

Children's Attitudes Towards Wildlife: A Comparison by Ethnicity and Community Size

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Abstract: Using questionnaires, we surveyed fifth grade students in eastern Texas during spring 1998 to evaluate their knowledge of and attitudes towards wildlife. We grouped data from 1315 completed surveys by community size (urban, semi-urban, semi-rural, and rural) and ethnicity (black, Hispanic, and white). We compared knowledge and attitude scores among groups using Kruskal-Wallis tests and evaluated relationships between knowledge or activities and attitudes using Pearson's correlations. We found that television was the primary source of wildlife information for the students; parents generally ranked lowest. White students had higher ($P < 0.05$) knowledge and attitude scores than Hispanics, which were higher ($P < 0.05$) than blacks. Rural white students had the highest scores ($P < 0.05$) among community sizes. For each ethnic group and community size, correlations between knowledge and attitudes were significant ($P < 0.05$). Students who experienced hunting and/or fishing had higher ($P < 0.05$) attitude scores than students who did not. Our results suggest that there is a need to teach basic wildlife education to students. While television may be exposing students to worldwide wildlife, they lack knowledge about local and regional species. Also, wildlife agencies should focus on increasing participation in consumptive use activities by elementary school students, especially females. Programs similar to Becoming an Outdoors Woman or Women in the Outdoors that target mothers and daughters or fathers and daughters may be a successful way to reach young females.

Key Words: children's attitudes, community size, eastern Texas, ethnicity, wildlife

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Demographic shifts resulting in increased urbanization will have monumental affects on fish and wildlife management in the United States. Such shifts will impact the public's understanding and familiarity with wildlife and participation in wildlife-related activities (Lapointe and Thompson 1993). To address these issues, numerous studies have evaluated the public's knowledge and attitudes towards a range of wildlife-related issues (e.g., Kellert 1976, Kellert 1985, Siemer et al. 1987, Duda et al. 1996). However, there is a lack of literature which focuses on attitudes of minorities towards wildlife.

By 2025, half of the Texas population will be persons of minority status (Mur-

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dock et al. 1992); voters from the various ethnic groups may decide the future of hunting, fishing, and wildlife management in the state. Understanding the attitudes held by future constituents will assist wildlife managers with designing education programs that erase misunderstandings and encourage the continuation of hunting and fishing. The objectives of this study were to examine and compare the attitudes of minority and non-minority fifth grade students towards wildlife in various-size communities in the Pineywoods of eastern Texas.

Methods

We sorted communities in eastern Texas into groups according to population size, namely rural (< 6000 residents), semi-rural (6000–25,000 residents), semi-urban (25,000–50,000 residents), and urban (>50,000 residents) (Kellert and Westervelt 1983). Within each group, we selected one or more communities in which to examine student attitudes. When possible, we selected communities with a median population in the size classification. Communities of different size classifications were at least 22 km apart.

Our target sample size was 400 black and 400 white students. In communities with more than one elementary school, we selected the largest school (Texas Education Agency 1996) to insure an adequate sample size. For each selected school, we requested permission to conduct the survey from a school administrator; if permission was denied, we selected another school or community. As an incentive to encourage schools to participate, we offered a short lecture concerning wildlife in Texas after the students completed the survey. To avoid biases between accelerated and standard classes, we sampled the entire fifth grade at selected schools.

Our survey consisted of three parts (Flannery 2000:63–64). Part I provided background information on students, including gender, ethnicity, source of wildlife information, and participation in hunting and/or fishing activities. Part II evaluated knowledge of wildlife based on yes or no responses as to whether each of 15 different animals was considered a wildlife species or a domesticated species. Part III evaluated student attitudes towards wildlife using 22 Likert-type statements; these were similar to those used by Pomerantz (1977) and Westervelt and Llewellyn (1985). Students were instructed to choose one response (yes, maybe, or no) for each statement.

