Regular glimpsing windows provide release from energetic masking

Maury Lander-Portnoy & Jason Zevin

Introduction

Energetic Masking

- Peripheral Overlap of Noise and Target

Auditory Stream Segregation

- Cohesion of disparate information into single percept (stream) and separation of that percept from others

Glimpsing Speech in Noise

- Taking advantage of periods with relatively unmasked target

Hypothesis & Predictions

Temporal regularities of noise can provide masking release by stream segregation

- The repetition of noise patterns (Cond. 1) should allow for auditory streaming and thus provide more masking release than:
  - The same glimpsing windows but without repetition to allow streaming (Cond. 2)
  - Random patterns of equal glimpsing duration (Cond. 3)

Methods

Experiment

- 60 USC undergrads with normal hearing
- Speech Perception in Noise (SPiN)
  - Open-Set Word-Recognition
  - Correct or Incorrect (No Partial Credit)

Targets

- 108 Multisyllabic words
  - Nationwide Speech Project Corpus

Methods (cont.)

Maskers

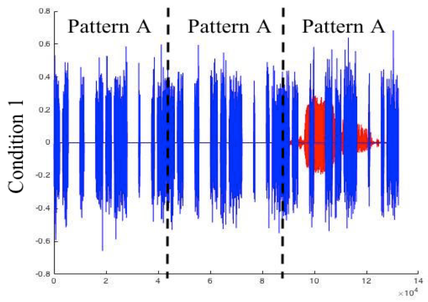
- Speech shaped noise
  - Correlated to aggregate of all targets
  - SNR of -10 dB

Stimuli

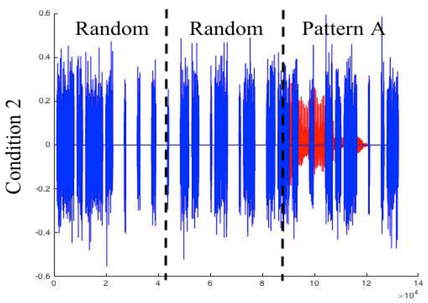
- Have long (100ms) or short (25ms) silences
  - Occur in 3 repeating 8Hz patterns per trial
  - Third repetition masks target
- 3 conditions differ in noise patterns

Conditions

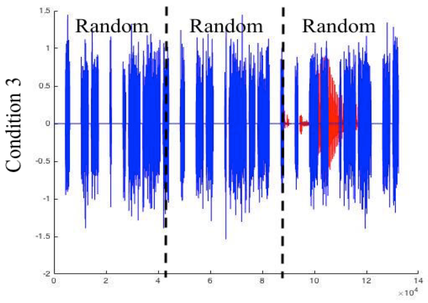
Cond. 1:
3 repetitions of a pattern that recurs across trials



Cond. 2:
2 random novel patterns followed by the same recurring pattern as Cond. 1

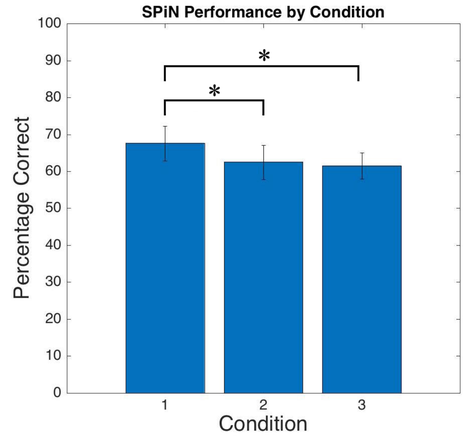


Cond. 3:
3 random novel patterns



Results

- Means: Cond. 1 = 66%; Conds. 2&3 = 61%



Cond. 1 shows highly significant difference from Cond. 2 (β = -.213, z = -3.24, p = .001) as well as from Cond. 3 (β = -.232, z = -3.53, p < .001)

Conclusion & Future Work

Online repeating temporal information affords improvement on SPiN task

- What mechanism underlies this?
  - Auditory Stream Segregation?
    - Takes time to build-up, dissipates quickly
    - Heavily reliant on auditory attention
  - Predictive Glimpsing?
    - Does not build-up, should not dissipate quickly
    - Level of reliance on auditory attention unclear

References

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