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Conditions of Observation and Social Distance in Groups of Squirrel Monkeys, *Saimiri sciureus*

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ABSTRACT. Observation conditions were very influential in determining the social distance among members of groups of squirrel monkeys.

With observer visible to the animals and recording by talking into a tape recorder the monkeys did not show a consistent pattern of social distance as reflected by actual space and frequency of bodily contacts, whereas when the observer was concealed, looking through a one-way vision screen and recording silently by marking on paper, the subjects tended to group in unisexual clusters, with that of the females showing higher cohesiveness.

INTRODUCTION

It is becoming more and more evident that the social organization presented by the members of a species is not a simple variable, its different modalities depending on genetic traits as well as on various environmental features, such as type of habitat or density of individuals.

In studies done in captivity the conditions of observation are also probably very influential in determining the kind of social organization observed. A case in example appears to be the squirrel monkey, where, concentrating on only social distance, the inconsistencies among the different laboratory and field studies are evident: PLOOG, BLITZ, and PLOOG (1963) could not describe any distinctive pattern of spatial distribution as measured by frequency of bodily contacts among captive groups living in small cages, whereas MASON and EPPLE (1969), working with animals kept in a 100 ft by 400 ft outdoor enclosure, and ALVAREZ (1973), observing monkeys in 15 ft by 9 ft cages, reported an arrangement of individuals in isosexual groups.

On the other hand THORINGTON (1967, 1968) observing squirrel monkeys living in natural conditions in Colombia, and BALDWIN (1971), working with semifree-ranging subjects in Florida, detected a tendency to group themselves in clusters of same age-sex animals.

Relative strength of social bonds could possibly be well represented by social distance. In this respect too, the results do not show uniformity: in laboratory studies, whereas CASTELL and PLOOG (1967) report greater social distance between females than between males, MASON and EPPLE (1969) and ALVAREZ (1973) show a consistent smaller distance among females, and in semifree-ranging conditions DUMOND (1967) and BALDWIN (1968, 1971) suggest that adult females tend to form a more cohesive sub-group.

Since conditions of observation may play an important part in this outcome we shall

try to analyse here their influence on social distance between group members in captivity.

METHODS

The observations were made on two groups of squirrel monkeys, each consisting of three adults of each sex. Group number 1 for 40 days and group number 2 for 20 days. No subject had previous contact with other members of its group before it was formed.

The observations were done at the Delta Primate Center (U.S.A.). Each group lived in a cage equipped with a system of coded runways to determine animal locations. Each cage measured 15×13 ft at the floor, 11×15 ft at the roof, and was 7 ft high. To discourage climbing, the cage walls were covered with fine wire screen, and the ceiling, with plywood. The cages were framed in wood, roofed, and the sides were covered with wire.

The runway system, placed 3 ft above the ground, was made from 3/4 in $\times 1\frac{1}{2}$ in lumber (thinner side up). The runways formed a grid consisting of nine 4-foot squares. The sides of each square were numbered and divided into four 1-foot segments, each segment identified by a different colour: blue, red, yellow, and green.

Observations followed a time-sampling procedure in which the location of each group member was recorded at two-minute intervals for a total of 30 observations per period. Each group was observed for one hour once a day, and the time of the observation period was changed every other day so that in two successive days each group was observed once in the morning (from 9:00 to 10:00 a.m.), and once in the afternoon (from 1:00 to 2:00 p.m.).

The data on location of individual subjects were processed directly by computer and information was obtained on social distance of each member of the group with reference to every other member. From such information it was possible to obtain the mean distance between males, the mean distance between females, and between males and females (the mean of the mean distances for the three male-male pairs, for the three female-female pairs and for the nine male-female pairs).

Data on bodily contact were also processed directly by computer. From these data information was obtained on the total frequency of contacts between each member of the group and every group member. The same data were used to obtain the mean frequency and percentage of contacts per two-day block between males, between females, and between males and females.

To facilitate identification of individual subjects, patches of fur were bleached or dyed black.

