

THE INFLUENCE OF KNOWLEDGE AND ANIMAL-RELATED ACTIVITIES ON CONSUMPTIVE AND NON-CONSUMPTIVE RESOURCE ORIENTATIONS

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Abstract: Knowledge levels and levels of activities involving animals were measured in 1315 eighth graders in Broward County, Florida. These variables were statistically compared with consumptive and non-consumptive resource orientations. Non-consumptive orientations toward wildlife characterized a majority of the population and were significantly associated with level of knowledge. Relationships between knowledge and consumptive orientations were mixed. Frequency of participation in animal related activities was significantly associated with knowledge and both consumptive and non-consumptive resource orientations. Attitudes towards hunting and knowledge are also examined. The results indicate that while knowledge and the frequency of animal activities are significantly associated with resource orientations, the strength of the associations are low indicating that other factors are operational.

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A major outgrowth of the environmental movement has been a renewed interest in the plight of wildlife. This interest has spawned a plethora of magazines, books, and elaborate learning materials designed to increase public consciousness about wildlife and endangered species and to educate both children and adults about the need for their conservation and preservation.

In the past, state and federal agencies charged with educational responsibilities have responded to perceived needs by providing generalized information in the form of written materials, canned slide/tape programs, and costly movie productions aimed at the public-at-large. Little or no audience research was done before these massive information-disseminating campaigns were thrust upon the public.

This is especially true of programs currently being designed to "educate" the public about endangered and threatened species. To begin an effective program of educational intervention, it is necessary to know the needs of the various target populations within the program. Despite the many dollars allocated for programs, little effort has been spent identifying needs and less effort has been spent evaluating the overall effects of such programs.

Research has largely concentrated on persons over 18 years old, and the largest body of research has been on hunters—a group that makes up less than 15% of the overall American population. Research on young people's perception of wildlife is lacking entirely. Currently most programs are designed to increase knowledge as a means of increasing personal awareness and commitment to the preservation of wildlife and while the goal of increasing knowledge is an admirable one, there is conflicting research about the interrelationships between knowledge and commitment (LaHart and Barnes, 1978).

This research measured consumptive and non-consumptive resource orientations and their associations with knowledge levels and frequency of activities involving animals. The study was supported by a National Wildlife Federation Conservation Fellowship.

STUDY DESIGN

The research instrument for this study was a teacher-administered questionnaire designed to: (a) measure knowledge, attitudes and animal activities; and (b) obtain data about attitudes toward consumptive and non-consumptive resource orientation.

The knowledge portion of the instrument was developed with the help of cooperating social studies and science teachers familiar with the environmental concepts middle

school students study as part of their curriculum. The knowledge portion was divided into 3 components. The *ecological knowledge component* was modified from Pomerantz (1977), reworded and designed to use examples of Florida's unique environmental systems. The *knowledge of animals component* included key questions from Kellert's (1976) study of adults. The questions were substantially modified to ensure readability. The *knowledge of endangered and threatened species component* was unique to this research, and many of the questions were developed by the cooperating teachers.

Since attitudes encompass both feelings and beliefs, they have both affective and cognitive components. Feelings and beliefs are generally directed toward decision-making, and therefore are important elements of perception. For the purposes of this study, measuring attitudes was accomplished using Likert-type questions similar to those developed by Kellert (1976), who measured the attitudes of adult Americans toward animals. Questions about reasons for enjoying wildlife were used to determine *consumptive and non-consumptive* orientations. A measure of *animal-related activities* was obtained to examine the possible influences of this variable on knowledge and resource orientation.

The draft instrument was examined by consultants involved in the Florida-wide eighth-grade assessment program, including persons working with attitude measurement and a reading specialist employed by the study site's school system. Recommended changes were incorporated into the instrument, and it was field tested on a population of 30 eighth grade students in Leon County, Florida. Discussions with students after the field test indicated the students did not have problems with any of the items. Students indicated they enjoyed the experience because it forced them to make choices about things they rarely had thought about prior to this test. The field test data were tabulated, and the range of scores indicated there would be sufficient spread for data analysis. Representatives from the Broward County, Florida, School Board also reviewed the instrument and recommended some additional changes.³

Description of the study area and study problem

Broward County, Florida, was selected as the study site because of the cosmopolitan nature of the population, a sizeable number of eighth graders were available, and excellent cooperation with the school system was assured. Broward County is located in southeastern Florida and is dominated by the city of Fort Lauderdale. The county has approximately 902,500 residents and is growing at a rate of 7% per year. The county has 25 public middle schools (grades 6, 7, and 8).

All teachers and students participating in the study were volunteers. A short study description was presented at a meeting of the Broward County Science Teachers Association and volunteers requested. Seventeen teachers volunteered, and 15 actually participated in the study.

Because the school system required that all parents be notified that the testing program was taking place, a parental permission slip that briefly described the study and provided parents and students the option of not participating was given to each student. None of the cooperating teachers reported any students refusing to participate. Data were collected during the week of 6 March 1978, by the 15 cooperating teachers in 7 middle schools representing a wide geographic distribution in the study area. Data analysis was done at the Florida State University's Computer Center using the Statistical Package for the Social Studies Program, Version 7.

