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Vocal learning and the origins of human speech: A comparative approach

Speech and language sciences, I argue, need an interdisciplinary and multidisciplinary approach. They are uniquely positioned to integrate both methods and ideas from the humanities, social sciences and natural sciences. To make this point, I will discuss a specific case, namely what makes human speech special compared to vocal production in other animal species. I will ask the question: Why are we such chatty animals? Human speech is a peculiar behavior from an evolutionary biology perspective: we spend much time producing sounds which - crucially and unlike most other animals - are learnt. Vocal learning, the ability to learn new sounds, is a key building block of speech. How did we acquire it since our last common ancestor with chimpanzees? Because speech and brains do not fossilize, and lacking a time machine, the comparative approach provides a powerful tool to tap into human cognitive history. Notably, behaviors that are homologous or analogous to human speech can be found across a few animal species and developmental stages. Hence, investigating rhythm across species is not only interesting to zoology, but it is key to unveil when speech-like behaviors appeared in human evolution. I will present data on sound production in marine mammals and primates, suggesting how vocal learning research in non-human mammals can inform speech evolution, combining strengths and knowledge from speech sciences, human cognitive neuroscience and behavioral ecology. I will discuss the interplay among phonation, learning, and development in harbor seals – perhaps an unconventional translational model till now -, arguing for their importance as model species for human speech origins. These results suggest that, while the full package may be uniquely human, several mammals share one or more building blocks of human speech. If time allows, I will also discuss some potential parallels in applying AI techniques to human natural language and animal communication systems.