# Biological bases of music cognition

## ABSTRACT:

A key feature of humans that is not present in other species is that we have a strong propensity to produce and enjoy music. Music has been observed in all known human societies and is a fundamental part of our everyday life. In the present project, we want to shed light on the biological bases (in neural and evolutionary terms) of musical cognition. More specifically, we want to understand how the human ability to process and produce music might be based on general grouping and perceptual principles with strong biological bases. For this, we focused on the study of how the brain identifies harmony and how it reacts to harmonic violations and the exploration of the evolutionary roots of musical principles as long as they might be shared, or not, across species. In a series of experiments, we recorded the electroencephalographic responses of highly trained musicians and naïve listeners when they were presented with harmonic sequences that either ended as expected or contained a music-syntactic violation. We observed signature neural responses to the violation of harmonic sequences independently of musical experience, and provided evidence of the features that constrain how our brain detects musical patterns. In experiments with animals, we demonstrated that some of the fundamental mechanisms humans use for music processing (such as those involved in the detection of rhythmic and harmonic structure) might emerge from general sensitivities already present in other species. Together, our results advance our understanding of the biological bases of music cognition.

**Keywords**

Music cognition, Evolution, ERPs, Animals, Harmony

## Published Work:

Celma-Miralles, A., & Toro, J. M. (2020). Non-human animals detect the rhythmic structure of a familiar tune. *Psychonomic Bulletin & Review, 27*, 694-699. doi: 10.3758/s13423-020-01739-2´

Pagès-Portabella, C., & Toro, J. M. (2019). Dissonant endings of chord progressions elicit a larger ERAN than ambiguous endings in musicians. *Psychophysiology, 57*(2), UNSP e13476. doi: 10.1111/psyp.13476

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