Fifth grade students within a selected school were surveyed either all at once or by classroom, depending on the preference of the school's administrators and teachers. The survey administrator introduced the wildlife survey, advised students that they did not have to participate, and asked students not to include names on the surveys. Surveys were then passed to students for them to complete. If the teacher preferred, it was read to the students by the survey administrator. When read, it was read without voice inflection so as not to sway answers. A benefit of reading the survey was that all students completed it at approximately the same time. Questions were not answered by the survey administrator or classroom teacher once the students began the survey.

We entered responses for completed surveys into a spreadsheet using numeric

coding. Due to small sample sizes, surveys of students who classified themselves as American Indian, Asian, or "other" were removed; those of Hispanic students were retained. Incomplete surveys also were removed. We examined the following hypotheses: 1) with community sizes pooled, there would be no differences among ethnic groups in knowledge of or attitudes towards wildlife; 2) for each ethnic group, there would be no differences among urban, semi-urban, semi-rural, and rural children in attitudes towards wildlife; 3) there would be no correlations between knowledge and attitude towards wildlife, and; 4) there would be no correlations between hunting/fishing participation and attitudes towards wildlife.

For Part I of the survey, we calculated averages for sources of wildlife information and for participation in hunting/fishing activities. Likewise, for Part II, we used averages for the percent of species correctly identified as wildlife or domesticated animals. In Part III, positive responses were scored as 3, neutral responses as 2, and negative responses as 1, and average scores were computed. Our data were not normally distributed ($P < 0.10$), thus we compared knowledge and attitude scores among ethnic groups and attitude scores among communities using non-parametric analysis of variance (i.e., Kruskal-Wallis tests). When significant differences were found, we used simultaneous multiple comparisons (Gibbons 1985) to delineate among parameters. To test correlations between knowledge of and attitudes towards wildlife, and between hunting/fishing activities and attitudes towards wildlife, we log-linear transformed the data and evaluated relationships using Pearson's correlation tests. All hypotheses were evaluated at an alpha level of 0.05.

Results

We surveyed students at 14 schools in 9 counties in the Pineywoods Region of eastern Texas. There were 440, 124, and 751 completed questionnaires for black, Hispanic, and white students, respectively, and 271, 333, 375, and 336 students from urban, semi-urban, semi-rural, and rural communities, respectively.

Background Information

All three ethnic groups received their wildlife information from similar sources. For each group, television was the primary source, books ranked second, and teachers third; parents generally ranked last. When student responses were sorted by community size, television was the primary source. Books ranked second for all but the semi-rural students, which ranked teachers as the second-most important source. The third-ranking source was different for each community size (Flannery 2000:28).

Although not examined statistically, there appeared to be differences among ethnic groups in hunting participation (Flannery 2000:30). Overall, 54% of white students had hunted as compared to 36% of Hispanics and 29% of blacks. Regardless of ethnicity, a higher proportion of males (64%) than females (26%) had hunted. The proportions of black males (52%) and Hispanic males (53%) that had hunted were similar; conversely, the proportion of black females that had hunted (11%) was less than half that of Hispanic females (23%). The largest differences among ethnic

Table 1. Mean scores of wildlife knowledge and attitude for black, Hispanic, and white fifth grade students in eastern Texas, spring 1998. Results of Kruskal-Wallis tests and simultaneous multiple comparisons are also shown.

	Ethnic group									P-value
	Black			Hispanic			White			
	N	\bar{x}	SE	N	\bar{x}	SE	N	\bar{x}	SE	
Knowledge (Percent correct)										
Male	201	65A ^a	1.36	58	72B	2.59	392	80C	0.88	0.001
Female	239	60A	1.21	66	71B	2.51	359	79C	0.91	<0.001
Pooled	440	62A	0.91	124	71B	1.80	751	80C	0.63	0.002
P-value (males vs females)		0.006			0.632			0.203		—
Attitudes (avg. score, range 1 to 3)										
Male	201	2.39A	0.03	58	2.53B	0.04	392	2.62C	0.01	<0.001
Female	239	2.22A	0.02	66	2.44B	0.04	359	2.46B	0.02	<0.001
Pooled	440	2.30A	0.02	124	2.48B	0.03	751	2.55C	0.01	<0.001
P-value (males vs females)		<0.001			0.116			<0.001		—

a. Within rows, means followed by a different letter are different at $\alpha = 0.05$.

groups were in the semi-urban and rural communities. However, there was no indication that as the community size decreased, the number of students who had hunted increased. For black and Hispanic students, lower proportions of rural students than either semi-urban or semi-rural students had hunted.

