Baboons at Wildcliff: Habitats and Behavior

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This report provides an overview of baboon habitats, communication, foraging and subtrooping, with special reference to the baboon troops on Wildcliff Nature reserve, South Africa

Habitats

Chacma baboons dominate the niche for monkeys living and foraging equally well on the ground and in trees (Estes, 1999). The range of the chacma baboon includes all habitats occupied by any species of the genus Papio, from very arid, highly seasonal environments to less seasonal, heavily forested areas (Anderson, 1981). Some troops have adapted to high-altitude habitats which have very cold winters. Baboons at Wildcliff occupy a wide variety of habitats. They have been seen foraging and moving through forests (pine, black wattle, and afromontane), meadows, fynbos, agricultural, and rocky mountain areas.

Baboons prefer to sleep on steep cliff faces and caves, but will also sleep in tall trees in contiguous forest or open woodland trees if necessary (Hamilton, 1982). Sleeping sites are probably chosen to ensure maximal predator avoidance. For this reason, Hamilton suggests that the spacing of adequate sleeping sites relative to the density of food is likely a factor contributing to group sizes in primates. We surmise that some of the Wildcliff baboons sleep in the cliffs and crevices near Ena's falls.

Communication

Sight and sound are the most important means of communication for baboons (Cheyney and Seyfarth,2007). Loss of the vomernasal organ means that a male baboon cannot test a female's urine to tell reproductive status, which attests to the downgrade in the importance of chemical signals in baboon communication. Color vision and 3-dimensional sight, along with vocal signals have replaced chemical communication. However, odor still plays a role in the social and reproductive lives of New World monkeys. For example, many social interactions involve contact and sniffing of genitals and other odor producing areas.

It was first proposed by Darwin that the production of sounds by animals originated as the involuntary consequence of other bodily movements, and that over evolutionary time the production of some sounds has become associated with specific emotions and has come to serve a communicative function (Cheyney and Seyfarth, 2007). There was some dispute over the question of whether or not animal calls are reflexively linked to emotions, meaning that they are automatic and insuppressible. It is now believed that there is no gap between the mental mechanisms that control call production and those that underlie comprehension.

Although there are no direct experiments in the field, evidence suggests that monkeys can choose when to call and when to say silent (Cheyney and Seyfarth, 2007). An experiment by Seyfarth and Cheyney used methods outlined by Peter Marler's jungle fowl experiment and showed that vervet monkeys give alarm calls at high rates whenever they are in the presence of a member of their own offspring, but almost no call when they were with an unrelated juvenile. Furthermore, laboratory experiments have demonstrated that vocalizations can be brought under voluntary control. It seems, therefore, that there is no obligatory link with the sign of a predator and elicitation of a call. The monkeys make the decision whether or not to vocalize, which depends on a complex combination of their own motivation, the situation, and their audience.

In contrast to humans, monkeys and apes rarely modify their vocal repertoire by adding new sounds (Cheyney and Seyfarth, 2007). Consequently, there are only slight variations in call loudness and subtle differences in vocalizations between the baboons in Kenya and the baboons in South Africa.

Baboon vocalizations acquire their meaning because each call is individually distinctive and each call type is predictably associated with a specific social context (Cheyney and Seyfarth, 2007). Some animal vocalizations are elicited by a broad array of stimuli, while others are much more specific. Listed below are descriptions of the vocalizations commonly heard in baboon troops, compiled from information from Cheyney and Seyfarth (2007) and Estes (1999). For a more thorough description of the communication behaviors seen in baboons at Wildcliff, please see the baboon observation log at wildcliff.org.

・Grunts

Grunts are the most commonly heard vocalization. They are individually distinctive and are given in a variety of nonaggressive circumstances. All grunts sound similar to the inexperienced listener but there are actually two acoustically graded types.

-Movement grunts are nasal grunts given in the context of group movement, usually in woods or tall grass where visibility is reduced, or as movement begins. A female stands up, looks at a few other individuals, and gives one or two grunts. Other individuals may grunt in return, which attracts the attention of additional troop members. The grunts contain information about the directions in which the individuals eliciting the vocalization are moving. Movement grunts occur at higher rates when movement is potentially dangerous or visibility is poor. Voices also change in pitch and rate with age.

・Alarm Calls

Alarm barks are given to alert the troop of a predator and the degree of danger. The primary stimulus that determines which alarm call is given is the type of predator seen. Baboons have a different alarm call for each predator, and different calls elicit different behavioral responses. For example, if a leopard call is heard the baboons will climb a tree, but if an eagle call is heard they scan the sky. When males give an alarm bark they produce loud wahoos similar to those given during competitive challenges with other males. Female alarm barks are just distinctive barks that are acoustically similar to contact barks that they give when they are lost or separated from the troop.

