

How High School and College Students Feel About Wildlife

Implications for Curriculum Development

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The works of Kellert (1976, 1980) and Kellert and Berry (1980) have drawn attention to human wildlife orientations as a legitimate and important area of concern in educational research. This need was further emphasized by Yager (1982) who highlighted the use of the natural environment, community resources and the students themselves as the foci of study in his list of desired states in future biology curriculum development. Yet determinations of human wildlife orientations, per se, are of limited value unless the model used to describe these orientations has an inherent capability of identifying the required, remedial programming. In this regard, Yager (1978) earlier suggested the need for basic research on the ways, means and amounts of various experiences that identify and potentially modify student attitudes and enhance their decision-making skills.

In order to identify student orientations toward wildlife we developed a model utilizing the Triandis (1971) theory that wildlife orientations are multidimensional, incorporating three components: 1) feelings; 2) beliefs; and 3) actions. By measuring these components, four human wildlife orientational typologies can be extracted. These typologies approximate Adair's (Lehart & Tillis 1975) four dimensions of social behavior: action, satisfaction, frustration and apathy, as these apply to people's orientations toward wildlife. The "action" category characterizes an individual with high aspirations prone to studying, learning and acting. "Satisfaction" characterizes a person with low aspirations but

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involvement. "Frustration" applies to a person with high aspirations but low involvement. "Apathy" applies to an individual who is low in aspirations, indifferent and lacking involvement. Essentially, this study incorporated attitudes (feelings) and perceptions (beliefs) about wildlife and involvement in wildlife related activities (actions) into a single orientational model using these four sociological dimensions. Additionally, the type of curriculum planning and required pedagogy could be predicted given the identification of a particular typology in an individual or student group.

Methods

Survey Administration

The survey was administered in class group settings to 118 high school students who have taken or were enrolled in a biology class in a central Texas high school and 110 undergraduate students enrolled in wildlife and fisheries sciences courses at a Texas university. The sample groups were chosen on the basis of two assumptions: 1) the high school students were expected to have multiple wildlife orientations because their involvement with a wildlife-related course, biology, was for the short-term goal of meeting graduation requirements; and 2) the college students enrolled in wildlife and fisheries science courses were more likely to have a single wildlife orientation because of their involvement with wildlife as an investment in their future careers.

The Survey Instrument

Species chosen: The survey instrument contained illustrations of eight wildlife species: the butterfly, rat, white-tailed deer, scorpion, rabbit, cockroach, lobster and coyote. Species were chosen to represent invertebrate and vertebrate groups, for their high degree of recognizability and their ability to elicit fairly strong like/dislike responses among students (Bart 1972; Badarraco 1973; Collins 1976; Kellert 1976). Only wild animals were selected to reduce the overall positive influences of domestic animals on human attitudes. To avoid the unconscious bias that may occur when perceptions are influenced by size, color or facial expressions, test species were represented by line drawings of similar size in black ink, and with the animal's common name beside the illustration. These illustrations ensured proper identification without influential photographs.

Three Model Components

Attitudes About Wildlife

For each animal, a series of 12 attitudinal statements were designed to isolate three hypothesized attitudinal categories: positivistic, utilitarian or negativistic (Kellert 1976). These categories were chosen to represent the continuum of human orientations toward wildlife, and minimized areas of overlap between categories. Students selected an agree, disagree or undecided response to each statement.

Perceptions of Wildlife

The second model component consisted of 15 bipolar adjective pairs (Osgood, Suci & Tannenbaum 1957) designed to measure a person's perceptions of each illustrated wildlife species. Adjective pairs were categorized into emotion, knowledge and activity associated with the animal. Students then evaluated each animal using a five-point semantic differentiation scale, eg. "pleasant" 5 4 3 2 1 "unpleasant".

Wildlife Related Activities

For the third model component, respondents were asked whether they have been involved, would like to be involved, or have no interest in a series of 25 wildlife related activities (Pomerantz 1977). Participation in wildlife related activities was used to further classify a respondent into one of the four wildlife orientations on the assumption that a greater degree of involvement with wildlife represented a more positively oriented individual.

Item-total correlations were conducted to determine which input variables (statements) made significant (Pearson correlations > 0.5, standardized item-total alpha > 0.8) contributions to the overall score for each model component. Those statements (Table

1) that fit the above criteria were retained for orientational scoring.

