Neural correlates of distraction in auditory scene analysis
Sebastian Pavlovic¹, Karla D. Ponjavic-Conte¹, Matthew S. Tata¹; ¹University of Lethbridge

Introduction

• We investigated the neural correlates of distraction in a selective listening task.

• Sustained attention modulates early ERP components (e.g., the N1) (Hillyard et al. 1973; Naatanen & Mitchie, 1979), but transient attention does not (Schroger, 1993; Tata et al. 2001).

• We hypothesized that breaking sustained attention with a competing distractor would negate attentional modulation of early ERP components.

• Previous work suggested that distraction reduces inter-trial phase locking (Ponjavic et al. 2012).

• We looked further into the neural correlates of distraction in selective listening by replicating the previous study and reconsidering the ITPL effect of distraction.

Methods

Distraction Impairs Perception

Distraction Modulates Early ERP Components

Outcomes

EEG Analysis:

• EEG recorded with 128-channel Electrical Geodesics array

• ERP analyzed in BESA

• Inter-trial Phase Locking (ITPL), Evoked and Induced power computed with MATLAB

Distraction Reduces Phase Locking

Conclusions

• Distraction disrupts attentional modulation of early ERP components

• Distraction phase-shifts (lags) early auditory response to targets

• Distraction attenuates gain of baseline ERP components and may also disrupt phase locking

References

Hillyard S. A. et al. (1973), Evoked potentials of selective attention in the human visual system


Tata, M. S., et al. (2001). Transient spatial attention modulates distinct components of the transient ERP.

1) Distraction attenuates gain of baseline ERP components and may also disrupt phase locking

2) Distraction results in lower ITPL - FDR Corrected p-values

Distraction Difference at 120 ms

−0.8 µV
−0.8 µV
reference free
reference free
0.08 µV/step
0.08 µV/step

Distraction Difference at 120 ms

−0.8 µV
−0.8 µV
reference free
reference free
0.08 µV/step
0.08 µV/step