

Supplemental Online Materials

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Materials and Methods

The study population is derived from two groups, Alto's Group and Hook's Group, which have been monitored continuously since 1971 and 1980 respectively. During the study period (1984-1999), both of the original study groups shifted their home ranges and fissioned.

In 1987-88, members of Alto's Group shifted their home ranges approximately 8 km to the west; Hook's Group shifted their home range four years later. Their moves were probably prompted by deterioration of local environmental conditions and loss of critical resources (1, 2). In 1995, Hook's Group split into two daughter groups, Linda's Group and Weaver's Group (1, 2). Demographic events and behavioral data were collected continuously in these groups throughout the study period. Alto's Group fissioned into three daughter groups between 1989 and 1991 (1, 2). One of these groups (Proton's Group) was dropped from the study due to logistical constraints and is excluded from these analyses. The other two groups (Dotty's Group and Nyayo's Group) were monitored continuously for demographic events throughout the study period, but focal behavioral data were not collected between 1992 and 1996. A full schedule of systematic behavioral sampling was resumed in these two groups during 1996 and continues to the present.

Data Collection Protocol

1 All adult females were subjects of focal observations. Females entered the
2 sampling rotation when they experienced their first estrous cycles and remained in the
3 sampling rotation until they died.

4 At 1-min intervals within each 10-minute sample observers recorded the activity
5 of the focal female (feed, rest, move, groom, be groomed, other social activity) and the
6 identity of the nearest neighbor (excluding the female's own infant) within a 5-meter
7 radius. Samples were distributed evenly throughout the day. All adult females in the
8 study groups were sampled approximately once a week (mean, s.e. = 52.2 ± 0.2 samples
9 per female per year) in a randomly-determined order. The number of samples conducted
10 on each female in a given year depended on the number of females in the study groups,
11 the number of study groups, and the number of available observers. All behavioral data
12 were collected by a team of experienced observers (Raphael Mututua, Serah Sayialel,
13 Philip Muruthi, and Kinyua Warutere).

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15 Assessment of Female Dominance Rank

16 All agonistic encounters were recorded on an *ad libitum* basis throughout all years
17 of the study. For each encounter, observers recorded the identity of individuals involved
18 in the encounter and the nature of the aggressive encounter. Disputes were considered to
19 be decided (i.e. one animal was designated the "winner" of the encounter and the other
20 animal was designated the "loser") if (a) one individual displayed only submissive signals
21 while the other displayed only aggressive signals, or (b) if one individual displayed
22 submissive signals while the other displayed no aggression or submission. Most

1 encounters were decided; the small fraction of encounters that were not decided were
2 considered to be “undecided.”

3 Monthly dominance ranks for adult males and adult females were computed based
4 on the outcome of dyadic agonistic encounters. Adult females maintained stable,
5 matrilineal dominance hierarchies in which maternal kin occupied adjacent ranks.

6 With few exceptions (3,4), all changes in female dominance rank during the study
7 period were due to demographic events (births, deaths, and maturation of adult females)
8 or group fission. Although many females’ rank positions changed when their groups split,
9 the relative rank ordering of females was not altered. As per convention, the highest
10 ranking individual is assigned the lowest rank number, 1.

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12 Analysis

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14 Relative infant survival was not consistently related to variation in females’ age
15 over the course of observations ($\beta = 0.0063$, $t = 0.92$, $P = 0.3385$) or to the average
16 number of close female kin (mothers, adult daughters, and adult maternal sisters) present
17 during the study period ($\beta = 0.0339$, $t = 1.39$, $P = 0.1665$; sample size is reduced because
18 geneological data were incomplete for females born before the original study groups were
19 habituated). The addition of these variables to the regression model does not increase its
20 explanatory power.

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22 References

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