

The Society for Neuroscience 33rd Annual Meeting Selected Abstracts

Coordination and synergism between visual and vocal display in brown - headed cowbirds.

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Sexually selected acoustic signaling is accompanied by visual displays in many birds. The motor integration of visual and vocal displays has not been extensively studied. Brown-headed cowbirds (*Molothrus ater*) "puff up" prior to song, move their wings during the song and conclude with a bow. Their song is generated with a sequence of 3-5 expiratory pulses, which are separated by silent inspirations. The timing of song and wing movements was investigated using high-speed filming and accelerometer recordings. Wing motions are synchronized with the respiratory movements of song such that the lowest wing position occurs at the transition from inspiration to expiration. Wing display may affect respiration by changing the size and movement of the thorax such that sound production is either impeded or enhanced. To characterize respiratory effort during song, expiratory muscle length and electrical activity (EMG) were recorded together with subsyringeal air sac pressure in the presence and absence of the wing display. Regardless of whether a wing display was performed, songs were generated with similar air sac pressure conditions and expiratory muscle length changes. However, when cowbirds displayed there was an increased intensity of low-frequency sound despite a 10-20% reduction in expiratory EMG activity. The integration between visual and vocal displays is further facilitated by a silent period at the beginning of expiratory pulses, which allows completion of the wing upstroke without affecting phonation. The synergistic interaction indicates that respiratory effort is modified based on the visual display, indicating that these two modes of communication evolved simultaneously.

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