



# Use of linguistic knowledge in the recognition of reduced words: effects of age and high-frequency hearing loss

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## REDUCED SPEECH AND AGING

### Reduced speech

- 'Reduced' pronunciations are ubiquitous in casual speech (e.g., 'onry' for 'ordinary')
- Many reduced words only identified accurately when presented in their original neighbouring-words context (cf. Ernestus et al., 2002).

### Context effects on word recognition and aging

- Older adults benefit more from semantic context in spoken-word recognition than young adults (Nittrouer & Boothroyd, 1990; Pichora-Fuller et al., 1995).
- However, this claim mainly based on (high-predictability) contexts of *Sentence-Perception-In-Noise* materials.

### Focus here: Fixed-expression contexts

→ Conditional probability of words in word combinations (role of linguistic experience)

→ *Following-word* context may facilitate 'late' word recognition, as in recognition of 'promised' in *promised land* vs. *promised lamp*

## RESEARCH QUESTIONS

1. Do older adults rely more on following-word context than young adults for spoken-word recognition?
2. Are there any interactions with the morphological complexity of the target word because longer words can be more reduced?
3. Does low-pass filtering the speech stimuli bring about a greater reliance on following-word context in young adults?

## WORD IDENTIFICATION EXPERIMENT

### Participants

- 56 highly-educated older adults ( $M=71$  years ( $SD=6$ , 61-86), average PTA over 1, 2, and 4 kHz in best ear is 28 dB;  $SD=14$ )
- 24 normal-hearing young adults ( $M=21$  years)
- 24 normal-hearing young adults ( $M=21$  years) who were presented with low-pass filtered speech stimuli

## Materials and manipulations

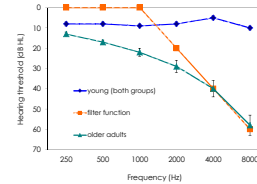
Native-Dutch speaker produced Dutch phrases in a fast and slurred way

- 48 four-word phrase pairs ('to the promised lamp/land')
- 24 of which with simple adjective ('fat')
- 24 of which with complex adjective ('promised')
- 96 filler four-word phrases without fixed expressions

*Cross-splicing*: initial-three-words part (including target word) of non-fixed expression used in both fixed and non-fixed condition

*Filtering*: Low-pass filter: -20 dB/octave dampening above 1 kHz

Note: only one group of young adults were presented with *filtered* stimuli



## Procedure

- Task: repeat third word of each phrase; be as fast and as accurate as possible
- Fixedness manipulation: target presented either in fixed-expression or non-fixed-expression context (rotated over targets on two experimental lists)
- Speech presented at 80 dB SPL for all listener groups

## RESULTS

### Accuracy

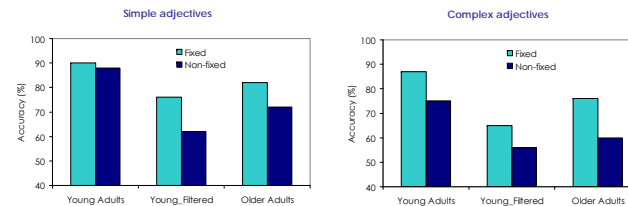


Figure 1. Word recognition accuracy in fixed and non-fixed expression conditions for the three listener groups.

### Simple target words

- \* main effect of Fixedness
- \* no interaction Fixedness x Listener Group

### Complex target words

- \* main effect of Fixedness
- \* Fixedness x Listener Group (effect smaller for filtered group)

## Response Latencies

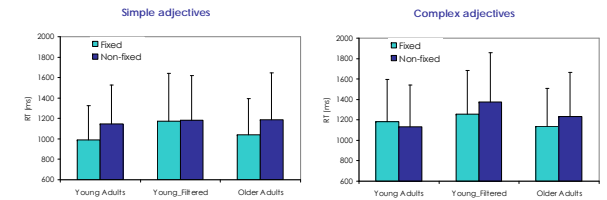


Figure 2. Word recognition RT (from target word onset) in fixed and non-fixed expression conditions for three listener groups. (Error bars = 1 SD).

### Simple target words

- \* main effect of Fixedness
- \* Fixedness x Listener Group (effect smaller for filtered group)

### Complex target words

- \* main effect of Fixedness
- \* Fixedness x Listener Group (effect larger for older adults)

### Individual differences among older adults (accuracy and RTs)

- Hearing sensitivity predicts performance
- But no interaction between Hearing sensitivity and Fixedness

## CONCLUSIONS

1. Older adults only relied more on following-word context than young adults in how fast they recognised complex adjectives
2. Complex adjectives have more unstressed vowels and thus more room for reduction. Greater knowledge on transitional probabilities may be particularly useful for more reduced and thus less intelligible words.
3. Signal degradation does not bring about a greater reliance on this type of context:
  - not in young adults: *smaller* effects in filtered-speech condition
  - not among older adults: those with more hearing loss did not show greater effect of fixed-expression context