TEMPORAL VARIATION IN MALE CHAFFINCH SONG DEPENDS ON THE SINGER AND THE SONG TYPE

by

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Summary

Studies of variation in bird song within a species have tended to concentrate on repertoire size and on song rate, while other aspects of song delivery have received little attention even though they are also likely to play an important part in the signalling process. We here examine the pattern of delivery of individual males’ repertoires in the chaffinch (\textit{Fringilla coelebs}) to identify variation in a range of temporal parameters of song delivery. Coefficients of variation differed between song units and across hierarchical levels. Basic units (syllables) were delivered with great temporal precision. The larger building blocks of a song (the different phrases and the flourish) showed the highest variability while variation for song duration itself was intermediate. Most variables showed consistent differences between males, but there were also consistent differences between song types within a male’s repertoire, as well as between the same song types as sung by different males. This suggests an interaction between a male’s phenotype and song production, but because of consistent differences between song types within repertoires, there is potential for selection to act on aspects of song delivery both of the individual and of the song type (\textit{i.e.} the culturally transmitted unit).

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Introduction

Song is a complex and multiple cue signal (Catchpole & Slater, 1995). To understand the evolutionary dynamics that have led to and continue to shape the current signal it is essential to describe variation within a population. The extent that different signal parameters vary within and between individuals determines how suited they are as potential cues for individual identity, quality or motivation of a sender (reviewed in Becker, 1982; McGregor, 1991; ten Cate et al., 2002). For bird song, variation has been assessed frequently using parameters such as repertoire size, versatility and song output (Searcy & Nowicki, 2000). Quantification of within type variation is unusual and is rarely taken into account when assessing versatility although it could be meaningful for communication. Many species have only one song type or very small song type or element repertoires. For some of these, substantial within type variation has been described. For different renditions of the same song type, elements are dropped, doubled or re-arranged (Sturdy et al., 1999), or amplitude characteristics are changed (Morton & Young, 1986), or the frequency of elements varies (Lambrechts, 1997), or song types come in several variants with slight structural differences in elements (Podos et al., 1992). In species with small repertoires and a high percentage of shared song types, within song type variability could be a cue to individual identity (Weary et al., 1990), a means of minimising habituation (Hartshorne, 1956) or like repertoire size and switching rates (references in Searcy, 1992; Langmore, 1997) a way of making song more attractive to females. Within song type variability could also be a motivation indicator and could therefore function as a graded signal (Slater, 1975; Davis, 1988; Weary et al., 1988) or as an indicator of male quality (reviewed in Lambrechts, 1996) or of age (Gil & Slater, 2000; Gil et al., 2001).

The chaffinch is a much-studied songbird with a small song type repertoire and a high percentage of song type sharing (Slater et al., 1980, 1984; Slater, 1981). A repertoire consists of one to six different song types, but the majority of males have two or three (see Fig. 1 for examples). Each song type is repeated a few times before a switch to another occurs; the number of repetitions and switching rate differ both between individuals and between song types within a repertoire (Slater, 1981; Riebel & Slater, 1999a, 1999b). While song rates and song type switching rates have been quantified, within song type variations are largely undescribed. A typical song is composed of