Knowledge and Attitude Scores

For each gender, there were differences among ethnic groups in knowledge scores (Table 1). White students scored higher than Hispanic students who scored higher than black students. Black males scored higher than black females. However, there were no differences between male and female knowledge scores in Hispanic or white students. Overall, white males had the highest scores and black females had the lowest scores (Table 1).

There also were differences among ethnic groups in attitudes towards wildlife. Black students had lower attitude scores than Hispanic students, who had lower scores than white students. For males, the same trend was found among ethnic groups. However, there was no difference in attitude scores of Hispanic and white females. Within ethnicity, black and white males had higher attitude scores than black and white females, respectively; Hispanic male and female attitude scores were similar (Table 1).

Within ethnic groups, only white students had attitude scores which differed among community sizes (Table 2). With genders pooled, white attitude scores formed three groups, with rural students in the highest group and urban students in the lowest. For both white males and females, there were differences between rural students and students in the other three community sizes (Table 2). With all students combined, there were differences in student attitude scores among community sizes

Table 2. Average wildlife attitude scores (range 1–3) of fifth grade students by gender, ethnicity, and community size in eastern Texas, spring 1998. Results of Kruskal-Wallis tests and simultaneous multiple comparisons also are shown.

Ethnicity	Community size												P-value	
	Urban			Semi-urban			Semi-rural			Rural				
	N	\bar{x}	SE	N	\bar{x}	SE	N	\bar{x}	SE	N	\bar{x}	SE		
Black														
Male	67	2.41	0.05	55	2.38	0.05	35	2.41	0.07	44	2.36	0.06	0.826	
Female	76	2.20	0.04	57	2.14	0.05	42	2.24	0.06	64	2.32	0.05	0.080	
Pooled	143	2.30	0.03	112	2.26	0.04	77	2.32	0.04	108	2.33	0.04	0.605	
Hispanic														
Male	13	2.46	0.08	22	2.54	0.07	12	2.59	0.10	11	2.53	0.09	0.669	
Female	18	2.32	0.11	23	2.48	0.06	12	2.47	0.06	13	2.50	0.06	0.846	
Pooled	31	2.38	0.07	45	2.51	0.05	24	2.53	0.06	24	2.51	0.05	0.527	
White														
Male	53	2.57A ^a	0.03	94	2.63A	0.03	142	2.59A	0.03	103	2.70B	0.03	0.003	
Female	44	2.35A	0.04	82	2.44A	0.04	132	2.42A	0.03	101	2.57B	0.03	<0.001	
Pooled	97	2.47A	0.03	176	2.54B	0.02	274	2.51AB	0.02	204	2.63C	0.02	<0.001	
Combined														
Male	133	2.48A	0.03	171	2.54AB	0.03	189	2.56B	0.03	158	2.59B	0.03	0.005	
Female	138	2.26A	0.03	162	2.34B	0.03	186	2.39B	0.03	178	2.47C	0.02	<0.001	

a. Within rows, means followed by a different letter are significantly different at $\alpha = 0.05$.

Table 3. Pearson's correlation coefficients (R) of knowledge and attitude of fifth grade students by gender, ethnicity, and community size in eastern Texas, spring 1998.