Oriental Scoring:

The scoring protocol for the first model component consisted of summing the response value given (agree = 1, disagree = 0) for each of the six attitude statements retained after satisfying the item-total

Table 1. Survey components used to measure high school and college students' attitudes, perceptions and activities concerning eight wildlife species: white-tailed deer, rabbit, coyote, rat, lobster, butterfly, scorpion and cockroach

ATTITUDE STATEMENTS: Response categories were agree, disagree and not sure.

- I consider this animal to be my friend.
- I consider this animal an important part of nature.
- I am curious about and would study this animal.
- I tend to avoid this animal.
- I consider this animal to be my enemy.
- I don't think it really matters if this animal becomes extinct.

PERCEPTIONS ADJECTIVE PAIRS: A five-point semantic differentiation scale was placed between each adjective pair.

pleasant/unpleasant	good/bad	safe/dangerous
ugly/beautiful	valuable/worthless	

Note: Students were asked to complete the above two survey sections for each of the eight animals illustrated here but on separate pages.

ACTIVITIES: Response categories were "have done this in the past", "never, but would like to", and "never, don't want to".

1. Went hunting.
2. Went fishing.
3. Watched wildlife (birdwatching).
4. Went for a hike to look for wildlife.
5. Joined a conservation group.
6. Studied wildlife.
7. Helped preserve wildlife homes.
8. Joined an environmental protection group.
9. Kept a wild animal for a pet.
10. Joined a group that prevents cruelty to animals.
11. Fed wildlife.
12. Joined a wildlife preservation group.
13. Caught insects or frogs.
14. Tried to photograph wildlife.
15. Went to a zoo.
16. Killed wildlife for food.
17. Had a wild animal stuffed or mounted.
18. Avoided personal contact with wildlife.
19. Thrown objects, screamed, or otherwise tried to scare wildlife away.
20. Went to a wildlife movie.
21. Watched a TV show about wildlife.
22. Read a book about wildlife.
23. Went to a nature center.
24. Touched a wild animal.

Frequency response rates for the above survey items and a listing of those survey elements not included in the orientational scoring process were reported by Newgard (1984).

correlations requirement and repeating this procedure for all eight wildlife species used in the survey. The procedure was the same for the second model component but summation was done on values from 1 to 5 for the five emotion adjective pairs retained for this portion of the study. The 24 activities in the third model component were summed on the values: 0 = have not done, 1 = would like to, and 2 = have done.

To determine a respondent's wildlife orientation, it was necessary to isolate each model component (attitudes, perceptions and activities) scores into a high/low continuum. For example, those respondents scoring above the mean in the first model component were considered high (H) for that component. However, if they scored below the mean they were considered low (L) for that component. This procedure was repeated for each model component resulting in eight possible response combinations (Figure 1).

The eight score categories were collapsed according to Adair's (Lehart & Tillis 1974) four dimensions of social behavior: action, satisfaction, frustration and apathy. Individuals who were high in all three components (HHH) were action oriented. Individuals who were low in either attitudes toward or perceptions of wildlife or both but high in participation in wildlife related activities (LLH, HLH, LHH) were assigned to the satisfaction category. Respondents who were low in participation yet responded high in one or both of the other two categories (HLL, LHL, HHL) were classified as having a frustration orientation. The apathy category represented individuals who responded low on each (LLL) survey component.

Results

Frequency of responses for both student groups surveyed to each of the statements in each of the three survey components and for all eight wildlife species were reported by Newgard (1984). The mean attitudinal score toward all eight animals used in our survey by college students was 35.39 (range = 22 to 48) compared to 24.29 (range = 9 to 42) for the high school students. The more positive attitudinal orientation was demonstrated by the higher mean score. Comparatively, the mean perception (emotion) score for college students was 80.77 (range = 44 to 102) compared to 93.44 (range = 53 to 115) for high school students. In this part of the survey, the lower score demonstrated a more positive orientation. Finally, the mean activity score for college students was 174.58 (range = 87 to 218) compared to 132.41 (range = 55 to 193) for high school students. All differences were significant at $P = .0001$.

