Interspecific Song Acquisition by a White-crowned Sparrow

Luis F. Baptista[1] and Martin L. Morton
Department of Biology, Occidental College, Los Angeles, California 90041 USA

With the exception of several groups (e.g. mimids, sturnids, menurids), most birds do not copy vocalizations from allospecifics in the wild (Dobkin 1979). Birdsong is thought to identify species and serve as an ethological isolating mechanism during pair formation. Thus, it would be advantageous for birds that learn songs to do so selectively from conspecifics. Social bonds with tutors may insure the acquisition of species-specific vocal signals by juveniles (Nicolai 1959, Immelmann 1969). A few species exposed to taped conspecific and allospecific song selectively learn only conspecific song (Marler and Peters 1977, Kroodsma 1978). Juvenile White-crowned Sparrows (*Zonotrichia leucophrys*) presented with songs of conspecifics, Harris' Sparrows (*Zonotrichia querula*), and Song Sparrows (*Melospiza melodia*) learned only conspecific songs (Marler 1970). Three naive White-crowned Sparrows presented with only Song Sparrow songs sang simple songs similar to those of birds raised in acoustical isolation and did not show any evidence of learning from the tutor tapes. It has been postulated that the naive White-crowned Sparrow possesses a crude auditory specification, the "template," for species-specific song. The template guides the bird to respond selectively to some intrinsic acoustical property in conspecific song during the song-learning process (Marler 1970).

We are aware of no published record of a White-crowned Sparrow singing songs of an alien species. We thus describe herein the first such observation and discuss its ethological significance.

A White-crowned Sparrow (*Z. l. nuttalli*) was captured as a nestling from Lompoc, California, hand-raised, and placed in an aviary when it was 46 days of age. It thereafter could hear songs of and interact socially with a variety of species in the same enclosure, including adult males of two subspecies of White-crowned Sparrows (*Z. l. nuttalli* and *Z. l. gambelii*) and an estrildid, the Strawberry Finch (*Amandava amandava*). We recorded songs of our hand-raised bird in May when it was about 1 yr old. At this time we observed this individual to be highly aggressive, dominating all the other White-crowned Sparrows in the aviary.

Songs from Lompoc White-crowned Sparrows ordinarily begin with a whistle, followed by a buzz, a trill, and a terminal buzz (Fig. 1A). Whereas songs of estrildid finches usually consist of harmonically rich syllables, the song of the Strawberry Finch consists of relatively pure-toned syllables in descending pitch (Baptista 1973; Fig. 1C). Our hand-raised White-crowned Sparrow sang a song beginning with a whistle typical of its species, but this was followed by a series of syllables in descending pitch closely resembling the song of a Strawberry Finch (Fig. 1B). Sometimes the introductory whistle was omitted from its acquired song. Typical of its species, the White-crowned Sparrow sang loudly. In contrast, Strawberry Finches sing more softly. This was the only song sung by our White-crowned Sparrow.

It is noteworthy that the Strawberry Finch song bears some resemblance to White-crowned Sparrow song in containing syllables that are short, sustained whistles. In one experiment, Marler (1970) presented a naive White-crowned Sparrow with tapes of conspecific and Harris' Sparrow songs, the latter also consisting of whistles. The experimental bird did not learn the alien songs. Why the difference in our results?

A number of recent studies indicate that live, interacting tutors provide more effective learning stimuli than tape recordings. Canaries (*Serinus canaria*) and Zebra Finches (*Poephila guttata*) learn more syllables if exposed to live conspecifics than to tape-recorded song (Waser and Marler 1977, Price 1979). Marler (1970) used only tape-recorded song as learning stimuli. The fact that our White-crowned Sparrow could interact socially with its alien tutor may have enabled it to learn its song. This does not explain, however, why it learned the Strawberry Finch song instead of conspecific song, which it heard abundantly in its aviary. One possible explanation is developed below.