Ethnicity	Community size							
	Urban		Semi-urban		Semi-rural		Rural	
Gender	R	P-value	R	P-value	R	P-value	R	P-value
Black								
Male	0.276	0.024	0.361	0.007	0.405	0.016	0.127	0.411
Female	0.317	0.005	0.265	0.046	0.393	0.010	0.134	0.292
Pooled	0.301	0.001	0.304	0.001	0.428	0.001	0.136	0.159
Hispanic								
Male	0.108	0.725	0.654	0.001	0.007	0.982	0.502	0.115
Female	0.317	0.005	0.265	0.046	0.393	0.010	0.134	0.292
Pooled	0.470	0.008	0.450	0.002	0.053	0.806	0.422	0.040
White								
Male	0.184	0.231	0.014	0.899	0.256	0.003	0.014	0.892
Female	0.135	0.188	0.116	0.125	0.238	0.001	0.081	0.250
Pooled	0.143	0.308	0.312	0.002	0.228	0.006	0.129	0.194

for both males and females. Female attitude scores were highest in rural areas and lowest in urban areas; scores from urban and semi-urban schools were similar. Male students in rural and semi-rural schools had higher scores than those in urban schools, whereas scores from semi-urban, semi-rural, and rural schools did not differ (Table 2).

Correlations of Knowledge and Activities to Attitudes

With ethnic groups sorted by gender and community size, there were correlations between knowledge scores and attitude scores (Table 3). Knowledge apparently influenced attitudes of black males and females and Hispanic females in the urban, semi-urban, and semi-rural communities, but not in the rural communities (Table 3). In rural communities, knowledge and attitude were correlated for Hispanic students as a group (Table 3). Attitudes of white females were correlated to knowledge in semi-rural communities, and those of white males were correlated in semi-urban and semi-rural communities.

With ethnic groups and community sizes pooled, student and family member participation in hunting/fishing activities were correlated to attitude scores ($P < 0.001$). Regardless of gender, ethnicity, or community size, students who hunted, fished, or had relatives who hunted and/or fished had higher attitude scores than those who did not participate or have family members who participated in such activities (Flannery 2000:42).

Consumptive Use and Attitudes

In Part III of the survey, five statements directly addressed attitudes towards the consumptive use of wildlife, including fish. Not surprisingly, more students approved

Table 4. Percentages of fifth grade students by ethnicity and community size who agreed with five attitude statements which addressed consumptive use of fish and wildlife in a survey conducted in eastern Texas, spring 1998.

	Fishing for food is okay.	Fishing for fun is okay.	Hunting for food is okay.	Hunting for fun is okay.	All hunting should be illegal.
Ethnicity					
Black					
Male	75	86	68	57	36
Female	63	74	43	38	51
Pooled	69	80	55	47	44
Hispanic					
Male	57	72	53	53	47
Female	65	74	41	38	59
Pooled	61	73	57	45	53
White					
Male	82	88	81	71	24
Female	69	81	51	44	54
Pooled	76	85	67	58	38
Community size					
Urban					
Male	74	85	69	54	38
Female	59	73	32	29	57
Pooled	67	79	50	41	47
Semi-urban					
Male	75	85	67	57	29
Female	69	75	44	48	51
Pooled	72	80	56	38	40
Semi-rural					
Male	78	85	81	75	24
Female	65	79	45	38	53
Pooled	71	82	63	57	39
Rural					
Male	82	89	79	70	32
Female	72	81	65	57	53
Pooled	77	85	72	63	43

of fishing than hunting (Table 4). Generally, white students were more supportive of hunting and fishing than black students and black students were more accepting than Hispanic students (Table 4). For all three ethnicities, the majority of females believed that all hunting should be illegal whereas the majority of males disagreed. White students showed the widest disparity between genders (30%) (Table 4).

In each community size, more males responded positively to each consumptive use statement than did females (Table 4). Males in the urban and semi-urban communities were considerably less supportive of hunting for food or for fun than were males in the semi-rural and rural communities. However, support for keeping hunting legal was stronger in the semi-rural and semi-urban communities. Rural females

were considerably more supportive of both hunting for food or for fun than females in the other community sizes. However, more urban, semi-urban, and semi-rural females supported legal hunting than supported hunting for food or fun. Conversely, larger percentages of rural females supported hunting for food or fun than supported legal hunting (Table 4).