・ Alert Calls

Alert calls are common and are given to warn the troop of large non-predatory animals, falling trees, social disturbances, etc. Unlike alarm calls, alert calls cause the troop to look in the direction of the call for more specific information.

・Aggression

Baboons emit a 2-phase grunt in response to rivals in the same or another troop, and to predators. The short, deep grunts increase in tempo and turn into barks and roars with rising excitement. Males are more likely to bark or roar than grunt. When there is a dispute involving females and immature, a lowpitched, rhythmic, noisy calls signal the onset of the aggressive interactions. These calls make a bridge between aggression and flight calls. Flight calls are shrill vocalizations combined with low-pitched aggressive calls, and they are used on a graded series from pure aggression to pure fear. The balance between the types reveals the emotion of the individual.

· Submission/Fear

High-frequency whistles, squeals, screeches, and screams of intense excitement can often be heard in baboon troops. These vocalizations are similar in practically all species of monkeys and baboons and they function to inhibit aggression and elicit aid of other troop members, especially mothers and adult females. Subordinates address dominant individuals with special calls, and friendly dominants respond with greeting grunts.

Isolation Calls

-Isolation calls are shrill whistles or barks given mainly by infants and juveniles temporarily separated from mother, but also given by other group members when they lose the group.

Foraging

A baboon's diets consist of a variety of plants, including grasses, tubers, bulbs, roots, leaves, bulbs, flowers, fruits, seeds, shoots, twigs, bark, sap, aquatic plants, mushrooms, and lichens (Estes, 1999) . Baboons dig up plants to eat the nutritious corms and rhizomes even when they are dry and low in protein. Invertebrates, such as grasshoppers, spiders, and scorpions, are often eaten as a dietary supplement, and vertebrates such as lizards, frogs, eggs, hares, rodents, and turtles are often eaten opportunistically. Baboons around Wildcliff have become a major predator of livestock. Male baboons occasionally take large prey such as antelope and they rarely share it.

Many species of monkeys and apes occupy a wide variety of habitats and are skilled at remembering the location and phenological factors of food and water. Within primates, there is a correlation between brain size, range size, and diet. Early studies found that species that depend on fruit, which is difficult to locate in both space and time, typically have larger brains and larger ranges than leaf foragers (Cheyney and Seyfarth 1990).

There are conflicting results in studies investigating the effects of environmental factors on foraging behavior. Most evidence points to more foraging in dry months (Dunbar and Dunbar 1974, Barton et al. 1988). In Bronikowski's study group in Amboseli National Park, wild-foraging groups fed less and moved more in years with greater annual rainfall and in those with higher daily minimum temperatures. Feeding, moving, resting, and socializing are interdependent, so when the group travels longer distances or travels more there is less time left for socializing and grooming. In other words, foraging time serves as a limiting factor for socializing and resting time. A report by Dunbar concluded that baboons should use available time for resting rather than social time when their foraging needs increase. Bronikowski and Altman found that when the troops they were observing spent more time foraging they spent less time moving resting, but socializing remained invariant. There is an argument explaining these findings that was proposed by Saunders (1988) which states that animals should respond to greater nutritional constraints by focusing their grooming time on a smaller number of key partners.

Another interesting finding by Bronikowski and Altman was the trend in feeding and resting behavior before and after shifts in home ranges. Home range shifts are one of a number of possible behavioral responses to environmental variability that animals use in addition to changes in activity budgets. In the years before shifting home ranges there were trends of decreased resting time, and the same was true afterwards. There is potential for a home range shift at Wildcliff since the black wattle eradication efforts will remove the majority of the forested area on the reserve, removing sheltered areas that they seem to prefer on rainy days or for protection from predators (pers. Observation).

In a study conducted at De Hoop Nature Reserve, only ___ km from Wildcliff, day length was determined to be the main factor underlying seasonal variation in activity levels (Hill et al, 2003). With higher mean annual temperatures, the proportion of time spent feeding decreases. The percentage of time spent moving increased in larger group sizes and decreased as mean annual temperatures increased. They also found that resting time decreased when more time was spent feeding and grooming, and resting time increased in higher latitudes.

Subtrooping

Baboons often live in large groups which rarely split into smaller groups that reunite again after hours or days. "Subtroops" are those groups which have consistent membership and "parties" refer to groups in which membership is inconsistent (Emory, 1979). All *Papio* species form parties, but until 1981 subtroops had only been positively identified in *Papio hamadryas* and *Theropithecus.* Four types of subtrooping behavior have been observed in baboons. The first is seen in crisis situations. Troops separate almost completely while individuals foraged singly, reuniting after the crisis ended. Second, troops separate for only a few hours during the day and always remain within hearing distance from one another. The third type of subtrooping occurs at night, and the troops sleep divided into small family parties. Finally, true subtroops divide frequently and spend all day completely separate from one another. This type of division normally occurs when the troop is the process of permanently dividing.

