



# Designing enrichment strategies when considering primate behavior

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In 1991, federal legislation mandated researchers to “provide a physical environment adequate to promote the psychological well-being of primates”<sup>1</sup>. Since then, significant advancements have been made in the housing conditions of primates used in research. Environmental enrichment has become an integral part of the animal care program and research protocol when using primates. Despite the difficulty in defining ‘psychological well-being’, a broad definition includes behavior, stress and the ability to adapt to changing conditions<sup>2</sup>. The greatest challenge in developing an effective program is to offer meaningful enrichment that minimizes boredom and reduces abnormal behaviors. Recognized primate behaviorist Victor Reinhardt grouped enrichment into several categories that address the behavioral needs of primates: animate, feeding, structural, positive reinforcement, inanimate and human<sup>3</sup>.

## Animate enrichment

Animate enrichment allows animals to actively express their need for social contact and social interaction with at least one conspecific<sup>3</sup>. Primates value social companionship as much as they value food; it is a necessity<sup>4</sup>. They maintain constant vocal, visual or physical contact with conspecifics. Providing opportunities for social interaction seems to be more critical to psychological well-being than providing nonsocial enrichments<sup>5-7</sup>. Pair or group housing is labor-intensive and worrisome because of potential injury, but once pairs or groups are established, this type of housing offers the most rewarding opportunity for primates to express a variety of natural behavioral repertoires. Although there is always a risk of incompatibilities developing, the potential benefits are thought to outweigh concerns.

## Feeding enrichment

Feeding enrichment encourages animals to spend time searching for, retrieving and processing food<sup>8</sup>. Primates spend a major portion of their day gathering and working for food. Foraging activity takes up to more than 60% of a primate’s awake time, depending on the availability of food in the environment<sup>3</sup>. Furthermore, primates would rather work for food than have it readily available such as in a standard feeder<sup>8</sup>. Foraging opportunities that promote seeking or working for food or treats, such as using PRIMA-Treats™ (Fig. 1) in a Fickle Finger Board™ or spreading peanut butter or honey topped with Meal Worms or Fleece Crumbles™ onto a Fleece Foraging Board™, are very effective. In addition, foraging products such as Fruity Gems, Turf Crumbles™, Fruit Crunchies™, Veggie Bites or Sunflower Seeds can be hidden in a Turf Foraging Board™ to provide beneficial feeding



**FIGURE 1** | PRIMA-Treats™ are nutritionally complete treats that complement an enrichment program. They can be used with enrichment devices such as our Finger Board™ for increased foraging activity.

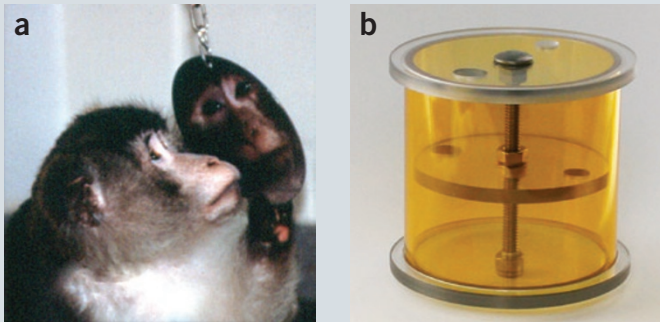
enrichment. More unsophisticated yet effective methods of providing foraging opportunities include placing foraging products into bedding or providing unpeeled, uncut or frozen fruits and vegetables; these options let the primates ‘do the work’ of finding food.

## Structural enrichment

Structural enrichment can be used to open up the vertical dimension of standard cages for animals<sup>3</sup>. Opening up the horizontal space is not as important. Conversely, vertical movement is vital to primates, as they may flee upwards when they perceive a threat. They show a distinct vertical flight response during alarming situations and retreat to high places during the night. Placement of a perch in the cage can allow animals to observe activity in the room, retreat when they are frightened and stay dry during cage cleaning. The perch should be placed so as to allow the primate to make normal postural movements without the tail touching the floor of the cage<sup>3</sup>.

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ADVERTISING FEATURE



**FIGURE 2** | (a) Monkey Shine Mirror™ allows primates to control their social interaction with others. (b) Shake•A•Treat Jr.™ is a cleverly designed treat dispenser that can be used with a variety of small foraging treats with diameters up to 0.5 in.

**Positive reinforcement enrichment**

Positive reinforcement can be used to promote cooperation rather than resistance from animals during study procedures<sup>3</sup>. Positive reinforcement enrichment is a win-win situation for both the primates and the technicians. When primates are rewarded with an appetizing treat after undergoing a procedure, they quickly become positively conditioned. Stress is reduced and safety is enhanced when primates cooperate during research-related procedures. Stress can also be avoided by providing medications in forms that animals accept willingly. Drugs can be hidden in a tasty substrate such as Monkey Dough™ or incorporated into highly palatable, fruit-flavored tablets such as Medicated Dosing Systems (MD's)™.

**Inanimate enrichment**

The goal of inanimate enrichment is to provide animals with items that distract them from boredom<sup>3</sup>. Using enrichment devices that promote natural exploratory, manipulative play and grooming activity is extremely beneficial. To satisfy this important need, Bio-Serv offers an extensive line of toys and creative devices that vary in type of material, texture, shape, size, color and functionality to add variety to enrichment programs. Products such as Kongs, Foraging Boards, Busy Buddy Footballs, Flexi Keys, Monster Chews, Bimple Bones, Jingle Balls™ and Wood Splits help keep primates engaged and attentive. The most important consideration when offering these enrichment products is the animal's safety. Evaluating how each primate uses a toy is important to assess its safety. Because the attention span of primates is similar to that of human babies, it is important to rotate play objects with different shapes, dimensions, mechanics, textures, colors and brightness<sup>9,10</sup>. Like humans, primates have different levels of intelligence; the complexity of the devices should be matched to the primates' intelligence levels.

**Human enrichment**

Creating safe interactive opportunities between humans and animals helps to acclimatize primates to the human species<sup>3</sup>. A positive bond with the caregiver may give an animal a sense of assurance from which coping strategies can be developed<sup>11</sup>.

Offering treats, speaking softly and working in a non-threatening manner can foster a positive relationship and engage the trust of the animal. Safe interaction between the caregiver and a primate using toy devices such as a Nylabone Tug Toy to play a game of "tug of war" is an excellent means of upbeat interaction. A positive human-animal bond can be a critical buffer in stressful or novel situations and can create a safer working environment<sup>12</sup>.

When considering an environmental enrichment program, the most important factor for decreasing stress is allowing a primate to have some level of control over its environment. Decreases in abnormal behaviors are observed when primates are allowed to control when and how often they want to interact with a toy or to choose which flavor, texture or type of treat to forage for<sup>3</sup>. Primates may use a Monkey Shine Mirror™ (Fig. 2a) to look at themselves, cagemates or caregivers coming down the hall, a great example of the animals having control over a device. Placing a variety of foraging treats into a puzzle feeder such as a Shake•A•Treat Jr.™ (Fig. 2b) allows the primate to choose which treat to work out of the device. Building in clever methods of providing primates control over their environment can enhance the ultimate goal of stress reduction in the laboratory environment.

**Company profile**

For more information on the products or techniques mentioned, please visit our website at <http://www.bio-serv.com/> or call our customer service representatives at 800-996-9908.

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