The conditions of observations varied so that for the first 20 days of observation of group 1 the observation compartment attached to the animals cage was not visually isolated from them and the observer dictated the data into a microphone, whereas for the last 20 days of this group and the whole observation period (20 days) of group 2 the observer compartment was completely covered with black plastic sheets to keep it in darkness and a small one-way vision screen was attached to it. During this time when the observer was visually isolated from the monkeys, he kept silent by

recording location and bodily contact data on prepared sheets that were processed directly by computer, instead of dictating these data into the tape recorder.

RESULTS AND DISCUSSION

Social Distance

The mean distance between males, between females, and between males and females for both groups are shown in Table 1 and Figure 1.

While the observer was visible to the monkeys and the recording was done by talking into a tape recorder (first 20 days of group 1) there was a tendency for the male-male distance to be smaller than the female-female and male-female distance ($p<.02$ and $p<.01$, respectively) and for the male-female distance to be smaller than the female-female distance ($p<.05$).

During this period the animals spent most of the time together in one milling cluster at one of the two corners of the cage as far as they could from the observer.

The setting of a one-way observation screen between observer and subjects for the same group and the recording of the observations silently by marking on paper had a dramatic effect on group geography, the group members showing for the rest of the observations a distribution in unisexual clusters; the males spending most of the time together and being more often in proximity to each other than to the females ($p<.01$); the females, likewise, were closer to each other than to the males ($p<.01$). Of these subgroups the female cluster tended to be the more cohesive, interfemale distance being more often less than the distance between males ($p.<05$).

The observations of the animals of group 2 were done from the beginning using the one-way vision screen and silent recording, and as can be seen in Figure 1 for the whole period of observations for this group the unisexual spatial distribution was also a fact, the males being most of the time closer to each other than to the females ($p<.01$); the females closer to each other than to the males ($p<.01$) and the female subgroup being more cohesive (closer together) than the male subgroup ($p<.05$).

Bodily Contacts

Most of the contacts occurred while animals were sitting quietly or in the huddle posture with the flanks in contact.

The mean percentage of bodily contacts between males, between females, and between males and females for both groups are shown in Table 2 and Figure 2.

In keeping with findings on social distance, in all phases and for both groups animals made contact mainly with members of the same sex ($p<.01$). Interfemale contacts being at all times less frequent than contacts between males (group 1, days 1–20: $p<.01$; days 20–40: not significant. Group 2: $p.<05$).

Although the unisexual distribution of bodily contact was present in all phases of the observations as reflected in the outcome of percentage comparison, this arrangement was most evident when the one-way vision screen and silent recording were used, the animals being at this time most frequently separated in two unisexual clusters contacting the members of their subgroup.

In the light of these results it seems that the failure to find unisexual grouping

Table 1. Mean social distance in feet between male-male, female-female, and male-female pairs.

	Group 1			Group 2		
	♂-♂	♀-♀	♂-♀	♂-♂	♀-♀	♂-♀
Observer visible	2.04	3.95	3.55	—	—	—
One-way observation screen	1.87	1.19	5.12	3.19	2.12	9.63

Table 2. Mean percentage of bodily contacts between male-male, female-female, and male-female pairs.

	Group 1			Group 2		
	♂-♂	♀-♀	♂-♀	♂-♂	♀-♀	♂-♀
Observer visible	29.1	12.4	8.1	—	—	—
One-way observation screen	47.6	52.0	1.1	36.4	43.7	0.3