Discussion

Students in this study gained more information about wildlife from television than any other source, which was similar to studies in Michigan (Pomerantz 1977), Colorado (Race et al. 1990), and nationwide (Westervelt and Llewellyn 1985). Pomerantz (1977) found that parents had a strong influence on student interest in wildlife; our study suggested the opposite. This difference in parental influence could be a result of changes in the American family since 1977. Lapointe and Thompson (1993) noted that the increase in women head-of-household families affect children's attitudes towards wildlife. Also, there are considerably more television stations available today than in 1977. The Learning Channel, Discovery, Disney, and many other television channels provide the viewing public with both fictional and non-fictional stories about wildlife from around the world.

Duda et al. (1998) found that more whites than non-whites had participated in hunting. Whites also had more participation in our study; however, there was involvement by both black and Hispanic students from the different community sizes. Duda et al. (1998) recommended that wildlife agencies focus on recruiting young hunters. However, they recommended against recruiting non-traditional hunting groups (e.g., non-whites). Our results suggest that both white and non-white youths could be recruited into hunting. Duda et al. (1998) suggested hunting advocates market hunting as a family opportunity. However, this would probably do little to recruit hunters from families in which no one hunts. An alternative strategy may be to provide some sort of bonus to individuals who take non-family members hunting (e.g., hunting a trophy area).

Knowledge Scores

Kellert and Westervelt (1983) and Kellert (1985) found that white children had more knowledge about wildlife than black children. Likewise, those researchers and others (Pomerantz 1977, Race et al. 1990) found males were more knowledgeable about wildlife than females. Our results were generally similar to those studies although we only found gender-related differences among black students, with males scoring higher than females. Reasons for the differences between black male and female scores but not between white or Hispanic male and female scores are unclear.

Kellert and Westervelt (1983) and Kellert (1985) also found that Connecticut students in rural areas scored higher on wildlife knowledge tests than students in urban areas. Our findings were similar in eastern Texas. Conversely, Race et al. (1990) found urban children in Colorado to be more knowledgeable about wildlife than rural children.

Our study demonstrates that there is a need to teach basic wildlife education

(i.e., differences between wildlife species and domestic species) to students, regardless of ethnicity or gender. Television may be teaching students about wildlife from distant countries, but students apparently do not get exposed to local and regional species through that media. Some students misclassified quail and numerous students referred to horses as wildlife (Flannery 2000:65), probably because horses were viewed as wild mustangs. Students also had difficulty classifying reptiles and insects as wildlife.

Attitude Scores

Kellert and Westervelt (1983) found white children had more positive attitudes towards wildlife than black children. They documented that blacks were less affectionate toward and less interested in wildlife than whites. In our study, it appeared that negative attitudes of blacks were related to their low exposure to hunting and fishing (Flannery 2000:30, 42) rather than apathy or lack of interest. The higher attitude scores of males correspond with the findings of Pomerantz (1977), Westervelt and Llewellyn (1985), and Race et. al (1990) in that males and females have different views about wildlife. Kellert and Berry (1987) concluded that gender is among the most important factors that determine attitudes about animals in our society. Based on our results, we concur.

The trend of increasing attitude scores with decreasing community size in our study is contrary to the findings of Race et. al (1990). They found that urban students had higher scores than rural students, and attributed the difference to increased use of Project WILD exercises by urban teachers. In our study, the results were probably directly related to the relatively high percentage of rural students who had hunting/fishing experience or had family members who shared such experiences.

Correlations of Knowledge and Activities to Attitudes

Although student attitude scores were reflective of knowledge scores, the coefficients were low. It is apparent that other factors were more important than knowledge in influencing attitudes. There also were correlations between participation in hunting/fishing activities and attitudes towards wildlife. Although the highest knowledge and attitude scores generally were in the rural communities, correlations between the two were not significant. Presumably, this was because in the rural communities, experience with hunting and fishing played a larger role than knowledge in influencing attitude scores. Also, there may be more acceptance and appreciation of such activities in rural communities than in larger communities. Other researchers also found that student participation in wildlife-related activities had a profound influence on knowledge and attitudes towards wildlife (Pomerantz 1977, Kellert and Berry 1980, Kellert and Westervelt 1983, Race et. al 1990).