³Single copies of the instrument are available from the authors.

Data analysis and discussion

The study results indicated that the scores on the 3 components of the knowledge test were not different enough to warrant separate analysis. The scores were all low with students correctly answering 49% of the ecology questions, 41% of the animal questions, and 47% of the questions about endangered and threatened species. For the purpose of this study, knowledge of ecology, knowledge about animals and knowledge about endangered and threatened species were combined into a total knowledge score with a mean of 22.7 (46%) and a standard deviation of 6.7. The highest possible score was 49, and the range was from 1 to 42.

The total *knowledge scores* were divided into 3 groups each representing about one-third of the sample. Persons with scores of 19 or below were assigned to the low group; persons with scores between 20 and 25 were assigned to the medium group; and persons with scores of 26 or above were assigned to the high group.

Students were also assigned to high, medium, and low groups based on the frequencies of their participation in *animal-related activities*. Divisions were made after examining data, and persons with scores below 7 were assigned to the low group; persons with scores between 8 and 11 were assigned to the middle group, and those with scores of 12 or higher were assigned to the high group. Assignments were made so approximately one-third of the sample fell into each group.

The relationships between knowledge and animal activities with consumptive and non-consumptive orientations

Table 1 gives the percent response by knowledge level with the reasons for enjoying wildlife, and Table 2 provides the percent response by level of animal activities and the reasons for enjoying wildlife.

The responses to the section of the instrument identifying the reasons why wildlife was important are not mutually exclusive; however, there appear to be differences between those who enjoy wildlife for consumptive purposes like hunting and fishing and those who enjoy wildlife for non-consumptive purposes like birdwatching.

Responses to non-consumptive questions like "enjoy watching wildlife" (chi-square = 55.50; $df = 4$; $p = .000$) and "enjoy learning about wildlife" (chi-square = 66.12; $df = 4$; $p = .000$) were significant when compared to levels of knowledge. Only 73% of the low knowledge group agreed they enjoyed watching wildlife, but 91% of the high knowledge group agreed. Just 59% of the low knowledge group enjoyed learning about wildlife, but 88% of the high knowledge group agreed.

Of the total population, 82% agreed they enjoyed watching wildlife, and 70% agreed they enjoyed learning about wildlife. Non-consumptive orientations toward wildlife characterized the majority of the population and these orientations are associated with knowledge levels. Of the high knowledge group, 42% had non-consumptive orientations and 36% had consumptive orientations. In the low knowledge group, 30% had non-consumptive and 40% had consumptive orientations.

Relationships between knowledge level and consumptive orientations are mixed. Enjoyment of hunting and fishing for food was significant (chi-square = 11.50; $df = 4$; $p = .021$), but enjoyment of hunting and fishing for sport was not significant (chi-square = 7.52; $df = 4$; $p = .111$) when compared to knowledge level. Enjoying hunting and fishing for food produced a contingency coefficient (a measure of the strength of association) of $C = .09$ and the strength of the relationship between knowledge level and hunting and fishing for sport was also weak ($C = .08$). Of the total population, 40% indicated they enjoyed hunting and fishing. Consumptive orientations toward wildlife characterized a minority of the population, and it is unclear if these orientations are related to knowledge levels.

When consumptive and non-consumptive resource orientations are compared with levels of animal activities (Table 2) the differences become less pronounced; the chi-

Table 1. Percentage of responses by knowledge level group and the reasons for enjoying wildlife (N = 1315).

<i>Level of knowledge</i>	<i>Agree</i>	<i>Disagree</i>	<i>Don't know</i>
<i>Enjoying watching wildlife (p = .000)</i>			
Low	73	14	14
Medium	82	10	8
High	91	6	2
Column Means	82	10	8
<i>Enjoy hunting and fishing for food (p = .021)</i>			
Low	36	48	16
Medium	39	46	15
High	46	44	10
Column Means	40	46	14
<i>Enjoy hunting and fishing for sport (p = .111)</i>			
Low	42	42	16
Medium	40	49	12
High	41	49	10
Column Means	41	47	12
<i>Enjoy learning about wildlife (p = .000)</i>			
Low	59	24	17
Medium	66	19	15
High	88	9	8
Column Means	70	17	13

square probabilities are all significant. The contingency coefficients are larger for non-consumptive orientations ($C = .24$ and $.26$) than for consumptive orientations ($C = .16$ and $.10$) indicating non-consumptive orientations and level of animal activities are more closely related than consumptive orientations and level of animal activities.

The percentage of the population indicating they enjoyed a particular activity was *the same* for activity levels and for knowledge levels. This reinforces the general finding that knowledge and animal activities are closely related.

Only 10% of the young people agreed with the statement that "wildlife is not important." Knowledge was significantly associated with this attitude (chi-square = 46.10; $df = 4$; $p = .000$). Only 8% of the high knowledge group felt wildlife was not important, and 13% of the low knowledge group shared this view; the contingency coefficient was $C = .20$.

