

CURIOSITY IN THE AMERICAN BLACK BEAR

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Abstract: American black bears (*Ursus americanus*) were tested to quantify their response to novel objects placed in their environment. The results indicate that the level of orientation may be greater in the black bear than in other North American carnivores. The exploration of objects by the black bear is characterized by a high degree of contact with the objects. This contact consists primarily of manipulating the objects with the forepaws and chewing the objects. The intense curiosity of the black bear should be recognized and considered in the management of this species and in the evaluation of bear/human conflicts.

Understand the behavior of an animal and its relationship to its environment is an important consideration in management of areas where humans and bears come into frequent contact, but it is often overlooked as a topic of research. The relationship of game species to their environment is usually studied in terms of populations and trends without considering behavior of individual animals. In practice, however, management of large, solitary animals such as the black bear in a preserve situation is often on an individual level, which requires an understanding of their behavior.

To obtain useful information about behavior, research must be designed to gather data systematically through direct observation. Information about behavior is too often obtained anecdotally, without actual observation of the animals. Observation is difficult but necessary to obtain clear information about what the animals are doing. Data from captive animals can be very important in explaining behavior observed in the field and in directing the field researcher toward behavior that may otherwise be overlooked.

Also, the behavior types being studied need to be defined so that their importance is not lost in semantics. With this need in mind, curiosity is operationally defined as an animal's orientation and/or contact with novel objects in its environment. Behavior that falls under this definition includes play, exploration, approach/avoidance, and orientation. Theoretical components of behavior will not be considered here. This paper deals with what the animal is likely to do in given situations. In other words, how curious is the black bear?

The study of curiosity in mammals began early. Scientists such as Darwin (1878), Morgan (1890), and Romanes (1969) clearly established the existence of intense curiosity in mammalian species, particularly in the primates. Unfortunately, this early interest in curiosity was not continued, and not until the late 1940s did curiosity again become a topic of behavioral study. These studies, however, tended to discuss the observed behaviors theoretically, and descriptions and quantita-

tive data on behaviors considered as curiosity were lacking.

The curiosity of the bear had primarily been related by anecdotal and narrative information. Everyone has a good story but no quantitative data. Several authors have noted that the bear exhibits a great deal of curiosity about humans and man-made objects. Leyhausen (1948) and Burghardt and Burghardt (1972) described young black bears manipulating unfamiliar objects and food with both mouth and forepaws. Krott and Krott (1963) described the first outing of 2 bottle-raised brown bears (*Ursus arctos*); both young animals immediately explored by digging, eating, or chewing on almost all objects available to them in a garden.

Older bears also seem to exhibit a good deal of curiosity. Skinner (1952) speaks of bears investigating campsites in Yellowstone National Park without attempting to obtain food. Bears in campgrounds and backcountry campsites are a problem in Great Smoky Mountains National Park. Food may be a factor, but Beeman (1971) reported that even campground bears consume only about 15 percent nonnative foods, which does not support the assumption that bears rely on garbage as a food staple. In addition, nonfood-related objects, such as trail signs, polyethylene aerial survey markers, mast traps, and weather stations, have all been damaged by bears.

Describing and quantifying curiosity in the black bear could help to evaluate and possibly predict outcomes of bear/human, bear/environment, and bear/management interactions. This study is an introduction to the description of curiosity in the black bear. The research was conducted near Tremont Environmental Center in the Great Smoky Mountains National Park in 1972-73. An extensive study by Glickman and Sroges (1966) of displayed curiosity in more than 100 species of zoo animals was used as a model. Glickman and Sroges intended to quantify the response of animals to novel objects placed in their environment. The procedure was simple; but it provided, for the first time, a

method whereby species could be compared, and not only quantitative but qualitative information could be collected.

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METHODS

The subjects were 2 female sibling black bears. These animals were hand-raised together from 3 months of age in a large seminatural enclosure. The enclosure was partitioned in half so the bears could be placed on either side or separated. Both animals normally had full access to both sides of the enclosure.

The bears' ages at the 3 test dates were approximately 16 months, 20 months, and 26 months. Their enclosure and care are described in detail by Bacon (1973).

