BEHAVIORAL STUDIES WITH A BLACK VULTURE, *CORAGYPS ATRATUS*

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To the best of our knowledge, the operant conditioning of carnivorous birds in the laboratory has not been previously reported, although raptorial birds have been extensively trained in complex instrumental responses for hunting purposes since ancient times. The vulture would be an interesting subject for study, if for no other reason than for its legendary appetite. Using a specimen of the black vulture, captured in northern Florida, we investigated the possibility of controlling its behavior. The specimen weighed approximately 4 kg, stood about 2 ft tall and resembled a bare-headed, somewhat shabby hen turkey. The vulture was fed whole dead rats or guinea pigs during periods when no experiments were planned and received water *ad libitum*. The rats were totally consumed if the bird was adequately deprived and, interestingly, no skeletal fragments were observed in the feces. Usually the skulls of larger animals, such as guinea pigs, were not swallowed but were picked clean. The vulture would not kill its own prey, nor would it make any attempt to feed if the carcass presented were still moving. Contrary to legend, the subject clearly preferred freshly killed animals and, unless grossly deprived, would not eat aged and spoiling carcasses. Vomiting, often reported as occurring in these birds, happened on only a few occasions following extreme excitation as a result of restraint.

The vulture was trained to peck a variation of the standard pigeon key, presented through an opening in one side of its living cage, and was rewarded with 50-g pieces of horse meat delivered through another opening in the wall below the key. The original conditioning was very rapid and essentially no magazine training was necessary. The animal pecked readily, and very few reinforcements were necessary in order to shape a good key response. With adequate deprivation (7-10 days), the vulture

would easily consume nearly a kg of solid non-fatty horse meat, approximately one-quarter of its body weight, during a single long experimental session, with no apparent diminution of response rate.

Performances on variable-interval and fixed-interval schedules of reinforcement are shown in Fig. 1. The bird was also trained on a FR schedule, but no records of the performance are available. The performances shown and the FR responding were similar to those of

Fig. 1. Cumulative records of VI 1 and FI 5 behavior of a black vulture.

several other species (rat, monkey, *etc.*) and show the control of responding exerted typically by these schedules.

The effects of selected oral doses of d-amphetamine and chlorpromazine were also investigated. The compound to be tested was dissolved in a small quantity of water and injected into a few grams of meat, which was fed to the bird preceding the test session. The lower tracings in Fig. 1 show the results of these experiments. The doses of d-amphetamine apparently were excessive, for 1 mg per kg eliminated the FI scalloping while 2 mg per kg badly disrupted the performance. Chlorpromazine produced effects similar to those previ-

ously reported for pigeons, with slight stimulation and occasional disruption of temporal control at low doses and clear disruption and markedly increased rates with high doses.

Behavioral studies of other large carnivorous birds would appear quite feasible, suggesting that studies of visual acuity, stereoscopic vision and depth perception could be performed, utilizing operant conditioning techniques. Such studies would allow data to be gathered on the psychophysical capacities of such birds, which up to the present have been almost entirely inferred from observations made in the field.