Both student groups indicated similar rankings of the eight animals used in our survey in both the atti-

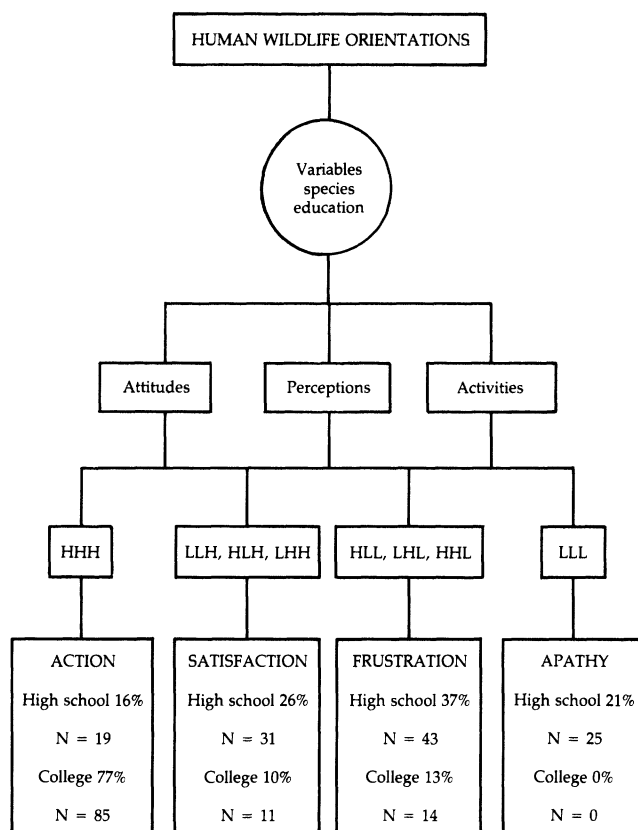


Figure 1. The human wildlife orientations model used in this study with the percentage and numerical distributions of respondents in the action, satisfaction, frustration, and apathy typologies. Respondent scores above (H) or below (L) the average score for any of the three model components produced the eight score patterns illustrated.

tudes (feelings) and perceptions (emotions) components. For example, college students ranked from most to least positive in terms of attitude the white-tailed deer, rabbit, butterfly, lobster, coyote, rat, scorpion and cockroach. High school students reversed the rank order of the first two animals. Ranking of the eight animals by the college students from most to least positive in terms of emotion was white-tailed deer, butterfly, rabbit, lobster, coyote, rat, scorpion and cockroach. High school students reversed the order of the butterfly and rabbit. Mean attitudinal and emotion scores between the high school and college students were significantly different at $\alpha < 0.05$ except for the white-tailed deer emotion score. These rankings were consistent with those of other studies (Bart 1972; Badarraco 1973; Collins 1976; Kellert 1976).

Differences in the number of college and high school students in the action, satisfaction, frustration and apathy categories (Figure 1) were significantly different ($\chi^2 = 91$, $DF = 3$, $P = .0001$). These differences were predicted based on an intentional selection of two survey audiences which were distinctly different in terms of age, education and vested wildlife interests. This selection was necessary in order to

test the sensitivity of our procedures and ultimately the model.

Significant ($P = .0001$) differences persisted between these student groups regardless of the wildlife species chosen for comparison. However, intragroup distributions within the four typologies, given a particular species, changed. For example, a comparison of the rabbit and rat for college students indicated a change from 84 percent to 25 percent (Action), 4 percent to 62 percent (Satisfaction), 13 percent to 5 percent (Frustration) and 1 percent to 7 percent (Apathy) respectively. This same comparison for high school students indicated a change from 38 percent to 2 percent (Action), 4 percent to 40 percent (Satisfaction), 56 percent to 11 percent (Frustration) and 2 percent to 47 percent (Apathy). Therefore, the introduction of species variables into this model of human wildlife orientations adjusted the typology distributions of respondents in a predictable manner, i.e. a greater degree of apathy could be expected for a rat compared to a rabbit. However, what could not be predicted yet revealed through applications of this model was the degree of change from one typology to another given a particular wildlife species.

Discussion

The identification of wildlife orientations based on a three component model (attitudes, perceptions, activities) resulted in mutually exclusive elements affecting the specification of a respondent's attitudinal type. This inherent flexibility of the model was by design to allow for hypothesized variation in each of the model components to emerge based on selected species and demographic characteristics of respondents. For example, this study demonstrated that whereas a respondent may be typed positivistic based on the first model component (attitudes) he was allowed to demonstrate consistency or inconsistency on the second (perceptions) component. Finally, a respondent may have demonstrated a high regard for wildlife in the first two components but varying degrees of involvement in the third component.

Therefore, applications of this model to other audiences (teachers, selected socioeconomic groups) provides for diversity of interpretations and a focus on cause and effect relationships affecting human wildlife orientations. Herein lies the strength of the model and applied procedures. Through analysis of diverse population responses to each component, educators can develop curricula based on known attitudes, perceptions or actions of public misinformation or uninvolvement.

