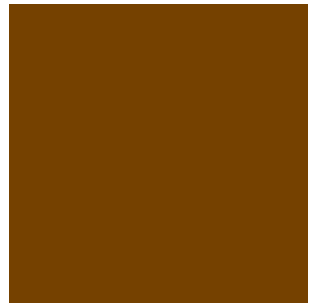
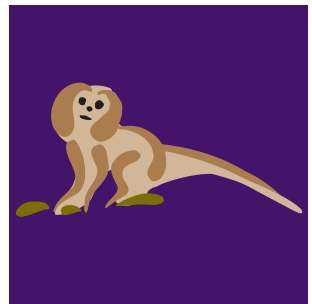
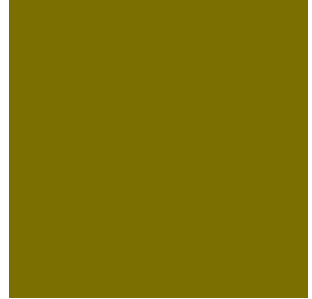


Capuchin Monkeys

Dorothy Fragaszy
Neuroscience and Behavior Program
University of Georgia



enrichment
for nonhuman primates



Introduction

.....

Nonhuman primates maintained in captivity have a valuable role in education and research. They are also occasionally used in entertainment. The scope of these activities can range from large, accredited zoos to small “roadside” exhibits; from national primate research centers to small academic institutions with only a few monkeys; and from movie sets to street performers. Attached to these uses of primates comes an ethical responsibility to provide the animals with an environment that promotes their physical and behavioral health and well-being. Thus, an obligation is entailed that those individuals/institutions caring for captive primates should make every effort to ensure adequate veterinary care and husbandry are provided, that the animals are housed in appropriate facilities, and that as broad a range of species-typical behaviors are able to be expressed by the animals as is possible for the captive environment.

This book serves as an introduction to the basic behavior and environmental enrichment of several species of nonhuman primates that are more commonly used in education, research and entertainment. In many ways, this book is meant to be a “how to” manual; it is not intended to be a broad scientific review of the primate behavior and enrichment literature. The fundamental premise taken throughout each chapter is that for an enrichment program to be effective, there must be a basic understanding of the biology and behavior of the primate species. The species addressed in this series are: baboons, capuchins, chimpanzees, macaques, marmosets and tamarins, and squirrel monkeys. Each species-section can be read as a stand-alone document without need to reference the other sections. This then allows the user to distribute the different sections to personnel caring for the specific animals.

Each section is divided into five parts: 1) Background, comprised of the habitat of the primate, the physical features of the primate, its psychological and/or



social behavior, and its mating and reproductive behavior; 2) Social World; 3) Physical World; 4) Special Cases, describing any age-related considerations and concerns associated with individual housing; and 5) Problem Behaviors. The content of this series has been provided by members of the Association of Primate Veterinarians (APV) and the American Society of Primatologists (ASP) who have special expertise in the species addressed. This book is intended to be a primer because it is, indeed, an introduction to the subject of environmental enrichment for primates housed in a diversity of conditions. A list of references and/or other resources (principally on-line) is provided at the end of each chapter that provide additional guidance. The use of scientific references has been limited, but should the reader desire more information about a specific subject, the links at the end of the sections will provide direction to obtaining additional detailed information. Readers are also directed to the National Research Council publication, the Guide for the Care and Use of Laboratory Animals (1996) and the U.S. Department of Agriculture's (USDA) Animal Welfare Regulations to review the regulatory requirements of the Public Health Service and the USDA for the provision of environmental enrichment.

.....
ii

The APV and ASP wish to thank the Office of Laboratory Animal Welfare, in particular Ms. Carol Wigglesworth and Dr. Axel Wolff; the U.S. Department of Agriculture/Animal Care, in particular Dr. Chester Gipson; and Ms. Dale Feurer, editor, and Ms. Lori Wieder, graphics and layout production, for their assistance with this project. The authors acknowledge the helpful contributions of Dr. David J. Shepherdson, Conservation Program Scientist, Metro Washington Park Zoo; Ms. April D. Truitt, Director, Primate Rescue Center, Inc.; and Ms. Kathleen Conlee, Program Officer, Humane Society of the United States. Special thanks also go to the chapter authors Dr. Christian Abee, Dr. Kate Baker, Dr. Linda Brent, Dr. Thomas Butler, Dr. Jeffrey Fite, Dr. Dorothy Fragazy, Dr. Jeffrey French and Dr. A. Michele Schuler, and to the reviewers from the American Society of Primatologists and the Association of Primate Veterinarians.