During the test, the bears were separated. Pairs of novel objects were placed in each bear's side of the enclosure. Four sets of objects were used:

- (1) Two pine blocks, 1 measuring $5.0 = 10.2 = 61.0$ cm and the other $2.5 = 30.5$ cm.
- (2) Two steel chains, 1 #20 welded chain measuring 61.0 cm and 1 smaller chain measuring 30.5 cm.
- (3) Two maple dowels, 1 measuring $2.2 = 91.4$ cm and the other $1.6 = 30.5$ cm.
- (4) Two water hoses, 1 measuring $2.5 = 61.0$ cm and the other $1.3 = 30.5$ cm.

The blocks, dowels, and hoses were used only once. The chains were reused but were washed between presentations to eliminate olfactory cues.

Each set of objects was placed in each animal's home cage, 1 set at a time. The objects remained 6 minutes and were then removed. The next set of objects was placed in the cage after a time lapse of 10 minutes. Objects were always presented to the bear in this order: blocks, chains, dowels, hoses.

Responses to the objects were recorded during the 6-minute period. Notation was made during each of the 72 5-second intervals as to whether the bear was orienting to or in contact with the presented objects. An orientation score (O) was given when the bear paid attention to but did not touch the objects. A contact score (C) was given when the bear was in contact with the objects. If contact occurred without noticeable orientation toward the objects, no score was given.

Three different tests were run, using this procedure. An account of the bear's behavior during the first test was recorded by hand. Behavior during the second and third tests was recorded with super-8 movie film.

RESULTS AND DISCUSSION

Quantitative Results

Quantitative results of this study indicate a very high level of curiosity. The scores of each animal for the novel objects presented in the 3 tests are given in Table 1. It is unfortunate that only visual orientation and actual contact are scored with this technique. Odor responses are ignored, and these responses may be important in bears that have well-developed chemosensory systems.

Chains aroused the highest degree of curiosity in the bears, followed in descending order by dowels, hoses, and blocks. The attention given to the objects is best appreciated by comparing the percentage of time spent

Table 1. Time spent oriented to and in contact with novel objects introduced for 6-minute periods (72 consecutive 5-second intervals) to 2 captive American black bears, at 3 age levels. All scores are given in number of 5-second intervals the subject oriented to or was in contact with the novel objects.

	16 months old			20 months old			26 months old		
	Orientation	Contact	Total response	Orientation	Contact	Total response	Orientation	Contact	Total response
Subject 1									
Blocks	1	18	19	3	0	3	1	70	71
Chains	2	70	72	0	70	70	1	66	67
Dowels	1	65	66	0	72	72	1	67	68
Tubing	0	35	35	0	72	72	1	71	72
Subject 2									
Blocks	6	10	16	0	72	72	0	69	69
Chains	2	70	72	0	72	72	2	68	70
Dowels	0	67	67	0	72	72	1	48	49
Tubing	2	31	33	0	64	64	1	70	71

with them. The bears attended to the objects an average of 82 percent of the time the objects were in their enclosures.

A comparison of the responses to the 4 set of objects among the bears, other carnivores, and primates is given in Table 2. The greater response of the bears to the chains, compared with the responses of other carnivores, may result from the bears' greater ability to use the forepaws to grasp and manipulate objects.

Table 2. Average of the time spent oriented to and in contact with novel objects for 2 captive American black bears, compared with averages for other carnivores and for primates. All scores are given in number of 5-second intervals of a possible 72 intervals per session that the animals spent oriented to or in contact with novel objects.

	Black bears	Carnivores ^a	Primates ^a
Blocks	41.67	38.49	33.79
Chains	70.50	19.07	24.43
Dowels	65.67	29.58	28.39
Tubing	57.83	39.98	26.21

^aGlickman and Sroges (1966).

The effect of captivity on the responses was not assessed. However, Davis and Dugan (1975) conducted a similar study with the same 2 bears and 4 zoo animals — a black bear, 2 Malayan sun bears (*Helarctos malayanus*), and an assumed hybrid between the grizzly (*Ursus arctos*) and a black bear. Their results indicated that the more sterile the environment, the higher was the responsiveness to the novel objects. Within their sample, age, sex, and species differences were not as apparent as housing differences. The 2 black bears of this study housed in a seminatural enclosure were less responsive than the zoo animals.

