

# List Equivalency in the Measurement of Listening Effort

## Use of SPIN Lists in a Dual-Task Paradigm

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### INTRODUCTION

- Listening effort is the cognitive resources allocated for understanding speech
- A dual-task paradigm requires an individual to perform two separate tasks in response to speech stimuli
- Primary Task: Speech Recognition, Secondary Task: Recall Performance
- In order to ensure accurate results, test materials must be equivalent
- Purpose: to investigate the equivalency of the SPIN lists for the measurement of listening effort within a dual-task paradigm
- Research Questions:
  - Are the SPIN lists equivalent with each other?
  - Are the high- and low-context sentences equivalent with each other?

### METHODS

#### Participants

- 25 adult, native English speakers with normal hearing

#### Equipment

- Speech stimulus presented in a sound treated booth through earphones

#### Materials

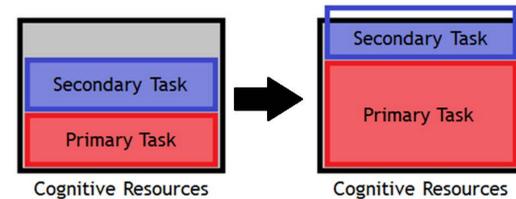
- Speech Perception in Noise (SPIN) sentences
- Contains 8 lists each with 50 sentences
- Half high-context and half low-context sentences
- Presentation order of sentences randomized
- Sentence-final target word
- Administered with background noise

A chimpanzee is an ape

She might have discussed the ape

### METHODS

#### Dual-Task Paradigm

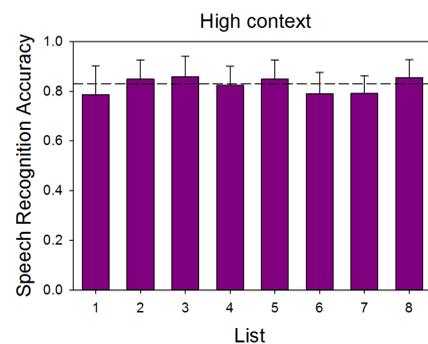


Performance on the secondary task quantifies the effort required for the primary task

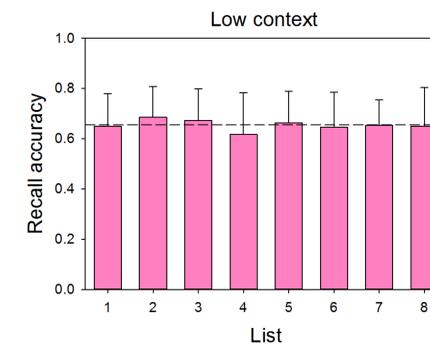
#### Procedure

- Participants listen to each sentence and identify the last word they heard
- At the end of each list, participants recall as many of the eight words as they can remember
- According to dual-task paradigm, changes in listening effort can be quantified by the subject's recall ability for that sentence
- Results are scored on the basis of correct word identification and correct recall

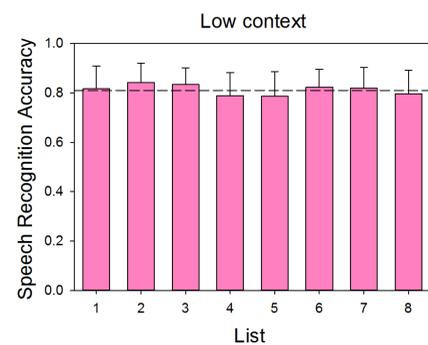
### RESULTS



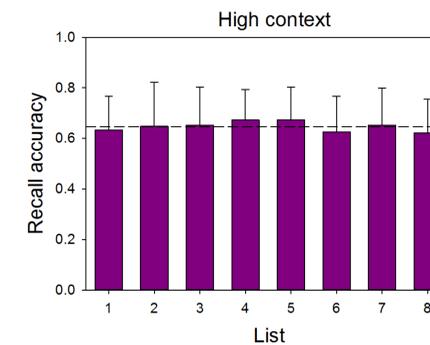
Graph 1. For speech recognition, the effect of list was significant for high-context sentences



Graph 2. For speech recognition, the effect of list was not significant for low-context sentences

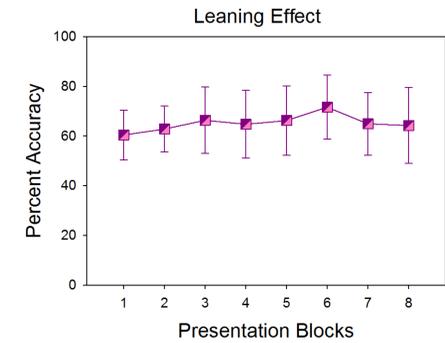


Graph 3. For recall, the effect of list was not significant for high-context sentences

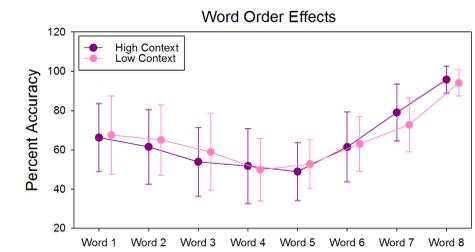


Graph 4. For recall, the effect of list was not significant for low-context sentences

### RESULTS



Graph 5. Participants demonstrated a learning effect during the first 75% of the recall test, followed by the effect of fatigue for the last 25%



Graph 6. Participants demonstrated higher accuracy for the last (recency) and first (primacy) words presented

- In addition, no significant difference was found between high and low context performance for neither speech recognition nor recall

### DISCUSSION/CONCLUSIONS

- The SPIN sentences were found equivalent in terms of both list equivalency and high-/low-context equivalency for a dual-task listening effort measures
- During speech recognition tasks, high context lists were found to be not equivalent. Clinicians should take caution when administering the SPIN lists comparatively as a speech perception measure
- Further research should investigate the equivalency of the SPIN lists for listening effort measures for individuals with hearing loss

### REFERENCES

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### CONTACT

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