—Kathryn Bayne, M.S., Ph.D., D.V.M., DAACLAM, CAAB
Editor, Working Group

This project is dedicated to the memory of Dr. Sylvia Taylor, Veterinary Medical Officer, Animal Care, U.S. Department of Agriculture, who was a proponent of providing enrichment to nonhuman primates and was generous in sharing her knowledge and expertise in this regard.

Capuchin Monkeys

Background

.....

Habitat

Flexibility, opportunism, and adaptability are the hallmarks of capuchin success. These monkeys occupy virtually every type of Neotropical forest, including humid and dry tropical forests, swamp forests, seasonally flooded forests, mangrove forests, and gallery forests, as well as dry, deciduous forests where rainfall is absent for five to six months of the year. They range from sea level forest to cloud forest up to 2700 meters above sea level. Capuchins are mostly seen in the middle layers of the forest, but will use all levels from the canopy to the understory, going to the ground to drink, forage or travel.

Physical Features

Capuchin monkeys weigh from six to 12 pounds and can live for more than 50 years. They are physically different from other New World Monkeys (platyrrhines) in that they have robust jaw and dental structures, large brains in relation to their body size, and moderately prehensile tails. Additionally, their hands have strong grips, a degree of opposition of the thumb to index finger, and somewhat independent finger movements. Taken together, these features afford capuchins a wide range of locomotor and foraging actions.

Behavior

Capuchins are active monkeys, agile at climbing and leaping. They use their hands and mouths to explore objects and surfaces, often destroying them in the process. More than other monkeys, capuchins act on their world through coordinated actions of hands, mouth, feet, and tail. They touch, handle, rub, bite, pull, push and pound objects as they explore them and manage to undo latches, untie ropes, unsnap hooks, and unscrew bolts.

Endowed with unusual tendencies to combine objects and string together sequences of actions with objects, capuchins can, for example, successfully order a set of nesting cups. They can use their bodies in innovative ways, such as holding multiple cups with their hands and feet while working with them.

Capuchin monkeys' memory and visual perception are similar to those of other non-human primates. They travel efficiently through familiar spaces from one location to another and they can use landmarks to locate objects they cannot see. They have good memories for significant events, and they perceive objects, object movements, and surfaces in much the same way as humans do.



Cebus mother and infant (photo by D. Fragaszy).

Capuchins are like other monkeys in that they can recognize an abstract relation among objects (e.g., sorting objects by size). Capuchins also can recognize two relations at the same time and use them in a nested or hierarchical fashion, such as sorting pictures by shape and sorting pictures of a given shape by size.

It is important to note that captive monkeys cannot solve everyday problems that wild monkeys can without extensive practice. Individual experience and immediate context powerfully affect capuchins' problem-solving skills and exploratory activities.

Capuchin monkeys express interest in other animals (including human companions) by looking at them, making facial expressions and vocalizing in specific ways to express different emotions, and touching them. Young monkeys cling

to their companions. Adults occasionally groom their companions when they feel comfortable and relaxed, using hands and tongues to touch the skin or hair. They are also quite playful, especially young monkeys. Capuchins of any age tend to be docile, but can become aggressive, even toward human companions, if frustrated or frightened.

Mating and Reproduction

Capuchins reach sexual maturity at four to five years of age. Females have a menstrual cycle of 19 – 22 days. Gestation lasts from 22 to 23 weeks, followed by 22 weeks without menstruation during nursing if the mother rears the baby, or about seven to eight weeks without menstruation if she loses the baby. Infertility while nursing lasts months longer, even after menstrual cycling resumes.