The relationship between knowledge and attitudes toward hunting

Table 3 summarizes the percentages of responses by knowledge level group with attitudes toward hunting and presents the chi-square probabilities. Of the total popu-

Table 2. Percentage of responses by level of animal activity and the reasons for enjoying wildlife (N = 1315).

<i>Activity level</i>	<i>Agree</i>	<i>Disagree</i>	<i>Don't know</i>
<i>Enjoy watching wildlife (p = .000)</i>			
Low	70	18	13
Medium	85	8	8
High	92	4	4
Column Means	82	10	8
<i>Enjoy hunting and fishing for food (p = .000)</i>			
Low	31	55	15
Medium	43	46	12
High	49	38	14
Column Means	40	46	14
<i>Enjoy hunting and fishing for sport (p = .000)</i>			
Low	34	52	14
Medium	45	45	10
High	45	43	12
Column Means	41	47	12
<i>Enjoy learning about wildlife (p = .000)</i>			
Low	56	30	14
Medium	41	14	15
High	82	8	10
Column Means	70	17	13

iation, 69% felt hunting for fun was wrong; 77% of the high knowledge group and 62% of the low knowledge group shared this view. The differences among knowledge levels were significant- (chi-square = 28.08; df = 4; p = .000); the contingency coefficient was C = .18. This answer is consistent with the responses to attitude question 28, "It seems wrong to kill a wild animal just to put it on display in someone's house," where 73% of the total population strongly agreed that it is wrong to kill animals for sport.

Attitudes toward hunting for food were quite different. Of the total population, 62% agreed that "hunting for food is OK;" 74% of the high knowledge group and 52% of the low knowledge group shared this view. The differences among knowledge levels were significant (chi-square = 61.22; df = 4; p = .000); the contingency coefficient was C = .21. This suggests that young people may perceive wildlife as part of a predator-prey relationship with humankind but largely reject the notion of using wildlife for just recreational purposes.

Table 3. Percentage of responses by knowledge level group and attitudes towards hunting (N = 1315).

<i>Level of knowledge</i>	<i>Agree</i>	<i>Disagree</i>	<i>Don't know</i>
<i>Hunting for fun is OK (p = .000)</i>			
Low	29	62	9
Medium	24	70	6
High	18	77	5
Column Means	24	69	7
<i>Hunting for food is OK (p = .000)</i>			
Low	52	31	17
Medium	59	32	10
High	74	19	6
Column Means	62	27	11
<i>It is OK for others to hunt (p = .313)</i>			
Low	39	45	16
Medium	41	46	13
High	43	46	12
Column Means	41	45	13
<i>Hunting should be against the law (p = .000)</i>			
Low	35	47	18
Medium	28	59	14
High	23	62	15
Column Means	29	56	16

Attitudes towards other people's hunting were about evenly split with 41% agreeing and 45% disagreeing that "It is OK for others to hunt." There were no significant differences among knowledge levels and the responses (chi-square = 4.76; df = 4; p = .313); the contingency coefficient was C = .06. These attitudes present an interesting contrast to the responses to the question, "I think all hunting should be against the law." Of the total population, 29% agreed that all hunting should be outlawed, 56% disagreed, and 16% were undecided. Differences among knowledge groups were significant (chi-square = 24.09; df = 4; p = .000); the contingency coefficient was C = .13. Of the high knowledge group, only 23% agreed; 35% of the low knowledge group agreed. Reasons for the differences in the responses to these questions are unclear, but the weak associations with knowledge level indicates that factors other than knowledge are apparently responsible.

Conclusions and management implications

These results apply to the study population; eighth grade students in an urban Florida county and generalizations to other counties should be done with caution. It is also important that these data not be used to characterize older or younger students because age was not a variable in this research.

Study results indicate that consumptive and non-consumptive resource orientations are well developed by the time young people reach the eighth grade. Programs aimed at influencing these orientations should begin at an earlier grade level. While knowledge appears to have some association with resource orientations, knowledge alone is not a particularly important variable. In fact, the results indicate that the frequency of animal activities are more highly associated with consumptive and non-consumptive resource orientations than knowledge.

This association of frequency of animal activity with resource orientation has two implications for educational strategies. First, programs designed to increase knowledge about wildlife and endangered and threatened species may or may not result in attitude changes. The programs clearly must include strong affective components and not simply provide information. Secondly, programs that involve field-trips and other types of outdoor activities are as important as cognitive knowledge; experience with the resource counts.

LITERATURE CITED

- Kellert, S. R. 1976. Perceptions of animals in American society. *Trans. of the North Amer. Wildl. and Natural Resource Conf.* 41:533-546.
- LaHart, D. E., and L. Barnes. 1978. Environmental perception: a holistic scheme of environmental education research. *J. of Environ. Educ.* (in press).
- Pomerantz, G. A. 1977. Young peoples attitudes toward wildlife. Wildlife Division Report No. 2781, Lansing: Michigan Department of Natural Resources.