Elementary speech processing in young adults

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Background

The brain analyzes the spectral and temporal information of the speech signal. The paradigm proved to be suitable for testing the paradigm on young adults to check its suitability.

Hypotheses

Behavioral:

1. Comparisons between syllables with shorter voice onset time (VOT) differences are more difficult to compare between adults and adults with shorter VOT differences.

2. Shifts in stress patterns of words are easier to detect than shifts of stress intensity at equal word positions.

Functional brain processing:

3. Auditory evoked potentials (AEP) elicited by syllables with longer VOTs show higher peak amplitudes than AEPs elicited by syllables with shorter VOT.

4. Deviant stimuli show an increased amplitude peak of auditory evoked potentials (AEP) compared to the standard stimulus.

5. Sources of AEP peaks are located in the ARC and show a leftward preference for processing fast changing auditory information and a rightward preference for slowly changing auditory information.

Methods

Participants:

21 Participants from 19 to 29 years of age (mean age 23.62 ± 2.439 SD) who were native Swiss German speakers who reported no bilingualism. None of the subjects was proficient in any music-related skill and all of them were right-handed.

Stimuli:

a) short-term integration: voice onset time (VOT) variations

b) long-term integration: prosody variations

EEG Recordings:

a) short-term integration

b) long-term integration

VOT discrimination task: 432 Trials divided into two blocks

EEG data:

a) Behavioral data

b) EEG data

c) Functional-behavioral relations

Data Analysis:

a) Behavioral data

b) EEG data

c) Functional-behavioral relations

Results

Behavior:

a) short-term integration

b) long-term integration

Categorization /da/ or /fa/

Word discrimination

VOT comparison

Standard Deviant 1

Standard Deviant 2

References


Outlook

- Extended cognitive testing.
- MRI scanning.
- Extended sample size.
- Investigation of different age groups.