Female tufted capuchins (*Cebus apella*) display their interest in mating using a rich and varied behavioral repertoire consisting of facial expressions, vocalizations, gestures, and body postures. In general, the female actively follows a target male, which, in most cases, is the dominant male in her group. She directs most if not all of her solicitations toward this target male. Initially (for hours and/or days), the sought-after male does not reciprocate and tends to avoid the female by leaving as soon as she approaches him. Later, the target male starts to respond to the female's solicitations with behaviors similar to hers. At this point, mutual sexual interest becomes evident and mating occurs. Females of other species of capuchins express their interest in mating less overtly. In these species, solicitations of the female by the male may be more obvious than the female's solicitations of the male.

.....
3

Social World

.....

Capuchin monkeys in the wild live in groups throughout their lives. Males, females, and immature animals travel, feed, and sleep near one another every day. If a monkey loses sight of its group, it calls loudly and searches actively to find the group again. In captivity, capuchin monkeys live compatibly in pairs or groups, but they do not live happily alone. Spending any amount of time by themselves, without familiar companions, is a hardship for capuchin monkeys. Capuchins can live compatibly with other species, for example, squirrel monkeys.

It is easiest to place capuchins in groups when they are young (three years old or less). Groups may range from pairs to two dozen or more animals, of mixed ages and sexes. Adults can live together in pairs compatibly, and pairs can be formed when animals are adults. Both male and female same-sex pairs are compatible, as are opposite-sex pairs. However, in the case of male-female pairs, one should make sure that the male does not monopolize food or other resources by virtue of his greater size and strength.

Introducing adults to each other as pairs or one adult into an existing group should be done with careful supervision, because the monkeys may injure one another through fighting. Introducing an adult male to a group with a resident adult male is not advised. Allowing monkeys to get to know one another in a space where one can escape or hide from the other until they are comfortable together makes the introduction process safer. For example, one can place the newly introduced individual in visual contact with the group but in a separate cage for several days. The new individual can be placed closer to the group in a gradual manner. If all individuals behave calmly at this point, the newcomer's cage can be placed next to the group's cage, permitting some physical contact through wire mesh, for example. When the newcomer is not threatened by group members, open a doorway between the two. Permit the newcomer to enter the group voluntarily, and leave the release cage in place for a period of days so that the newcomer can return to it (i.e., escape from the group) if need be. There is no certain way to prevent fighting between members of a group and a newcomer, so all introductions must be carefully monitored.

Physical World

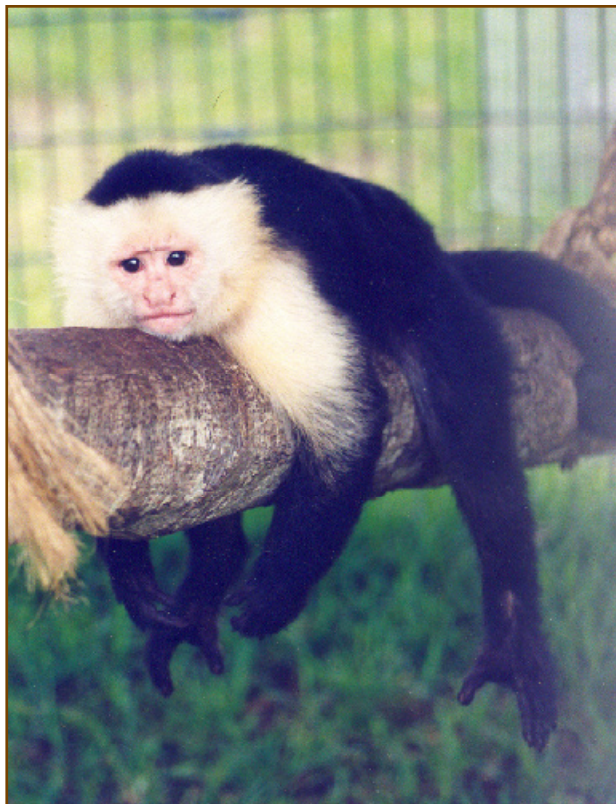
Capuchin monkeys in the wild spend most of their time in trees. They spend about half of their waking hours foraging, eating a wide variety of plant and animal foods. In captivity, providing opportunities to travel and rest above the ground promotes healthful exercise and hygiene. Providing perches at two or more heights allows capuchins to move around in a way that is natural for them. In general, the vertical dimension appears more important to these monkeys' use of space than the horizontal dimension.

