

ATTILA ANDICS



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RESEARCH AREA

In our lab, we study the neural and behavioral mechanisms underlying voice and speech perception across mammals, with a particular focus on the evolution of human language. We investigate how the brain extracts information about the identity and emotional state of vocalizing individuals, and how these ancient perceptual systems have been adapted and repurposed to support the uniquely human capacity for speech. Our overarching goal is to understand language evolution by determining whether human voice- and speech-related brain specializations are truly species-specific innovations, or whether they emerged from more general mammalian voice processing mechanisms.

Using a comparative cognitive neuroscience approach, we combine ethological methods with non-invasive brain imaging techniques such as fMRI, EEG, and HD-DOT. By studying humans, dogs, and pigs, we examine how different species perceive conspecific and human vocalizations, recognize individuals, and respond to emotional cues. This research sheds light on how living in a speech-rich social environment may have shaped both the evolutionary emergence and developmental tuning of human voice and speech perception, providing new insights into the origins of language.

TECHNIQUES AVAILABLE IN THE LAB

We conduct comparative studies of auditory and speech processing across species using modern cognitive neuroscience and ethological methods, non-invasively, with awake, cooperative animals—research of this kind is possible at only a few laboratories worldwide. Students gain hands-on experience with functional magnetic resonance imaging (fMRI), electroencephalography (EEG), and high-density diffuse optical tomography (HD-DOT). These methods allow precise mapping of brain activity in both space and time.

SELECTED PUBLICATIONS

Andics, A., Gábor, A., Gácsi, M., Faragó, T., Szabó, D., & Miklósi, Á. (2016). Neural mechanisms for lexical processing in dogs. *Science (New York, N.Y.)* 353(6303): 1030–1032.

Boros, M., Magyari, L., Morvai, B., Hernández-Pérez, R., Dror, S., & Andics, A. (2024). Neural evidence for referential understanding of object words in dogs. *Cur Biol* 34(8): 1750–1754.e4.

Boros, M., Magyari, L., Török, D., Bozsik, A., Deme, A., & Andics, A. (2021). Neural processes underlying statistical learning for speech segmentation in dogs. *Cur Biol* 31(24): 5512–5521.e5.

Gábor, A., Lehoczki, F., Bensaali-Nemes, F., Faragó, T., Surányi, K., & Andics, A. (2026). Cross-species acoustic codes for yes and no in human nonverbal vocalizations. *Cognition* 266: 106284.

Morvai, B., Boros, M., Ferrando, E., Magyari, L., & Andics, A. (2025). Comparative EEG reveals general and conspecific vocalization sensitivities in evolutionarily distant mammal species. *Neuroimage* 317: 121355.