**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 PRAAT2. Set PRAAT settings for Hz and Dynamic Range🡪 Hz set to between 0 and 5000🡪 Dynamic Range can be between 25.0 and 40.03. Zoom in for each individual element4. 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 boundary5. 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
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| [Working Component System]Breaks:* BD – break down
* BU – break up
* BF – break flat
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| AcknowledgementsI would like to thank the following people for their help throughout this project:* Professor Elliot Moreton
* Haven Wiley
* Steve Johnson
 | BibliographySteven 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. |