**Inventory Size and Complexity in the Song of the American Robin**

A newly discovered parallel between Humans and Robins

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| **Hypothesis:**  ***American Robins with larger element inventories will have more complex elements in their inventories.*** | |
| Why Robins?   * Create new and unique songs at will * Little structure rules to date   + Syllables -> Elements   + Elements create inventories   + Johnson 2006 | Humans?   * Consistently produce new and unique utterances * Human phoneme structure   + Utterances -> phonemes -> features   + Explain sequencing   + Size Principle     - Inventory size directly linked to phoneme complexity     - Lindblom and Maddieson 1988 |
| Data Used   * 14 recordings * Between 30 and 40 minutes * Collected in Spring * Chapel Hill/Carrboro area North Carolina * Multiple song bouts * Between 6 and 35 elements | What are the complexity variables?   * Inventory size in terms of number of elements   + 9 elements versus 22 * Element length in terms of number of components   + 4 components versus 27   Expecting: Longer component strings in larger element inventories |
| [PRAAT Spectrogram Settings]  The steps for breaking down a complete inventory file:  1. Open file in PRAAT  2. Set PRAAT settings for Hz and Dynamic Range  🡪 Hz set to between 0 and 5000  🡪 Dynamic Range can be between 25.0 and 40.0  3. Zoom in for each individual element  4. Turn on intensity and use the intensity contour to mark boundaries for each element  🡪 Mark the beginning and end of the visible element with a boundary  🡪If the minimum matches a pinch in the waveform, mark the boundary  5. Label each new component using the component type chart | [PRAAT Spectrogram Example]  Labeled Element Example |
| Results: Components | |
| Results: Average Number of Components | |
| What the results suggest   * Larger inventories contain more complex components * Humans are not completely unique   + Multiple comparisons     - Morpheme/Element     - Phoneme/Element   + General Principle to Communication     - Model for combinatorial systems     - Probability of picking complex parts | There is still more to learn about Robins   * Component system with labels   + Testing of component prevalence     - Vertical pitch falls only above 20 elements     - Horizontal consistency most common   + Restrictions     - Components -> Elements     - Elements -> Song bouts * Other song birds |
| [Working Component System]    Breaks:   * BD – break down * BU – break up * BF – break flat | |
| Acknowledgements  I would like to thank the following people for their help throughout this project:   * Professor Elliot Moreton * Haven Wiley * Steve Johnson | Bibliography  Steven L Johnson, "Song learning and syntax patterns in the American robin and the soil characteristics of bank swallow nest sites" (January 1, 2006). *Electronic Doctoral Dissertations for UMass Amherst.* Paper AAI3206190.  Lindblom, Björn & Ian Maddieson (1988), Phonetic Universals in Consonant Systems. In Larry M. Hyman & Charles N. Li (eds.) Language, Speech and Mind, pp. 62-78. |