White-crowned Sparrow songs are the most thoroughly studied songs of any avian species to date (review in Baptista 1977), yet no field record exists of a White-crowned Sparrow learning an allospecific song. A juvenile White-crowned Sparrow spends its first 20–40 days interacting with its parents in their home range. Perhaps during this period it becomes acquainted with its species "Gestalt" and thereafter directs its social interactions mostly (if not entirely) toward conspecifics. It is perhaps this early learning period that guides a naive White-crowned Sparrow toward an adult conspecific as song tutor. The tutor

A

B

C

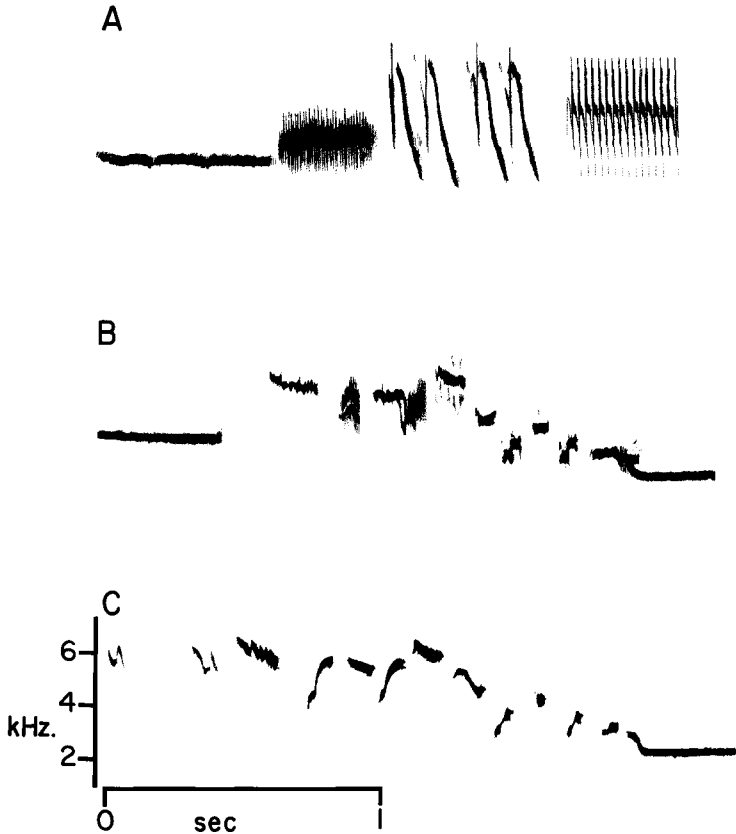6–
4–
kHz.
2–

0   sec   I

Fig. 1.   A. Tracing of sound spectrogram of White-crowned Sparrow song from Lompoc, California. B. White-crowned Sparrow's imitation of *Amandava amandava* song. C. Song of male *Amandava amandava*.

may be an adult from its own population or a migrant of another subspecies (Baptista 1974). A hand-raised White-crowned Sparrow deprived of early social interaction with conspecifics may be more catholic in its choice of song tutors at a later date. This may explain how the White-crowned Sparrow learned the *Amandava* song, but it is still unclear as to why it did so. In any case, this observation indicates that song development in the White-crowned Sparrow is more open (less innately limited) than was formerly thought.

LITERATURE CITED

BAPTISTA, L. F. 1973. Song mimesis by a captive Gouldian Finch. Auk 90: 891–894.
———. 1974. The effects of songs of wintering White-crowned Sparrows on song development in sedentary populations of the species. Z. Tierpsychol. 34: 147–171.
———. 1977. Geographic variation in song and dialects of the Puget Sound White-crowned Sparrow. Condor 79: 356–370.
DOBKIN, D. S. 1979. Functional and evolutionary relationships of vocal copying phenomena in birds. Z. Tierpsychol. 50: 348–363.
IMMELMANN, K. 1969. Song development in the Zebra Finch and other estrildid finches. Pp. 61–74 *in* Bird vocalizations (R. A. Hinde, Ed.). Cambridge, England, Cambridge Univ. Press.
KROODSMA, D. 1978. Aspects of learning in the ontogeny of bird song: where from, when, how many, which, and how accurately? Pp. 215–230 *in* The development of behavior (G. Burghardt and M. Bekoff, Eds.). New York, Garland Publishing Co.