Participation in hunting/fishing had more of a positive influence on females than males in all four community sizes; black females had the strongest correlation of any group (Flannery 2000:42). This suggests that females who participate in hunting/fishing or have family members who do so are likely to have positive attitudes towards wildlife. As females had lower attitudes towards wildlife than males, wildlife

agencies should target females with programs that promote hunting/fishing opportunities and skills. Programs such as "Becoming An Outdoors Woman," "Get Hooked on Fishing," or the National Wild Turkey Federation's "Women in the Outdoors" are excellent ways to introduce women to hunting/fishing. Developing similar programs, which target mothers and daughters or fathers and daughters may be a successful way to reach young females.

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Literature Cited

- Duda, M. D., O. Augustus, S. J. Bissell, B. J. Gruver, S. Jacobs, A. Lanier, and T. Mathews. 1998. Public attitudes towards fish and wildlife management in Indiana. *Responsive Management*, Harrisonburg, Virginia.
- _____, S. J. Bissell, and K. C. Young. 1996. Factors related to hunting and fishing participation in the United States. *Transactions of the North American Wildlife and Natural Resource Conference* 61:324–337.
- Flannery, K. C. 2000. Children's attitudes towards wildlife: a comparison by ethnicity and community size. Master's thesis. Stephen F. Austin State University, Nacogdoches, Texas.
- Gibbons, J. D. 1985. *Nonparametric methods for quantitative analysis*. Second edition. American Science Press, Columbia, Ohio.
- Kellert, S. R. 1976. Perceptions of animals in American society. *Transactions of the North American Wildlife Conference* 41:533–546.
- _____. 1985. Attitudes towards animals: age-related development among children. *Journal of Environmental Education* 16:29–39.
- _____ and J. K. Berry. 1980. Knowledge, affection, and basic attitudes towards animals in American society. U.S. Fish and Wildlife Service, U.S. Government Printing Office, Washington, D.C.
- _____ and _____. 1987. Attitudes, knowledge, and behaviors toward wildlife as affected by gender. *Wildl. Soc. Bull.* 15:363–371.
- _____ and M. O. Westervelt. 1983. Children's attitudes, knowledge and behaviors towards animals. U.S. Fish and Wildlife Service, U.S. Government Printing Office, Washington, D.C.
- Lapointe, G. D. and T. R. Thompson. 1993. Marketing wildlife to a new constituency. *Transactions of the North American Wildlife and Natural Resource Conference* 58:170–173.
- Murdock, S. H., K. Bachman, R. B. Ditton, M. D. N. Hogue, and D. Ellis. 1992. Implications of future demographic change for participation in fishing in Texas. *North American Journal of Fisheries Management* 12:548–558.
- Pomerantz, G. A. 1977. Young people's attitudes towards wildlife. Division report 2781, Michigan Department of Natural Resources, Detroit.
- Race, T. M., E. Decker, and J. Taylor. 1990. A statewide evaluation of Project WILD's effect

290 Flannery and Whiting

on student knowledge and attitude towards wildlife. *Transactions of the North American Wildlife and Natural Resource Conference* 55:101–107.

Siemer, W. F., R. B. Peyton, and D. J. Witter. 1987. Teachers' attitudes towards animals: implications for conservation education. *Transactions of the North American Wildlife and Natural Resource Conference* 52:460–467.

Texas Education Agency. 1996. *Texas School Directory*. Texas Education Agency, Austin.

Westervelt, M. O. and L. G. Llewellyn. 1985. Youth and wildlife: the beliefs and behaviors of fifth and sixth grade students regarding non-domestic animals. U.S. Fish and Wildlife Service, U.S. Government Printing Office, Washington, D.C.