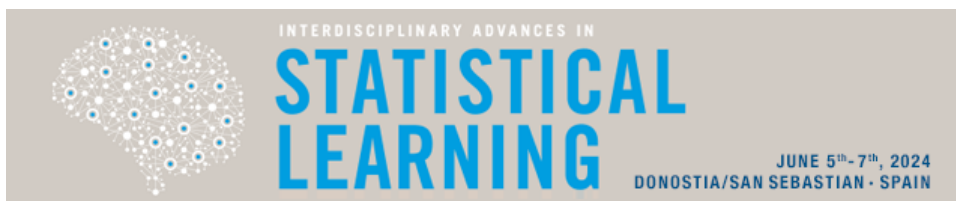


INTERDISCIPLINARY ADVANCES IN STATISTICAL LEARNING



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**Electrophysiological evidence for a human-like consonant bias in dogs'
perception of continuous speech**

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Consonants have been argued to be more important for word identification than vowels. This may explain why in humans, unlike in non-human primates and rodents, statistical learning to segment continuous speech streams into words relies more heavily on consonant than vowel patterns. To understand if this consonant bias is uniquely human or may be present in other species that live in the same speech-rich environment, here we directly compared speech segmentation in family dogs (N=26) and humans (N=27). We exposed both species to three different speech streams, varying whether three consecutive syllables contained word-like patterns based on recurring consonants (consonant-word condition) or vowels (vowel-word condition), or contained no such patterns (random condition). We assumed that more efficient word segmentation would lead to greater neural entrainment to the word boundary frequency (1.3 Hz). Inter-trial coherence (ITC) measures of neural entrainment in both species were higher in the consonant-word condition than in either of the other two conditions. This human-like bias in dogs for segmenting words when defined by consonants reveals that living in the human social environment may be sufficient for linguistic constraints on statistical computations to emerge, even in an evolutionarily distant mammal.

Voice identity discrimination in the dog and the human brain – the role of conspecificity and relevance

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Voices of conspecifics, typically the most relevant social partners, are processed preferentially in many species' brains. This may arise from ancient neural tuning to conspecific voices, or may reflect processing preference for experientially relevant sounds. To disentangle these accounts, the special interspecific relationship of dogs and humans provides an ideal study case: for dogs, that are not only selected to communicate effectively with humans but also live with them, human vocalizations may carry greater social relevance than conspecific vocalizations. In a fast periodic auditory stimulation-based EEG study, we presented humans and dogs with continuous vocalization streams (dog/human) in an oddball design: every third sound differing in vocalizer identity. We predicted that if experiential relevance outweighs ancient evolutionary relevance (conspecificity), then both species' brains will entrain more on human voice identity changes. We found that both dogs and humans entrained on human but not on dog voice identity changes, despite that dog and human voices were acoustically similarly discriminable. Experiential relevance may thus outweigh ancient evolutionary relevance during voice identity discrimination.