MARLER, P. 1970. A comparative approach to vocal learning: song development in White-crowned
    Sparrows. J. Comp. Physiol. Psychol. Monogr. 71: 1–25.
———, & S. PETERS. 1977. Selective vocal learning in a sparrow. Science 198: 519–521.
NICOLAI, J. 1959. Familientradition in der Gesangsentwicklung des Gimpels (*Pyrrhula pyrrhula* L.).
    J. Ornithol. 100: 39–46.
PRICE, P. H. 1979. Developmental determinants of structure in Zebra Finch song. J. Comp. Physiol.
    Psychol. 93: 260–277.
WASER, M. S. & P. MARLER. 1977. Song learning in canaries. J. Comp. Physiol. Psych. 91: 1–7.

Bigamy in a Male Mockingbird

CHERYL A. LOGAN AND MARY RULLI
*Department of Psychology, University of North Carolina at Greensboro,
Greensboro, North Carolina 27412 USA*

Like many passerine species, the Mockingbird (*Mimus polyglottos*) is thought to be highly monogamous. Laskey (1935, Auk 52: 370), for example, reports perennial pair bonding between identified males and females, even though the female may leave for the fall and return to the same male during the subsequent breeding season. We report here a case of bigamy coupled with a decrease in parental commitment in a male Mockingbird, precipitated by the disappearance of a male territorial neighbor.

Two color-banded males had maintained adjacent territories in Guilford County, North Carolina for at least 3 yr prior to our observations. During the 1980 breeding season both males had mated and both were feeding newly hatched offspring by the last week in April. On 2 May 1980 (1 day following the fledging of his offspring), one of the two males, designated M2, disappeared and was never seen again. Both prior to and following the disappearance of M2, the behavior of each male had been observed during hourly observation periods. Each period was divided into 120 30-s time bins, and the single occurrence per time bin of each of a number of behaviors, including the feeding of offspring, conspecific agonistic encounters, incubation in the female, and song in the male, was noted. Observation was continued through 31 July 1980, and a total of 50 h of observation was completed following the disappearance of M2.

Observations indicated that the neighboring male (designated M1) began encroaching on the resident female's territory immediately following the disappearance of her mate. During the 2 h of observation conducted on the day M2 was found missing, his mate (designated F2) was observed to engage in 21 agonistic encounters with the usurping male. Most were at or near the original territorial boundary. Despite her defensive efforts, within 2 weeks the aggression subsided, averaging only one encounter per hourly observation period. The intruder had gradually usurped the entire area once held by the missing male. The resident female was not, however, expelled. Throughout the period of observation, both females remained in their original areas, actively defending them from intruders when necessary. During the period immediately following her mate's disappearance, F2 continued to feed her two fledglings alone. On several occasions, F2's offspring were observed begging for food in M1's presence. He was never observed to feed F2's fledglings, however, although his own brood disappeared 3 days after fledging themselves. On 17 May 1980 and 25 May 1980, M1 was observed copulating with F1 and F2, respectively, and by 29 May 1980, both females were found incubating on their respective sides of the double territory. By the end of the breeding season M1 had initiated a total of 5 clutches with the 2 females—3 with F1 and 2 with F2. Only two of these—those with F2—were successfully reared to maturity.

Of considerable interest at this point was the male's parental behavior. Observations of M1's feeding of his first brood (with F1) yielded a male/female feeding ratio of 0.795, calculated over 9 h of observation. Following the disappearance of M2, the two half-sib clutches were begun synchronously. The second M1-F1 clutch was destroyed prior to hatching; the first M1-F2 clutch, however, hatched successfully on 12 June 1980. M1 actively fed his new mate's offspring. Calculation of male/female feeding ratios compiled over 11 h of observation yielded a value of 0.781. When the clutches were not competing with one another, therefore, M1 shared parental duties to roughly the same degree with both mates. Prior to the