

SPECIES TYPICAL USE OF OBJECTS IN CAPTIVE CHIMPANZEES

by Mary Lee A. Jensvold,
Deborah H. Fouts,
Roger S. Fouts

Species typical behaviors in captive non-human primates are the variety of behaviors that free-living individuals exhibit. Caregivers use the display of species typical behaviors as one measure of well-being in chimpanzees (Bloomsmith, 1992; Line, 1987). U.S. Department of Agriculture regulations on the care of captive non-human primates mandate that "...the primary enclosures must be enriched by providing means of expressing noninjurious species-typical activities." (1998, p. 76). The regulations also mandate that "...research facilities must develop, document, and follow an appropriate plan for environment enhancement adequate to promote the psychological well-being of nonhuman primates. The plan must be in accordance with the currently accepted professional journals or reference guides..." (p. 75). These regulations require caregivers to provide opportunities for captive non-human primates to express species typical behaviors, yet they do not specifically state how to create these opportunities nor do they offer many suggestions. It is up to the caregiver to research this information in journals and manuals, yet some of the information may not be available. Research in what structures, diet, and objects promote species typical behaviors is greatly needed. This report provides preliminary data on a group of captive chimpanzees' use of objects and manifestation of the group's species typical behaviors.

METHOD

The participants were five adult chimpanzees: Washoe, Moja, Tatu, Dar, and Loulis. All, except for Loulis, were cross-fostered like human children. In this environment they acquired the signs of American Sign Language (ASL) (Gardner & Gardner, 1989). Loulis was adopted by Washoe when he was 10 months old. He acquired the signs of ASL from Washoe and other signing chimpanzees (Fouts, Fouts, & Van Cantfort, 1989). Throughout the chimpanzees' lives caregivers daily have provided them with interesting objects such as toys, puzzles, masks, dress-up clothing, jewelry, glasses, magazines, books, crayons, paper,

paints, boxes, stickers, unbreakable plastic mirrors, cloth sacks, whistles, cardboard, and so on (Fouts, Abshire, Bodamer, & Fouts, 1989).

The chimpanzees reside in a 7,000 sq. foot indoor/outdoor enclosure at the Chimpanzee & Human Communication Institute (CHCI) on the campus of Central Washington University. On weekdays they had access to their daytime enclosures, two large exercise rooms and a large outdoor area, from 9 a.m. until noon and 1 p.m. until 3:30 p.m. They also had access to a suite of nighttime enclosures from 3:30 p.m. until 9 a.m. and again from noon to 1 p.m. On weekends they had access to the daytime areas for half of the day and access to the nighttime enclosure the remainder of the time. They received three meals a day in the nighttime enclosures. Several times a week caregivers provided a forage in the daytime enclosures and the chimpanzees always had access to water in the daytime enclosure.

Data collection occurred over a two day cycle. Observers prepared 50 items and randomly assigned them to the New or Recycled category. Recycled Objects were in the daytime enclosure for two consecutive days. New Objects were in the daytime enclosure for one day. On Day 1 observers placed the 50 objects in the chimpanzee daytime enclosures before the chimpanzees entered.

Each of the 50 objects belonged to one of five object categories. The object categories were: containers such as cups, bags, plastic boxes; grooming objects such as brushes, combs, toothbrushes, and mirrors; tubing such as straws and garden hoses; toys such as plastic shovels, masks, puppets, and stuffed animals; and dress-up objects such as clothing, blankets, shoes, hats, pillows, and make up. There were 10 objects that represented each of the five categories. Thus there were 10 containers, 10 grooming objects, 10 tubing objects, 10 toys, and 10 dress-up objects.

In addition, there were three other categories of destructible objects that were not counted toward the total 50 objects and they were replaced daily. They may or may not have been presented during data collection times. These categories were: paper such as magazines, cardboard, and newspaper; foliage such as branches, leaves, and sticks; and food/drink.

Fifteen groups of Earthwatch volunteers collected the data from November 1998 to September 2000. Data was collected from 9 a.m. to noon and again from 1 p.m. to 3 p.m. Data collectors stood or sat in the observation area where they could see all of the daytime enclosures. Data collectors observed a focal chimpanzee for 15 minutes and wrote their observation every 15 seconds. When the chimpanzee was not contacting an object, this was recorded. When the chimpanzee was contacting an object, data collectors recorded the category that the object belonged to and how the chimpanzee was contacting the object. The object categories were described previously. There were 14 behavioral categories that described the way the chimpanzee was using the object. These categories are listed in Table 1.

RESULTS

There were a total of 150,000 observations made over 625 hours. Figure 1 shows the frequency of the Object Use categories when the chimpanzees were using a single object. The most popular objects were dress ups at 30 percent and paper at 21 percent. Food was the lowest at 0.3 percent. On data collection days we did not offer forages. Thus the only food the chimpanzees had was what they brought in themselves and water which was always available.

The chimpanzees used more than one object at a time (Multiple) 22 percent of the time that they used objects. The range was 36 percent for Tatu to 7 percent for Loulis. Figure 2 shows the frequency of the Object Use Categories when the chimpanzees were using multiple objects. When the chimpanzees used more than one object, dress ups were used 43 percent of the time and paper was used 20 percent of the time. Dress up use increased 13 percent in multiple use from single use.

Figure 3 shows how the chimpanzees used the objects in the Dress Up category when using single or multiple objects. Passive contact was the most frequent, which included behaviors such as touching or lying on an object. Wearing was the second most frequent category.

Figure 4 shows how the chimpanzees used the objects in the Paper category when using single or multiple objects. Passive contact was the most frequent category. Manipulate with Hand was the second most frequent category.

