department of Lands and Forests. Or see: The problem of changing beliefs and attitudes. J. Wildl. Mgmt. 21 (4):463-465.
- McFADDEN, J. T., J. R. RYCKMAN, AND G. P. COOPER. 1964. A survey of some opinions of Michigan sport fishermen. Trans. Am. Fish. Soc. 93 (2):183-193.
- PAYNE, S. L. 1951. The art of asking questions. Princeton University Press, Princeton, N. J. 249 pp.
- PETERLE, T. J. 1961. The hunter, who is he? Trans. N. Am. Wildl. Conf. 26:254-266.
- SCHOENFELD, C. A. 1957. Some public relations aspects of wildlife management. J. Wildl. Mgmt. 21 (1):70-74.
- SMITH, M. B., J. S. BRUNER AND R. W. WHITE. 1956. Opinions and personality. John Wiley & Sons, Inc., New York. 294 pp. p. 5.-pp. 33-37.
- SMITH, R. H. Jan. 1965. Personal communication. Selection of deer hunter addresses.
- SULLIVAN, P. L. AND J. ADELSON. 1954. Ethnocentrism and misanthropy. J. Abnormal Psych. 49 (2):246-250.