Phonological Features and MEG
-M100 (auditory cortical evoked field) sensitive to coronal vs dorsal consonant distinction
-M100 latency differences for coronal vs. dorsal with as little as 50ms burst stimulus
-Suggests consonant feature extraction as early as M100 processing stage

Questions:
-Which phonological features modulate M100?
-Is feature-dependent modulation based on phonological knowledge or a consequence of general auditory processing?

PRESENT STUDY
Comparing M100 for Amharic and English listeners on a language-specific feature contrast: Plain vs. Ejective Stops
Amharic: Semitic language of Ethiopia and Eritrea spoken by approximately 25 million people
Ejective stop consonants share place articulation with plain stops, differ in their manner of production: Larvae raised during stop closure creates distinctive "popping" sound
Ejective stop consonants differ from plain stops in overall amplitude and spectral details of burst (95% CI = -13.133 - -0.042) p = 0.0356

M100 should show effects of manner of articulation and natve language

METHODS
M100 recorded from healthy adults (20 to 30 years old) with normal hearing sensitivity (better ear 50-120 dB HL)

Stimuli:
-Burst portion of voiceless plain and ejective Amharic stops (45ms burst segments) extracted from CV syllables in carrier phrase: /pʊtɪ/ (plain) and /pʊtɪ'/ (ejective)

Participants:
-9 native speakers of Amharic:
-From Addis Ababa region of Ethiopia
-Recruited from Addis Ababa University

Participants:
-9 native speakers of English:
-From Maryland community
-Recruited from the University of Maryland

Participants received monetary compensation or course credit for their time

MEG Recording:
-160-channel whole-head biomagnetometer with axial gradiometer sensors (KIT System, Kanazawa, Japan)
-Recording bandwidth: DC-200 Hz, 60 Hz notch filter, 500 Hz sampling rate

Sensor Selection:
-5 sinks, 5 source sensors from Left Hemisphere selected for each participant based on M100 elicited by pretest 250 Hz tone localizer

RESULTS
M100 M100
Amharic Speaker M100 to /k'/ Amharic Speaker M100 to /k'/

Amharic Speakers:
-No significant effects of place
-Significant effect of manner on M100 amplitude:
-English speakers to code this distinction generally

Amharic Speakers:
-Place of articulation only coded in the M100 for English speakers, not for Amharic speakers

PHONETICAL FEATURES AND MEG

DISCUSSION/OPEN QUESTIONS
English speakers can distinguish coronal stops from other stops based solely on stop bursts, even when dealing with foreign language stimuli, why not Amharic speakers?

Why an effect of manner only in alveolar stops for English speakers?

Why no effect of manner on latency in Amharic speakers?

Why normalization of stimuli removed important cues to ejectives (amplitude), this may lead to a generally weaker effect

REFERENCES

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