"ALTRUISTIC" BEHAVIOR IN RHESUS MONKEYS[1]

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Previous work in our laboratory(1) had demonstrated that most rhesus monkeys refrained from operating a device for securing food if this caused another monkey to suffer an electric shock. The present experiments were designed to investigate some of the determinants of this "altruistic" behavior.

EXPERIMENTAL METHOD

A 5 × 2 × 2 ft. masonite and plexiglass box was divided in the middle by a half-silvered screen that blocked vision only from the right (stimulus) to the left (operator) compartment. The latter was equipped with red and blue signal lights, two chains suspended from ceiling microswitches, a food tube and a water cup; the right compartment was bare except for floor and wall girds attached to a Grason-Stadler E6070B constant current shock source and scrambler.

Eight male and 7 female feral rhesus monkeys (Os) were separately trained in the operator compartment to secure a 0.7 gm. pellet of food by pulling one chain in response to a red light and the other chain to a blue one, each of 5 sec. duration and occurring in random order at irregular intervals ranging about a mean of 15 sec.; this training was continued until the responses were 90% correct with less than 20 unsignalled reactions in 2 consecutive sessions. A "stimulus animal" (SA) was then placed in the right compartment for 3 sessions while the O continued to feed on signal; however, on the 4th day one of the chains was programmed also to administer a 3 sec., 5 ma high-frequency shock to the SA. Each O was run with a given SA until, again in 2 consecutive sessions, either (i), the O selected the non-shock chain more frequently than the other (binomial $p < .01$ 2 sided) or (ii), there were no differences at the $< .25$ level; significantly, despite occasional position preference, no animal pulled the shock chain more often than that for food only. Every O was then given 2 sessions alone in the apparatus and 2 more with a new SA.

RESULTS

These can be marshalled briefly under the following parameters:

Frequency of "altruism": Only 5 of our 15 Os failed to show a statistically significant preference for the non-shock chain (criterion (i) above); even so, one of these refrained from manipulating *either* chain for 5 days and another for 12 days after witnessing shock to its SA. This self-starvation was more likely to appear in animals that had themselves experienced electroshock in the role of SAs.

Consistency: Of the 7 Os that responded non-differentially to their first SA, 5 continued to do so with subsequent stimulus animals; of the 8 Os that refrained from shocking their first SA, 4 spared all later partners. In 15 instances in which the same O-SA pair was tested more than once, there were only 2 Os that switched from sacrificial to indifferent responses, and 2 that changed in the opposite direction; all the other pairings demonstrated that the behavior of an individual O remained fairly constant.

Dominance: Since the 5 non-differentiating Os, according to various dyadic tests of primacy(1), ranked respectively 2nd, 3rd, 7th, 13th and 14th among the "altruistic" Os, sensitivity to SA distress was apparently not significantly related to group dominance.

Familiarity: In 9 tests in which the O and SA had been cagemates, the former responded differentially in 5; in 28 pairings in which they had not been cagemates, sacrificial behavior appeared in only 8. Although these results are not statistically

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significant ($<.05$ by chi-square), it is likely that a compatible relationship between animals in the home cage favors "altruistic" behavior.

Threat Deterrence: On the other hand, the rage and attack mimetics of large (5.1 K) male or female SAs during shock proved to be no more effective than those of smaller (3.2 K) animals in deterring the feeding responses of persistently indifferent Os or expediting "altruism" in the others.

Auditory Communication: In later pairings, the 2 compartments of the apparatus were insulated and separated from each other in order to minimize the possibly deterrent effects of specific vocalizations and/or a generally heightened noise or vibration level during shock to the SAs (2, 3); this did not significantly alter the characteristic responses of any O.

Further experiments are planned to investigate the relationships between these patterns and the life experiences of individual animals.

Conclusions

1. A majority of rhesus monkeys will consistently suffer hunger rather than secure food at the expense of electroshock to a conspecific.
2. This sacrificial pattern is induced primarily by visual communication, remains characteristic for individual animals, and is enhanced by familiarity or previous experience of shock, but is not significantly related to relative age, size, sex, or dominance.
3. Such protective or "succorance" behavior, observable throughout the animal kingdom(4), deserves greater cognizance in psychiatric theory and therapy(5).

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