Vocal Communication in a Fission-Fusion Society: Do Spider Monkeys Stay in Touch With Close Associates?

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In fission-fusion societies, in which animals from the same group may spend long periods of time apart from each other, individuals could use long-distance vocalizations to maintain contact with others. This could be achieved with vocalizations that simply carried information about the caller’s identity and location. I explored this possibility using observations and experiments from a 3-year field study of spider monkeys (Ateles geoffroyi) in Punta Laguna, México, analyzing the use of the species’ most frequent vocalization, the whinny. By following 2 subgroups simultaneously, I found that subgroups that were within the active space of the whinny approached each other more often than subgroups that were farther apart. Individual adults in these subgroups also emitted more whinnies when they were within hearing range of another subgroup than when farther apart. I used a paired playback design to determine whether whinnies could influence the behavior of close associates as opposed to nonassociated individuals. Although nonassociates were as likely as close associates to respond vocally to playbacks of whinnies, only a close associate ever approached the speaker. Collectively, the results suggest that whinnies are used by spider monkeys to achieve flexibility in spacing while maintaining specific social relationships.

KEY WORDS: fission-fusion; contact calls; spider monkeys; playback experiments.

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INTRODUCTION

Fission-fusion societies are among the most complex vertebrate societies (Kummer, 1968: Hamadryas baboons, *Papio hamadryas*; Poole et al., 1988: African elephants, *Loxodonta africana*; Kruuk, 1972: spotted hyenas, *Crocuta crocuta*; Smolker et al. 1992: bottlenose dolphins, *Tursiops truncatus*; Goodall, 1968: chimpanzees, *Pan troglodytes*; van Roosmalen and Klein, 1987: spider monkeys, *Ateles* spp). Their defining feature is the large fluidity in association patterns. Group members form subgroups that change in size and composition throughout the day, each individual spending long periods of time separated from others in the group. Still, as in other mammalian societies, social relationships vary among different pairs, ranging from tight bonds to neutral or agonistic relationships between individuals that are seldom in the same subgroup. It is in this sense that fission-fusion societies are complex: a fluid grouping pattern exists among individuals with permanent social relationships. Fission-fusion presents a challenge to our understanding of the mechanisms by which groups are formed and maintained by individuals with different social relationships.

There is a general class of animal signals—contact calls—that appears to play a role in maintaining the spatial coherence of the social unit. The unit can be a pair (Butterfield, 1970: zebra finches, *Poephila guttata*; Smith, 1972: Carolina chickadees, *Parus carolinensis*) or a large group (Green, 1975: Japanese macaques, *Macaca fuscata*; Robinson, 1982: wedge-capped capuchins, *Cebus nigrivittatus*; Dittus, 1988: toque macaques, *Macaca sinica*; Boinski, 1991: squirrel monkeys, *Saimiri oerstedii*; Wilkinson and Boughman, 1998: greater spear-nosed bats, *Phyllostomus hastatus*; McComb et al., 2000: African elephants, *Loxodonta africana*). A common feature of contact calls is that they may be heard by some group members that are not in visual contact with the caller, which is common in fission-fusion societies.

Spider monkeys live in groups of 15–40 members in an area of 30–200 ha (van Roosmalen and Klein, 1987; Symington, 1987; Ramos-Fernández and Ayala-Orozco, 2003). Subgroups of 1-20 individuals split and come together several times during the day, resulting in some individuals spending several days at distances of ≤2 km from others in the group. There are distinct patterns of association between different group members: males tend to associate more often and for longer periods of time than females do, and within each sex there are associations of different strength (Symington, 1987; Chapman, 1990; Ramos-Fernández, 2001).

The whinny is the most frequent call of spider monkeys. Eisenberg (1976, pp. 39) first described it as a position indicator that “appears to