

Learning repetition-based regularities in speech: a NIRS study with 7-month-old infants

Gaia Lucarini¹, Alessia Pasquini¹, Judit Gervain^{1,2}

¹University of Padua (UNIPD); ²Université Paris Cité

gaia.lucarini@phd.unipd.it; alessia.pasquini@studenti.unipd.it; judit.gervain@unipd.it

Infants exhibit a robust capacity for learning rules from speech. By 6 months of age, they can encode both repetition- and diversity-based regularities between adjacent syllables (e.g., ABB: “mubaba” vs ABC: “mubage”, respectively; de la Cruz-Pavía & Gervain, 2021). By contrast, non-adjacent repetitions (e.g., ABA: “bamuba”) have been investigated only in newborns (Gervain et al., 2008), who fail to discriminate them from diversity-based controls (ABC).

Since non-adjacent dependencies play an important role in language, in this study we investigate if 7-month-old infants can discriminate non-adjacent repetitions from ABC controls using Near-Infrared Spectroscopy (NIRS). We compare a repetition-based ABA artificial grammar and an unstructured ABC control grammar. Infants’ brain responses are recorded from the frontal, temporal, and parietal regions, bilaterally.

Data collection is ongoing. Preliminary results from 13 babies (6 females, mean age:

210.4 days) suggest that infants encode both non-adjacent repetitions and diversity-based structures as compared to baseline in bilateral temporal areas (Fig. 1).

If confirmed, these results suggest that infants are able to encode non-adjacent repetitions as early as 7 months of age, laying the foundations for grammar learning.

References

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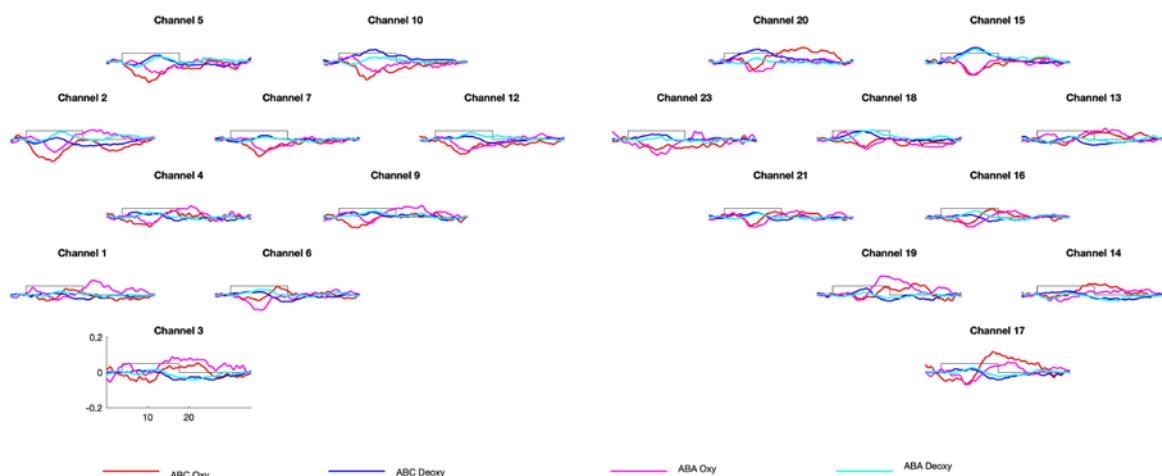


Figure 1. Infants’ grand average hemodynamic response to ABA and ABC patterns in frontal, temporal and parietal channels. The x-axis represents time in seconds; the y axis shows the concentration in mmol x mm. The rectangle along the x-axis indicates the time of stimulation.