Capuchin monkeys benefit from additional opportunities for manual activities similar to those used in foraging, including manipulative puzzles and objects to

handle and tear apart. Supplying a variety of objects, such as soft plastic items or cardboard, on a regular basis promotes healthful manual activity. Provision of these items must be monitored to ensure that gastrointestinal obstruction does not result. Providing a variety of foods, including different kinds of fruits and dairy products in addition to a commercial pelleted chow, is another element of good physical care. Fruits, seeds, nuts and eggs can be provided whole or minimally

processed; cracking, peeling, separating, and otherwise processing food is healthful activity for capuchins, so long as they have the teeth and fingers to achieve this. Foods, such as peanut butter and honey, can be hidden in sections of a PVC pipe or a box with holes, and the monkeys will use straw or sticks to retrieve it. Monkeys new to these tasks may take some time to figure out how to solve these problems. Caregivers can provide “hints,” such as placing the stick into the tube, to help them learn. It should be noted, however, that food treats should not be fed in such quantities to discourage the animals from eating their nutritionally balanced diet.

As suggested by the wide variety of habitats in which they live, capuchin monkeys are fairly hardy with respect to temperature and humidity, although they cannot cope with freezing temperatures. Monkeys that are accustomed to a narrow range of temperatures and humidity should be introduced gradually to new conditions to give them time to acclimate. It should not be assumed that animals will spontaneously seek out heated indoor spaces when the outdoor tem-



*White-fronted capuchin (Cebus albifrons) resting on a log
(photo by D. Fragaszy).*



Capuchin retrieving food items from a pool (photo by D. Fragaszy).

.....
6

perature falls, especially if they have just arrived in new housing. Particularly if the ambient temperature falls below 68 degrees Fahrenheit, perches and shelves should be constructed of materials that do not conduct heat quickly. Polyvinyl chloride (PVC) and wood, for example, do not conduct heat as quickly as metal.

If outdoor temperatures drop below 45 degrees Fahrenheit, capuchins need access to a heated indoor enclosure. Optimum temperature ranges vary among the different species, but range from approximately 65-85 degrees Fahrenheit. Infants and young juveniles need a heated space at even warmer temperatures. Cold monkeys sit in a huddled position with the tail wrapped around the body and move less frequently than normal. If there is snow on the ground, monkeys may walk in it voluntarily; this can quickly lead to frostbitten fingers and tails, which require amputation.

