The neural correlates of natural speech rhythm processing in Arabic, French and bilingual infants

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To what extent does the native language shape the encoding of continuous speech in early development? This study aims to better understand the impact of prosody on neural responses in populations of monolingual and bilingual infants across different rhythm class languages, specifically stress-based (Arabic) and syllable-based (French). We will compare infants at different stages of development, 6 and 20 months. Six-month-old infants are thought to rely heavily on lexical stress and syllables for word recognition [1,2]. However, this effect is mostly observed in isolated words, and the age at which infants recognize these accentuated words depends on their native language [3,4,5]. Studying developmental differences across languages is critical because most language acquisition research has concentrated on WEIRD languages [6]. Besides, cross-linguistic comparisons allow us to assess whether neural specialization occurs and evolves in the encoding of rhythmicity in speech and if this process is language-specific. 3.5-month-old bilingual infants are already more sensitive to within rhythmic class variations than monolinguals [7]. This behaviorally tested sensitivity to rhythm in bilinguals might reveal early differences in cortical encoding of speech between monolinguals and bilinguals. To assess how neural specialization to the native rhythm develops in monolingual and bilingual infants, we will use mTRF applied to EEG data collected while infants are presented with natural continuous speech, either in their native language or a foreign one or their two native languages [8,9,10]. We evaluate the accuracy of an audio signal-to-cortical response matching predictive full model based on different regressions, including acoustic (i.e., syllables, lexical stress, speech envelope, and phonetic features) and linguistic features (i.e., word onset, sentence onset, word comprehension, grammatical categories) to extract the importance of rhythmic variables in speech encoding. P.S : The poster will resume the theoretical and methodological aspects of the study and present the results of a pilot study in adults as well as preliminary data in French monolingual and bilingual infants of both ages at the time of the conference.