DISCUSSION

Free-living chimpanzees build nests every night and sometimes during the day. A chimpanzee spends over half of his or her life in a nest (Fruth & Hohmann, 1994). "Each arboreal construction is a skilful inter-weaving of leafy, springy branches, large and small, with a central mattress of twigs and leaflets sometimes detached and added for lining. Terrestrial nests are similarly made, but usually of herbaceous vegetation." (McGrew, 1992, p. 210). While chimpanzees spend the bulk of their time sleeping in their nest, McGrew points out that they also copulate, eat, groom, and convalesce in them (p. 210).

We often observed the chimpanzees at CHCI arranging clothing, blankets, and paper in a circle and then resting on the arrangement much like nesting behavior in free-living chimpanzees. The data in this report shows that the chimpanzees often used objects in the Dress Up category, which includes clothing and blankets, in Passive Contact, which includes lying or sitting on an object. At CHCI we have often observed paper such as magazines or cardboard being incorporated in a nest arrangement. The data in this report shows that the chimpanzees often used Paper objects in Passive Contact which supports this observation. Paper, clothing, and blankets are malleable objects like branches and vegetation and are readily arranged into a soft nest. Captive environments are usually covered with concrete, fencing, dirt, and other hard materials. Providing captive chimpanzees with clothing, blankets, and paper provides an

alternative to rest on and allows for the species typical behavior of nesting. Other materials such as straw or willow-type branches could be used as well.

Washoe, Moja, Tatu, and Dar were raised like human children until each was approximately 5 years old and in their daily life they wore clothes (Gardner & Gardner, 1989). Today we observe the chimpanzees putting on and wearing clothes, hats, glasses, necklaces, and shoes. The data in this report showed that Wearing was the second most popular activity with Dress Up objects. We often observe Moja wearing shirts and sweaters on cool mornings. Future research will examine individual differences in the use of objects. Dress Up objects are important objects. They were the most popular category of objects at CHCI, and this finding is supported by Gaspar (1993) who found that clothes were popular items with a group of captive chimpanzees.

Frequently we provide the chimpanzees with picture-filled catalogues. The chimpanzees often hold the catalogues and look at the pictures. They often sign to themselves or others about the pictures. The data in this report reflect the popularity of catalogues, as Paper was the second highest category. The frequent use of this destructible object supports the findings of Shefferly, Fritz, and Howell (1993) and Brent and Stone (1998) that showed destructible objects were more popular than indestructible ones. Future research at CHCI will explore how the chimpanzees use various types of paper objects such as magazines, plain paper, and shredded paper.

Free-living chimpanzees are immersed in a forest of objects. Chimpanzees are prolific tool makers and tool users (Whiten, et al, 1999). Free living chimpanzees make probes with branches and stalks, crack nuts with stones, soak liquid and remove dirt with leaves, and sit on large leaves. Providing captive chimpanzees with many objects provides opportunities to manipulate objects and makes for a more stimulating diverse environment. Figures 1 and 2 show that the chimpanzees used all of the categories of objects. They used objects 36 percent of the time that they were observed and 22 percent of that time they used multiple objects at a single time. Brent and Stone (1998) provided individually housed chimpanzees with one object or eight objects. An object was left in the enclosure until it was destroyed or had not been contacted for two days. The lifespan of objects averaged 3.2 days. The chimpanzees contacted an individual object more when it was presented alone than when it was in the group since in the group condition contact was divided among the many toys. Yet the combined level of use was higher in the group condition. Providing chimpanzees with a group of objects increased the species typical behavior of manipulating objects.

Our findings indicate the importance of providing chimpanzees with a multitude of dynamic objects which provide opportunities to manifest species typical behaviors. These should include but not be limited to destructible objects such as paper and foliage, sturdy objects such as toys and containers, and soft objects such as clothing and blankets.

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TABLE 1.

Carry or Drag	This category includes objects which are carried or dragged during locomotion. The item can be held in the chimpanzee's hands, feet, mouth, pelvic pocket, or neck pocket.
Eat or Drink	The chimpanzee is actively consuming food or water.
Flail or Shake	During flailing, a chimpanzee holds an object firmly in one hand. He/she repeatedly raises his/her hand and slaps the object down on the ground (this movement could also be side to side). During shaking the object is shaken vigorously up and down or side to side.
Manipulate with Foot	The object is manipulated or held by the chimpanzee's foot. If a chimpanzee is using both his/her hands and feet to manipulate an object, code only as Manipulate with Hand.
Manipulate with Hand	The object is manipulated or held by the chimpanzee's hand.
Manipulate with Mouth	An object is manipulated or held in the chimpanzee's mouth. This includes licking and biting. These objects are not ingested. If a chimpanzee is using both his/her hands and mouth to manipulate an object, code only as Manipulate with Hand.
Passive Contact	This includes lying on, standing on, sitting on, walking on, jumping on, or touching an object with any part of their body. Receiving the action of an object such as a human brushing a chimpanzee or applying makeup to a chimpanzee is Passive Contact.
Rub or Rake	A chimpanzee pushes an object against another object, structure, or person.
Throw or Drop	A chimpanzee throws or drops an object.
Wearing or Covered	The chimpanzee wears the object. The objects are not held in place by the chimpanzee's hands, feet, or mouth. This category also includes being covered with an object.
Multiple Use	The chimpanzee is using more than one object.
Bad Observation	Chimpanzee is not visible and/or object use cannot be determined.
No Object Use	Chimpanzee is not contacting an enrichment object.
Other	Object use which does not lend itself to the uses described above.