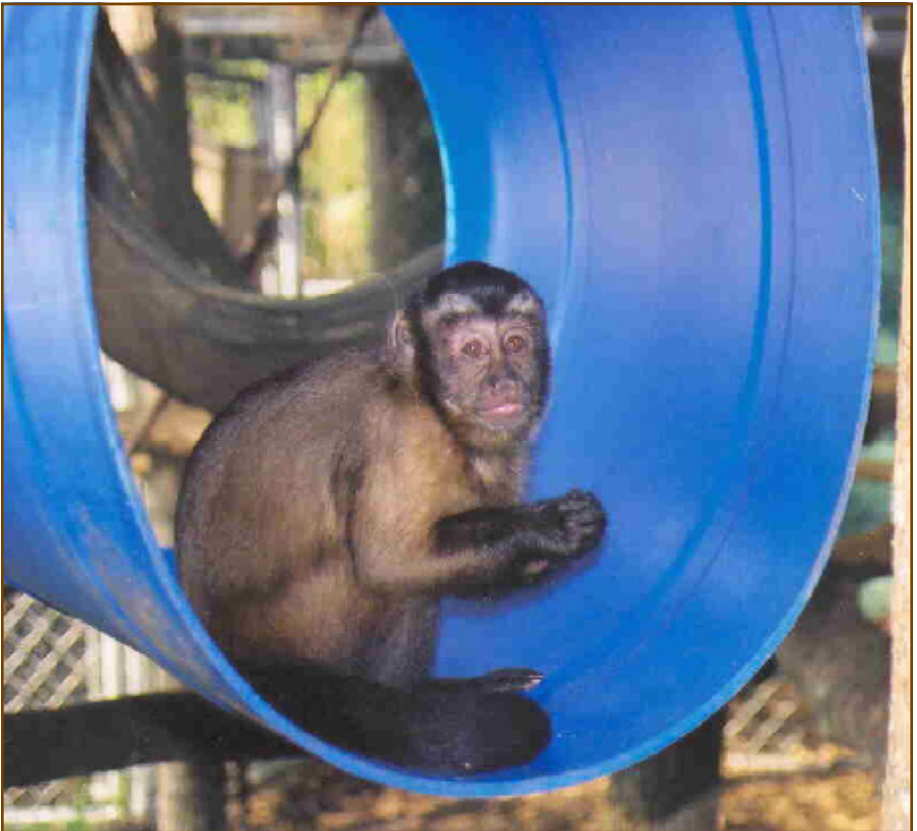
Capuchins should have enough space to move in a normal manner by walking, climbing, and jumping, and places to sit that permit the tail to hang below the perch without touching the floor. They prefer to spend most of their time well above the floor and flee upward if frightened. However, they will spend much time manipulating a loose floor covering, such as straw or wood shavings. Such bedding materials provide an attractive focus for activity for captive monkeys and enrich the environment in a positive way.

Capuchins housed in social groups, particularly if the groups are large (i.e., 10 or more monkeys), should have enclosures with at least two separate compartments, separated by a wall and with one or more connecting doorways or tunnels. This arrangement reduces injuries by permitting animals to avoid one another, and it makes separating animals simpler for the keeper and less stressful for the monkeys. Capuchins in exhibits such as zoos should have an area available to them that is away from the visitors' view, to allow for occasional privacy.

Special Cases

.....

There are no particular considerations for older monkeys so long as they are in good health. Infants, on the other hand, require more frequent feeding, a more easily chewed and digested diet, and an object to which they can cling, such as a paint roller attached to a base so that it is stable and can be removed for wash-



.....
7

Capuchin sitting in a barrel placed off the ground (photo by D. Fragaszy).

ing. Even more than adults, infants need constant social companionship.

Housing animals individually should be avoided. Extra provisions for manipulative activity should be provided for monkeys that are temporarily housed individually for medical or research reasons, but solitary activities do not substitute for social companionship.



Social group in semi-naturalistic environment (photo by K. Bayne).

Problem Behaviors

.....
8

Noticeable changes in posture, movement, and activity level are indicators that a monkey may be ill. Capuchin monkeys can develop stereotypical movement patterns, such as pacing, and they may perform these more persistently when stressed. When captive monkeys persistently make vocalizations known as “chucks” that are used in the wild when predators appear, this means that they are frightened. Monkeys normally give chucks when strangers or people associated with capture, such as veterinarians, appear. Altering care routines or housing arrangements may reduce fear; social companions and alternative activities can help capuchin monkeys return to a calmer condition.

Capuchin monkeys engage in a highly distinctive, self-care behavior, known as anointing, in which they rub pungent and sometimes topically irritating plant or animal materials on their fur. Captive monkeys may do this with oranges, for example. They also rub their bodies with urine, a behavior called urine washing. Although these behaviors may appear aberrant, they are, in fact, normal.

Safety Issues

.....

Capuchins do not readily accept physical restraint, such as being held in a gloved hand. They will bite if frightened, as during restraint or imminent capture, and they have a strong bite. It is best to use a sturdy box with a latching sliding door to transport animals or to train them to participate voluntarily (e.g., using a leash and collar). Capuchins can be readily trained using positive reinforcement to perform behaviors required for many routine care procedures, such as moving from one place to another. Chemical or physical restraint should be a last resort only.

As with all monkeys, handlers should be careful about latching cages securely. Capuchins are particularly interested in opening latches; mere springs or harness snaps, for example, will not hold them for long. A padlock is more secure.

