

Vocal Plasticity and Pattern Extraction in a Non-Human Primate

Abstract

Speech and its components were originally believed to be unique to humans, but accumulating comparative data across species have challenged this conclusion. While some components may be uniquely human, many appear to be either derived from our ancestors or present in other animals as a result of convergent evolution. The experiments presented in this thesis address one aspect of speech, auditory-feedback-mediated vocal plasticity (how acoustic input can change vocal output), and whether this ability is present in a non-human primate (the cotton-top tamarin, *Saguinus oedipus*). We tested whether tamarins were able to modify the timing of their calls (vocal output) in order to restrict calls to silent intervals in patterned background noise (acoustic input). We found that the tamarins do have vocal plasticity in call timing, and this plasticity is relatively precise and flexible. We used this call timing assay to address another aspect of speech, pattern extraction. We created temporally patterned background noise with two different length silent intervals. The tamarins successfully extracted the temporal pattern and used it to place more of their calls in the longer of the two silent intervals, as well as calling earlier in the long silence. In all of these experiments, the tamarins also changed the spectrotemporal structure (call amplitude and duration) of their calls to compensate for the background noise. These results demonstrate that the cotton-top tamarin has many forms of vocal plasticity, thereby sharing some of the skills that were originally believed to be unique to human speech.