LOCAL SONG TRADITIONS IN INDIGO BUNTINGS: CULTURAL TRANSMISSION OF BEHAVIOR PATTERNS ACROSS GENERATIONS

by

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The transmission of local behavior patterns from older individuals to younger ones by imitative learning constitutes tradition or culture. Behavior traditions are perhaps best known among animals other than man in the songbird species that learn their songs (Bonner, 1980). In birds with local song dialects where neighboring individuals have songs that differ consistently from the songs of other local populations, the songs are learned. They may be copied from older males by the young males after they have dispersed from their birth site (Kroodsma, 1974; Verner, 1976; Thielcke, 1977; Jenkins, 1978; Payne, 1980, in press a) or within their home area if they do not disperse (Marler & Tamura, 1964; Baptista, 1975).

Information on the long-term persistence of local song dialects is of interest not only for the comparative parallel that behavior traditions provide for human cultural evolution but also for the possible evolutionary

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significance of the local behavior differences themselves for the gene flow and evolutionary divergence among populations (Thielcke, 1970). Although the behavioral mechanisms including critical periods (Marler, 1970; Nottebohm, 1969) and social factors (Immelmann, 1969, 1975; Payne, in press a) in song learning have been studied in some detail, little is known directly about the lifespan of a song tradition or even whether the local song patterns generally persist over several generations.

Indigo buntings Passerina cyanea are small songbirds common in eastern North America. Neighboring males sometimes share the same song (Thompson, 1970). The small dialect populations or neighborhoods may consist of as many as 12 individual males in a season, though small song groups of 2 to 5 males are more common (Payne, unpublished). The large number of song dialects within a local population makes the species particularly well suited for a study of the survival of local cultures, for each song group constitutes a replicate tradition population and large samples of song dialects and their fates can be studied over the years.

We present the results of a long-term study on the rate of cultural survival, modification, and extinction of song types in a local population of indigo buntings recorded over a period of 15 years. To test whether the local song patterns are long-term traditions we compare the survival of songs and the survival rate of individual birds in the populations. Observations were designed to answer the following questions: (1) Do local songs persist over the years? (2) What proportion of songs persist from year to year in modified form and in the same form? (3) Is cultural survival of song traditions greater than the demographic survival of individual birds? (4) Are certain song traditions more likely to survive than others?

FIELD METHODS

Indigo buntings were studied in an 800-ha area of the E. S. George Reserve, a natural history research area of the University of Michigan, and neighboring lands of the Pinckney State Recreation Area south and east of the reserve, in Livingston County, southeastern Michigan. The area includes hilly terrain covered with old fields, oak-hickory woods, and shrubby swamps (Evans, 1975; Collins & Wilbur, 1979). Aerial photographs with 100-m-square grids were used as detailed maps for plotting territories of each bird.

Thompson initially tape-recorded the buntings from 1963 through 1972 with the peak field effort in 1965 to 1969 when in each year from 26 to 44 birds were recorded. Most individuals were not caught or individually recognizable, but one marked male returned for four years and retained the same song from year to year. Several cases were observed of birds sharing songs with other individuals, usually neighboring territorial buntings (Thompson, 1970).

Payne and Sweany tape recorded more than 50 birds in each year in the same area from 1977 through 1980. We attempted to record samples of 10 songs of each individual