Although Glickman and Sroges (1966) found older zoo animals tended to be less responsive, their results with bears were inconclusive.

A comparison of the mean of total responses among the carnivores is shown in Table 3. The bears exhibited a greater level of curiosity toward the novel objects

Table 3. Mean total of responses of carnivores to novel objects introduced into their environment. All scores are given in number of 5-second intervals of a possible 72 intervals per session that the animals spent oriented to or in contact with novel objects.

Carnivores	Mean score
Superfamily: Feloidea ^a	29.65
Family: Felidae ^a	32.10
Genus: <i>Panthera</i> ^a	45.06
Genus: <i>Felis</i> ^a	17.94
Superfamily: Canoidea ^a	34.35
Family: Canidae ^a	31.00
Family: Procyonidae ^a	36.91
Family: Mustelidae ^a	32.86
Family: Ursidae	58.92

^aGlickman and Sroges (1966)

than the other carnivores tested. Even though these data were collected from captive animals and the number of subjects was small, the intensity of the bears' response still has important implications. Black bears may be more likely to approach and come in contact with novel objects in their environment than other animals. Problems with black bears have not typically been viewed in terms of curiosity. However, it seems that bears may exhibit an intrinsic behavior to approach and manipulate new objects in their home ranges.

Behaviors Toward Novel Objects

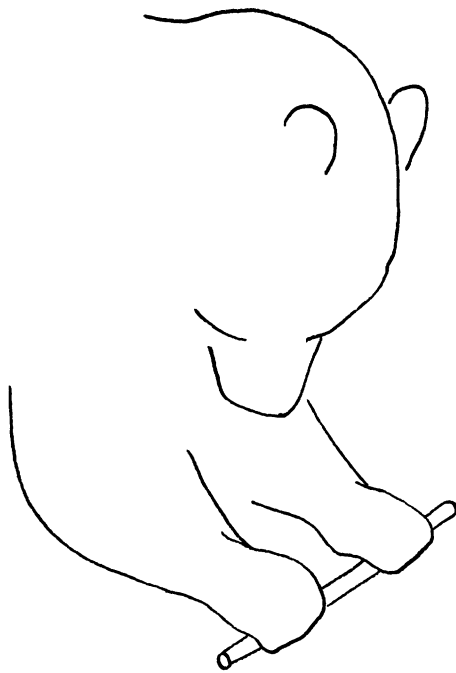
The bears initially reacted to all test objects in a similar manner. When the object was introduced, the animals would approach, smell the object, manipulate it with their forepaws, and then begin to chew on it.

The use of the forepaws was very pronounced. The bears seldom were in contact with the objects unless they were using their forepaws to grasp, hold down, or turn the objects. Both animals were adept at lifting and turning over the objects. The animals could partially grasp the objects by bending the claws of the front foot downward, almost touching the front pad of the foot. Lifting and turning over an object was accomplished by grasping the farther side of the object and pulling upward and back toward the body. Although the pads of the front paws of the bears could be turned so that they were perpendicular to the ground, flipping of objects by a rotation of the foreleg was not observed. Also, the bears never lifted an object with the pads of the front foot turned upward. All lifting was a raking motion with the claws turned downward and back. The bears were observed using one forepaw to lift the chains, dowels, and tubing from the ground. The chain was grasped between the claws and the foot pad, as described. The dowels and tubing were lifted in the same manner as the chain or by pushing the object between the toes and lifting the forepaw upward.

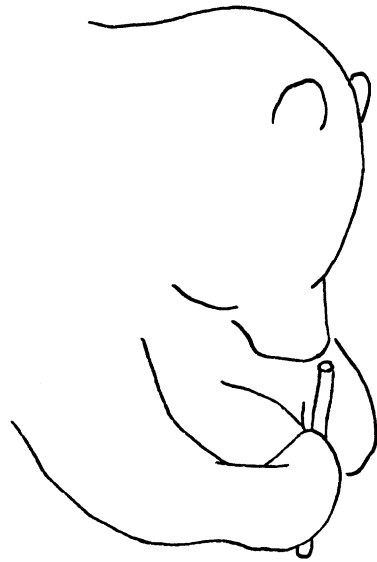
The objects were often held between the forepaws for chewing. The blocks, dowels, and hoses were held in 1 of 4 positions, illustrated in Fig. 1.