Capuchin monkeys are hardy when kept in healthful conditions. They are, however, highly susceptible to the common human cold and other respiratory illnesses. People suffering from these illnesses should not go near the monkeys. Like other monkeys, capuchins also are highly susceptible to measles, chicken pox, and other viral diseases common in humans. Capuchins (primarily *Cebus apella*) may be particularly susceptible to Type II diabetes if fed improperly and not allowed sufficient physical activity.

.....
9

Resources

.....

Bayne K, Dexter S, Suomi S. 1991. Ameliorating behavioral pathology in *Cebus apella* monkeys with social housing. *Laboratory Primate Newsletter*. 30(2):9-12.

Cooper MA, Thompson RK, Bernstein IS, et al. 1997. The integration of stranger males into a group of tufted capuchin monkeys (*Cebus apella*). *American Journal of Primatology* 42:10 (Abstract).

Fragaszy D, Visalberghi E, Fedigan L. 2004. *The Complete Capuchin: The Biology of the Genus Cebus*. New York: Cambridge University Press.

Hayes SL. 1990. Increasing foraging opportunities for a group of captive capuchin monkeys (*Cebus capucinus*). *Laboratory Animal Science* 40:515-519.

Ludes E, Anderson JR. 1996. Comparison of the behaviour of captive white-faced capuchin monkeys (*Cebus capucinus*) in the presence of four kinds of deep litter. *Applied Animal Behaviour Science* 49:293-303.

National Research Council. 1998. *The Psychological Well-Being of Nonhuman Primates*. Washington, DC: National Academy Press.

Nowak R. 1999. *Walker's Primates of the World*. Baltimore, MD: The Johns Hopkins University Press.

Riviello MC. 1995. The use of a feeding board as an environmental enrichment device for tufted capuchin monkeys (*Cebus apella*). *Primate Report* 42:23-24 (Abstract).

Visalberghi E, Anderson JR. 1999. Capuchin Monkeys. In: *The UFAW Handbook on the Care and Management of Laboratory Animals, Seventh Edition*. UFAW [Universities Federation for Animal Welfare] (edited by T Poole and P English), 601-610. Blackwell Science, Oxford, UK.

Westergaard GC, Fragaszy DM. 1985. Effects of manipulatable objects on the activity of captive capuchin monkeys (*Cebus apella*). *Zoo Biology* 4:317-327.

Common Names of Capuchins

.....
10

Cebus albifrons ssp: White-fronted capuchin, Brown-faced capuchin, Ecuadorian capuchin, Shock-headed capuchin, Trinidad white-fronted capuchin, Varied capuchin, Andean white-fronted capuchin

C. apella ssp: Black-capped capuchin, Guianan brown capuchin, Brown capuchin, Tufted capuchin, Hooded capuchin, Large-headed capuchin, Margarita Island capuchin, Peruvian tufted capuchin

C. capucinus ssp: White-throated capuchin, White-faced capuchin, Panamanian white-throated capuchin, Gorgona white-fronted capuchin

Cebus libidinosus ssp: Bearded capuchin, Tambopata tufted capuchin, Pale capuchin, Paraguayan tufted capuchin

C. kaapori: Ka'apor capuchin

C. nigrivittatus ssp: Weeper capuchin, Weeping capuchin, Black-horned capuchin, Crested capuchin

C. olivaceus ssp: Brown weeper capuchin, Chestnut capuchin, Ka'apor capuchin, Kakapo capuchin, Wedge-capped capuchin, Weeper capuchin, Weeping capuchin

C. xanthosternos: Yellow-breasted capuchin

enrichment for nonhuman primates

This series of booklets on enrichment for nonhuman primates was made possible through the cooperation of:

- ~ Department of Health and Human Services
- ~ NIH, Office of Laboratory Animal Welfare (OLAW)
- ~ US Department of Agriculture, Animal Care
- ~ Association of Primate Veterinarians
- ~ American Society of Primatologists

For more information, contact OLAW at NIH
tel: (301) 496-7163, e-mail olaw@od.nih.gov
NIH Publication No. 05-5746

Department of Health and Human Services, 2005