Important issues remain to be addressed through further applications of this wildlife orientation model. For example, there remains a need to study

the relationships of sex, residence, ethnicity, occupation and income as these socioeconomic factors affect wildlife orientations. The orientations of specific constituency groups to selected wildlife species, eg. Black persons' orientations toward snakes, needs to be quantified rather than assumed. Finally, the model, survey and analysis procedures may be applied as a pre- and post-test instrument to school and community education programs designed to address cognitive and affective positions of students concerning wildlife.

The determination of students' wildlife orientations was based on the interrelationships of attitudes, perceptions and activities concerning wildlife. The college students, chosen explicitly for their hypothesized positive orientations, were indeed categorized into the action orientation based on their high interest, knowledge and involvement with wildlife. This was expected due to their exposure to courses designed to teach wildlife values, management and importance to ecosystem stability and to career choices related to these wildlife courses.

The action orientation represented a person with an overall positive attitude toward wildlife and one who was concerned about species survival, curious about their habits and habitats, and worried about man's impact on their continued existence. These individuals perceived wildlife to be pleasant, beautiful, good and valuable. They are active in various group study and consumptive wildlife activities and need be the least concern to biology educators since these individuals have benefited from wildlife through their own education and involvement initiatives.

Other respondents were classified either as satisfied, frustrated or apathetic. The majority (84%) of the high school students, whose formal exposure to wildlife education was limited to a biology class, were less attitudinally concerned or aware of wildlife (many biological topics are often unrelated to wildlife) and were classified into these groups.

The similarity between the apathetic and satisfied individual could be analogous to an "I don't know so I don't care" orientation in which the lack of formal wildlife education has caused neutral or negative attitudes toward wildlife. For the apathetic, this has also led to minimal interaction with wildlife. One means of correcting this situation might be more concentrated and stimulating introductions of wildlife related concepts into high school biology curricula (Adams 1982, 1983; Adams, Charles, Greene & Swan 1985; Hamilton 1982).

The frustration orientation categorized a student group with positive attitudes or perceptions of wildlife contradicted by low involvement. LaHart (1981) demonstrated that for 8th grade students, participation in animal-related activities produced the highest association with knowledge, especially noncon-

sumptive activities like hiking, reading about wildlife and having pets. However, knowledge, per se, played a relatively minor role in predicting attitudes. Therefore, this group may benefit from programs designed for increased interaction. Biology teachers might consider the enhanced use of wildlife professionals who could address this problem through development of interpretive programs which increase student interaction opportunities with wildlife, including the use of nature centers, wildlife refuges, fish hatcheries, nature preserves, zoos and other wildlife-related facilities.

Summary

The objective of this research was to develop a practical, deductive model of human orientations toward wildlife and which provided the prescription required in the development of alternative biology curricula. The need for this research was supported, in part, by the magnitude of time and money spent by U.S. residents to participate in nonharvest wildlife activities (Shaw & Mangun 1984), by the lack of prior studies with our emphasis, and as a partial fulfillment of the educational research needs stressed by others (Yager 1978, 1982). Furthermore, and more importantly, as the process of urbanization continues to withdraw nearly one million acres of agricultural land and therefore wildlife habitat from their productive capabilities annually, the resultant urban habitats will continue to isolate humankind from the natural environment and endemic wildlife. This isolation may perpetuate cognitive and affective orientations toward wildlife by the general public, which could have further, negative consequences on this vanishing resource. Thus the need for active, well planned, targeted educational programming on the natural environment and its endemics emerges as one of the most important areas in curriculum development today. However, educators need a mechanism which gives focus to their curriculum development efforts. We have demonstrated that people can be accurately categorized into four, finite sociological typologies of wildlife orientations. Each typology not only specifies the group characteristics but also the required remedial education.

Shaw and Mangun (1984) described human wildlife orientations based largely on reports from respondents who may already be in the "action" category. In this report, we have drawn attention to the existence, characteristics and needs of the alternative and perhaps larger subset of typologies of human wildlife orientations. Those individuals who can be placed in the "satisfied," "frustrated" and "apathetic" orientations toward wildlife require forms of wildlife education quite different than those in the

"action" category. We have also attempted to sensitize biology teachers to the educational needs of their students in terms of one community-based resource, ie. wildlife. The process of bringing students back into contact with their natural environment through wildlife related activities may be one of the greatest challenges to the biology teaching profession in the remainder of this century.

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