Exploration of the blocks, dowels, and hoses generally occurred with the bears lying on their stomachs. Exploration of the chain included playing with it, which was often the case with other objects. During play, the bears would assume a variety of body positions. Both bears would sit upright, with legs forward, and pull the objects to their stomachs, rolling and wrestling with them.

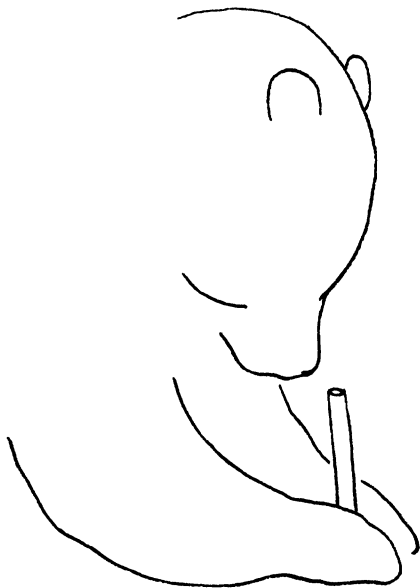
Clawing at the objects was observed but did not occur frequently. The blocks and tubing were pawed



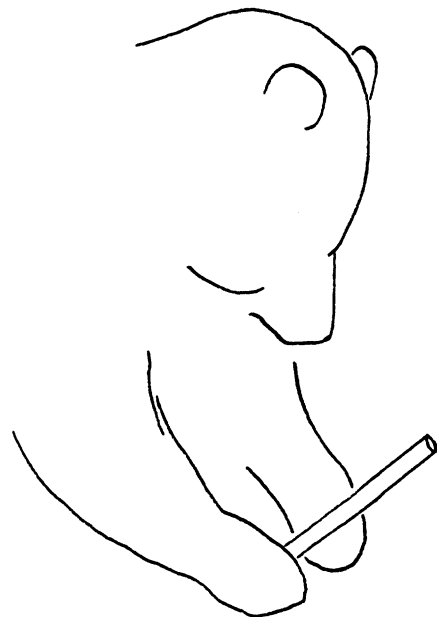
FLAT ON GROUND



ONE PAW AGAINST THE OTHER



BETWEEN PAWS



DOWNWARD PRESSURE WITH ONE PAW

Fig. 1. Use of the forepaws by black bears to hold objects.

initially but were then turned, held, and chewed. Both bears oriented to the opening at each end of the hoses. They would place a claw in the hole and pull, as if trying to pry something out.

Exploration also invariably involved chewing. The methods of holding illustrated in Fig. 1 were used to secure the objects in order to chew, lick, and smell them. The bears would use a pair of canines or molars to splinter the wood. After it was splintered, the bears would use the incisors to grasp the objects lightly and pull pieces from them. The canines were used to grasp the tubing in attempts to pull portions away. Both bears intermittently smelled the objects between bouts of chewing.

The response to the chains was the most interesting. After initially smelling and chewing a chain, both animals would rake and lift it and let it fall several times. Then the bears would begin to play with the chain.

They would assume a variety of body positions and were very active. The forepaws were used to hold, lift, and swing the chain. One bear would lie on her back and hold the chain above her face with one forepaw. She would then pass the chain from paw to paw, placing 1 or 2 claws in the links and allowing an end of the chain to dangle and brush her face.

Curiosity is one of many behaviors that should be assessed for ideal management of this family of animals. Behavioral data are being recognized as an important management tool, and delineation of predictable behavior is important in evaluation, control, and prevention of bear/human conflicts. The recognition of a high degree of intrinsic curiosity in the black bear may aid managers in conflict situations. The bear is not motivated solely by a search for food in its approach to the human environment. The conscientious removal of food without regard to the bears' innate curiosity may not eliminate potential conflict.

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