Understanding the Rhythm of Dove Coos

John Butterworth, 2014

The purpose of my research this summer was to look for rhythmic commonalities in the way that doves and pigeons sing. Doves and pigeons belong the family *Columbidae*. I worked through every genus of this family and transcribed the available recordings. Transcription is a musical analysis of sound in which the listener will notate the sounds he or she hears on a musical staff so it is repeatable by a musician.

Rhythm in music is the repeated pattern of sounds. Specifically, the repeated pattern of strong and weak beats. A beat is the basic unit of time measurement in music. A strong beat is defined as a sound which is emphasized: an emphasis could be a sound that is louder, longer, or of higher pitch. In music, there are two major notational conventions by which musicians specify how many beats are in a measure and the time duration of each beat. One convention, called simple time, is when each beat is subdivided into two equal parts. The other convention, called compound time, is when each beat is subdivided into three equal parts. To determine whether a bird’s song was in simple or compound time, the relative sound durations in a song were analyzed, as well as the positioning of strong and weak beats.

To analyze a specific dove recording, I would load it into two programs: audacity and raven. These programs would generate graphical representations of the sound. The two graphs generated are called an oscillogram and a sonogram. The oscillogram is a representation of the amplitude, or loudness of a sound and the sonogram is a representation of the frequency, or pitch of a sound. I was able to determine strong and weak beats by analyzing the sonogram and oscillogram for sounds that were louder, longer, or higher in pitch. Through analysis of sound length, pitch, and loudness of the bird coos I was able to generate musical notation of the bird coos. After finishing my transcription, I would superimpose it on an image with the sonogram and oscillogram to help someone better understand how the transcriptions were made (Figure 1).

To analyze the significance of my transcriptions, I created a database of all the *Columbidae* birds that I was analyzing. The database included the birds’ weight, wingspan, geographic location, genus, and clade. Although I have not been able to analyze all of my results, the database will help me understand if there are connections between a way the birds sing and their size, geographic location, or position on the *Columbidae* phylogenetic tree. From the preliminary analysis of my findings, I have found that birds of the clade *Zenaida* only sing in simple time, while birds of the family *Streptopelia* sing in compound time. I hope to further analyze my results to look for more commonalities in the way doves and pigeons sing.

Graphs/images/figures (if applicable)
Figure 1: Oscillogram, sonogram, and transcription of the mourning dove, *Zenaida macroura*, song. The top graph is the oscillogram, and the bottom graph is the sonogram.

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