In 1981, Anderson observed subtrooping in two chacma baboon troops at Suikerbosrand, South Africa that varied in frequency according to season, being more frequent in the seasons with lower temperatures and food availability (Anderson, 1981). Anderson reported that the mean size for 35 subtroops in the Kraal troop was 18.8 individuals and the mean size for 38 subtroops in Aasvoel was 15.2.

It is likely that subtrooping occurs as a result of a shortage of essential resources (Anderson, 1981). Pregnant and lactating females and young juveniles face the greatest demand for energy. Furthermore, subordinate females face direct and indirect competition from other troop members. By subtooping these females gain additional food resources and reduce the amount of energy expended in conflict. However, young females and those with infants are also the most vulnerable to predators , so they are the animals that can both gain and lose the most from subtrooping in habitats where predation occurs. (Anderson, 1981). In Suikerbosrand, some males tended to be found in one-male subtroops, while others did not. The author suggests that the difference in preference may be genetic, physiological, anatomical, learned, dependent on life-history stage, or some combination of these factors (Anderson, 1981).

One large troop with over 80 individuals has been observed at Wildcliff. There is an additional group of nine baboons that has been seen, consisting of one male, three adult females, and 5 juveniles. The small group is often seen on the same day as the large troop and usually forages in the same meadows. I have often seen the small troop walking in a straight line through, without foraging at all. It is impossible to know if the small troop is a subtroop of the large troop without following them to observe their interactions with each other, but it would be an interesting avenue for further research.

Guidelines for Baboon Habituation at Wildcliff

We are seeking to habituate baboons for purposes of research and radio collaring. This is initially difficult, because the baboons at Wildcliff have been harassed by farmers. A lot of them have likely experienced farmers shooting at them and there are known instances of them being honked at and electrocuted by electric fences. Some farmers will kill one baboon and leave the carcass on their territory to “scare” the others away. Because of these negative experiences, they are now “negatively habituated,” meaning that they are very nervous and fearful of humans. This means that it will take additional time and patience to habituate the troop. The following are guidelines that I have gathered using advice from collaborators at UCT and other literature, as well as experience in the field.

1. Always carry a long stick when interacting with the baboons. When the veterinarian comes to sedate the baboon and put on the radio collar she will use a blow-gun. If the baboons are accustomed to seeing a long stick they will be more likely to remain calm when they see the blowgun.
2. When you approach the troop, they seem less spooked if you do not walk directly towards them. Walk back and forth, almost parallel to the group, and slowly make your way towards them. It helps if you pretend like you’re concentrating on something other than them. For example, I often bend over to look at the plants or frogs, which seems to put them at ease and

make them less likely to run away. Avoid sudden movements, as they tend to run immediately if you move too quickly.

3. Baboons interpret eye contact as a direct threat, so you encounter a male that is head bobbing or stomping his feet at you, etc. be sure to stand up and look at your feet.
4. There are advantages to both standing and sitting while observing the baboons. Natural predators tend to stalk before killing, and the baboons can interpret you sitting and watching them as a precursor to an attack. If you make yourself very visible and move around where they can see you, they will not mistake you for a predator. However, sitting is less overbearing and the baboons seem to relax when I sit down. Since humans are so intimidating to the troop at Wildcliff, I have found that sitting is more effective.
5. There is a fake cage in the meadow so that the baboons become comfortable moving inside and on top of it. When the veterinarian comes to put the collar on, the baboon will have to be trapped inside a real cage and it will be much easier if they enter the cage readily. The cage can be baited with fruit as long it's done before the baboons arrive (ie first thing every morning) so they don't associate the food with humans. Once it is clear that the baboons are comfortable with the cage, it can be moved to another section of the meadow so you can see whether or not the position of the cage matters to them. They may interpret the cage in a new area as a novel item even though they were accustomed to it in the original position.
6. Never eat around the baboons. They could learn to associate humans with food, leading to aggression.
7. It is helpful to wear the same hat/jacket every time you're with the baboons so they have an easy way to identify you. They quickly learn the way you walk and act, but at first it is good to have a way that they can know it's you immediately (before they run).

The baboons tend to come to the meadow in the afternoon, and almost always the day after it rains. It seems that they usually come from the Ena's Falls area early in the morning and then move above Gayle Meadow and through the black wattle forest around Heron House, and then into the meadow. They also like to forage in the field on Von Staden's land (on the left when entering Fynbos Road from the main road). The baboons are much more habituated in the meadows (Far, Misty, and Oaktree meadows) than anywhere else on the reserve because they have seen me there more than anywhere else.

Once the baboons are habituated enough to get within a few meters, it is important to identify each baboon and assign a name. Look for scars, missing fur, injuries, differences in tail morphology, different coloration, etc. Once you can identify individual baboons you will exponentially increase the value of your observational data.

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