

**MIRROR IMAGE VERSUS CONSPECIFIC STIMULATION
IN ADULT MALE ZEBRA FINCHES**

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Mirror image versus conspecific stimulation in adult male Zebra Finches.—Mirror image stimulation (M.I.S.) has been used to study social responses in a variety of animals (Kaufman and Hinde, *Anim. Behav.* 9:197-204, 1961; Svendsen and Armitage, *Ecology* 54:623-627, 1973). The advantage of this technique over direct visual contact with a conspecific is control of the stimulus by the experimenter. While this procedure has been conducted with several species, only chimps have so far shown the ability to recognize their own image (Gallup, *Science* 167:86-87, 1970).

Siamese fighting fish (*Betta splendens*) exhibit a preference for M.I.S. over visual access to a conspecific (Baenninger, *Psychon. Sci.* 4:241-242, 1966). This phenomenon also has been shown to exist in House Sparrows (*Passer domesticus*) and parakeets (*Melopsittacus undulatus*) (Gallup and Capper, *Anim. Behav.* 18:621-624, 1970). I examined this phenomenon in Zebra Finches (*Poephilo guttata*).

Ten adult male Zebra Finches were tested in a continuous choice situation of M.I.S. and visual access to a conspecific. The testing apparatus was modified after the plan of Gallup and Capper (op. cit.). It consisted of a plywood box 72 cm long, 42 cm wide and 38 cm high. The ceiling had an opening 43 cm long and 26 cm wide covered by fine screen.

Two perches, 17 cm long, were placed 8 cm above the floor and centrally located on each side of the cage. One perch was associated with an 8 × 5 cm mirror; the opposite perch was placed in front of a plexiglass window of the same size. This window allowed visual access to a 14 cm long, 14 cm wide and 18 cm high target cage. The target cage contained one adult male conspecific. A cardboard partition in the test cage kept the test bird from seeing the stimulus associated with the opposite perch. A continuous supply of food and water was available in the target cage and on each side of the experimental cage.

Testing was initiated by placing one bird in the experimental cage and a conspecific in the target cage. A photoperiod of 12 h was controlled by a light source placed 40 cm above the testing apparatus. Time spent on each perch was electrically quantified. The weight of the bird on the perch triggered a microswitch hooked up to an electric timer. Timers were reset at the end of each 24 h period; this procedure was continued for a period of 9 days.

Figure 1 shows the amount of time spent on the perch associated with the mirror and the amount of time spent on the perch associated with the target cage. Day 1 was not included in the graph as this was considered an adjustment period. The data show an overwhelming preference for interaction with the conspecific compared to the almost total absence of time spent on the perch associated with the mirror. The preference for conspecific visual access continued until day 6 after which preference for M.I.S. took place. Preference for M.I.S. continued through the final 3 days of testing.

All of the 10 individuals tested showed an overwhelming initial preference for visual access to the conspecific and later exhibited a preference for M.I.S. which continued

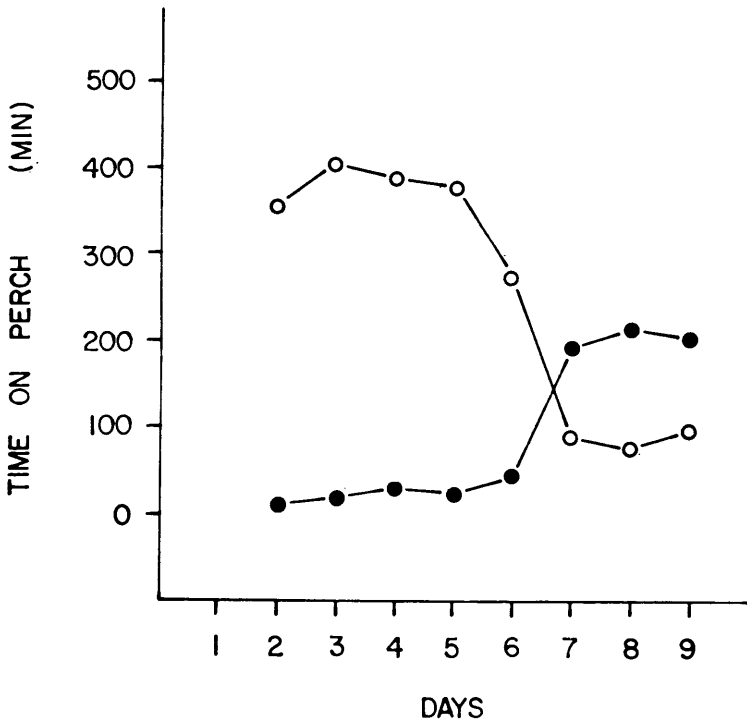


FIG. 1. Mean time in minutes spent in front of a mirror (solid circles) and in front of a conspecific (open circles) by 10 adult male Zebra Finches as a function of time.

throughout the testing period. The earliest shift in preference took place on day 4 by 1 individual, and the latest shift was exhibited on day 8 by 2 individuals. One individual shifted preference on day 5, 2 on day 6 and 4 on day 7. Due to the abbreviated period of testing it was not possible to determine whether this shift was more than a temporary phenomenon.

The fact that after a period of time there is a definite preference for M.I.S. in adult male Zebra Finches suggests this phenomenon may occur among other bird species. The preference for M.I.S. was shown in the absence of auditory cues. This tends to support the hypothesis of Gallup and Capper (op. cit.) that the mirror image is being perceived as a supernormal stimulus. Superficially, there may seem to be little difference between the mirror image and the conspecific, but the mirror image will always be both predictable and compatible with the animal's behavior. The mirror image may also be considered a novel stimulus. It has been demonstrated with guppies (*Lebistes reticulata*) (Russell, Anim. Behav. 15:586-594, 1967) that novel stimuli may be investigated less in a strange environment. This may explain the initial lack of interaction with the mirror image. The fact that the animal did not habituate to the image may be due to the abbreviated duration of the experiment. The complexity of a stimulus increases its novelty (Berlyne, Conflict, Arousal and Curiosity, McGraw-Hill, New York, 1960:43).

This may be true of the mirror image and at least partly responsible for the lack of habituation. Future work considering the preference for M.I.S. over an extended period of time with a variety of species may give some idea as to the adaptive significance of this behavior.

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