Audiovisual Entrainment to Pseudo-speech Signals

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BACKGROUND

Speech detection thresholds for AV < A alone [1]
Best for correlated auditory and visual envelopes

How is envelope correlation tracked across modalities?
Signal transmission rates, processing areas differ

Current Experiment:
Measure steady state responses (SSR) using MEG
- quantify entrainment to periodic A,V, and AV stimuli
- at a speech-relevant modulation frequency
- with synchronous or asynchronous envelopes

Predictions:
1. Increase in SSR power for AV modulated stimuli
2. Envelope asynchrony reduces entrainment response

RESULTS

SSR reliably elicited to AV pseudo-speech signals

Grand averaged linear SSR power (n = 14)

Increase in power for AV SSR in Auditory Sensors

SSR power (dB) by condition

1. Greatest response in Posterior Temporal & Occipital sensors
2. Significant SSR at Fm and 2nd harmonic
3. No significant SSR in Anterior Temporal sensors

DISCUSSION

1. Multisensory SSR elicited using novel stimulus types
2. AV modulated stimuli induced greatest response change in auditory sensor areas
3. Topographic phasor plots suggest harmonics may reflect differential processing within & across modalities

• No effect of envelope phase shift?
  • Some asynchrony is tolerated for AV detection and synchronicity judgment [1,2]; onset/offset synchrony may have driven perceptual ‘grouping’ of AV in these stimuli
• No power increase in visual sensors for bimodal stimuli [cf. 3]
  • Differences in unimodal control conditions for comparison
• Does envelope tracking response scale up to real speech?
  • Speech envelopes have variable rates, also FM in speech

SELECTED REFERENCES & ACKNOWLEDGMENTS