

Language discrimination in dogs – an fMRI study on the effects of immersion in a new language

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Introduction

Human infants are learning one word per waking hour at the peak period of language acquisition¹. Doing that **effortlessly** is enabling them to get from babbling at 6 months of age to full sentences by the age of 3 years². They are tuned to spoken language from birth and use **computational strategies** to detect the statistical and prosodic patterns in language input³.

In contrast there is a limit to language capacity in non-human species in terms of vocabulary, achieving symbolic communication ability and reciprocal receptive behaviors⁴.

However similarly to infants there is evidence for:

- language discrimination by cotton-top tamarins⁵ and rats⁶;
- sensitivity to transitional probabilities in cotton-top tamarins⁷ and rats⁸.

Dogs live in the **same language environment** as humans, they attend to spoken words and process them similarly to humans^{9,10}. Consequently the aim of the present study is to investigate if a neural attunement to the surrounding language can be observed in dogs, similarly to humans.

Method

Subjects N = 2 Mexican dogs recently moved to Hungary

Design Longitudinal fMRI study on language immersion:

Scanning every 1,5 months (first scanning within the first month of their arrival)

Segmental experiment: pseudowords (not presented here)

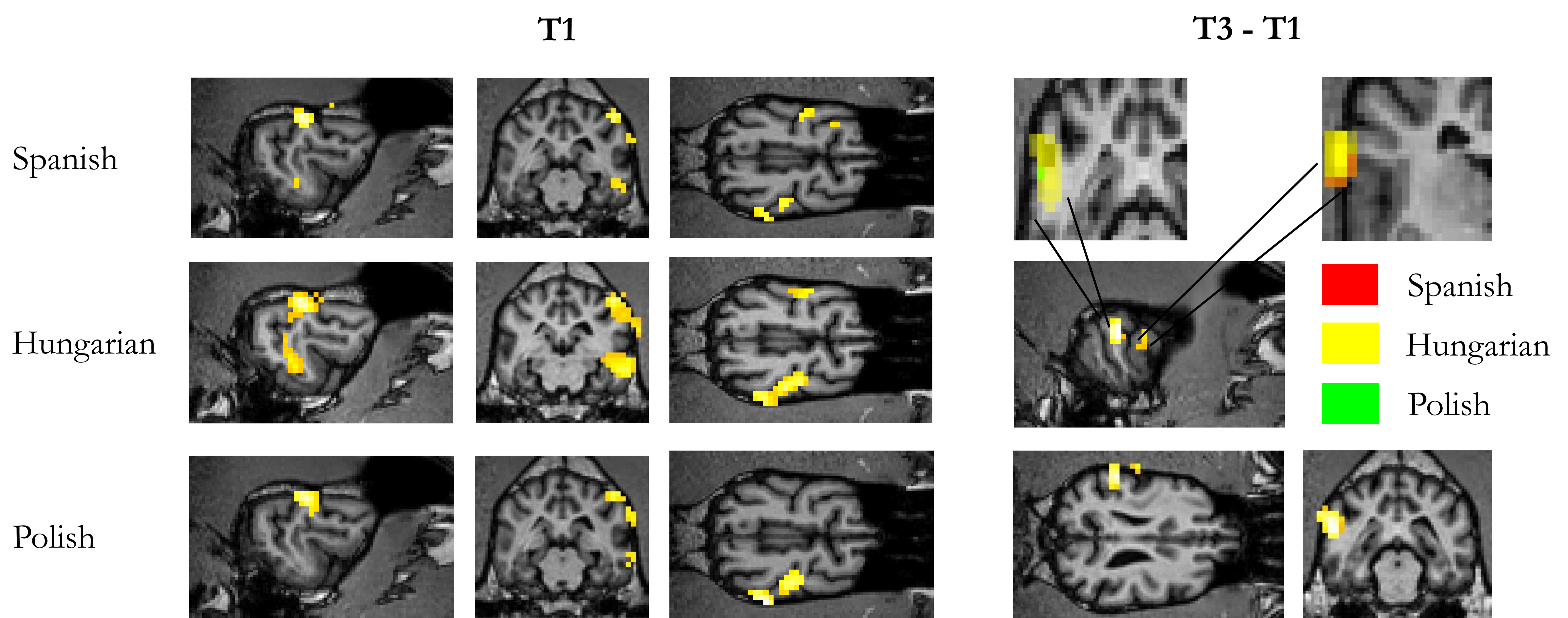
Suprasegmental experiment: excerpt from the Little Prince

Stimuli 3 languages with different phonetic structures and intonations:

- 'Native language' – Mexican Spanish
- Immersion language – Hungarian
- No contact language – Polish

Acquisition details Sparse sampling, 8 channel coil

Results



Conclusions

- Right hemispheric activation for human language (see Andics et al, 2016)
- More extended activations for the novel but not for the unknown language – learning?
- Traces of neural specialization for the familiarity effect

References

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