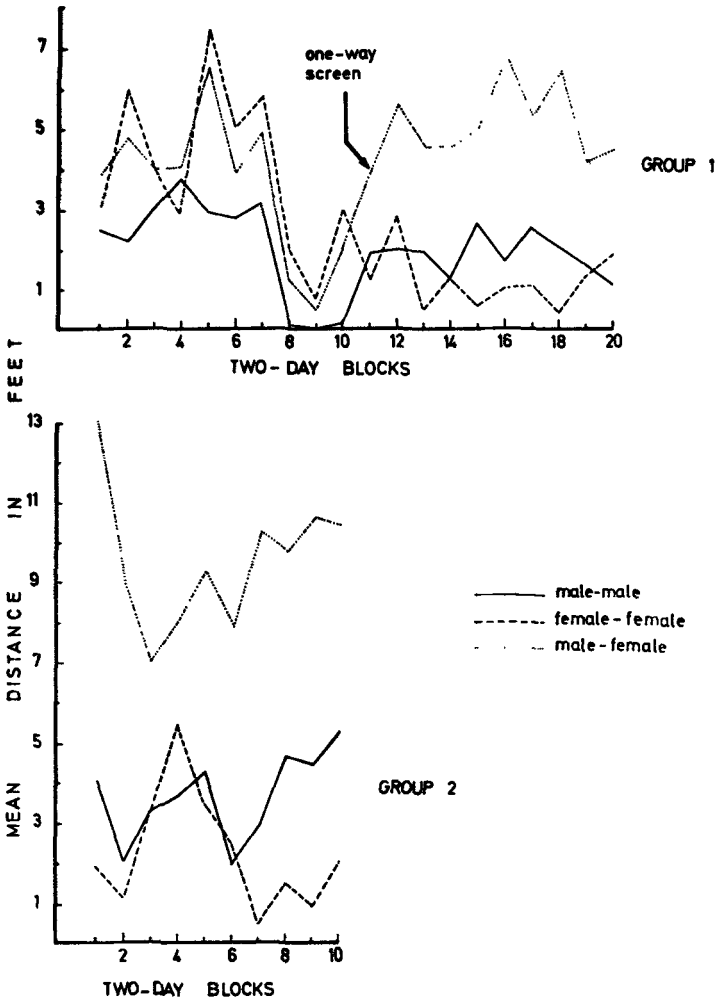

Fig. 1. Mean social distance within and between the sex classes.

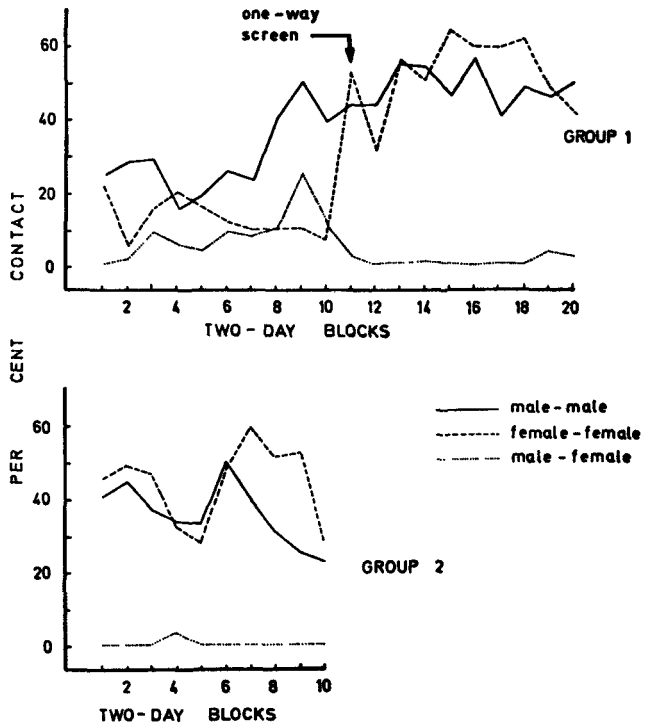

Fig. 2. Mean percentage of bodily contacts within and between the sex classes.

tendencies in previous observations in captivity can probably be attributed to a combination of restrictions of space and to the effects of outside disturbance.

If we examine these data with a view to determining the relative cohesiveness of male and female subgroups, there are clear indications that cohesiveness is stronger among females. The strong cohesiveness among females was, however, very affected by the condition of observer visible, this effect consisting mainly in a tendency showed by the males of group 1 to approach the females subgroup, which as a result would dissolve as the females fled from the males.

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