

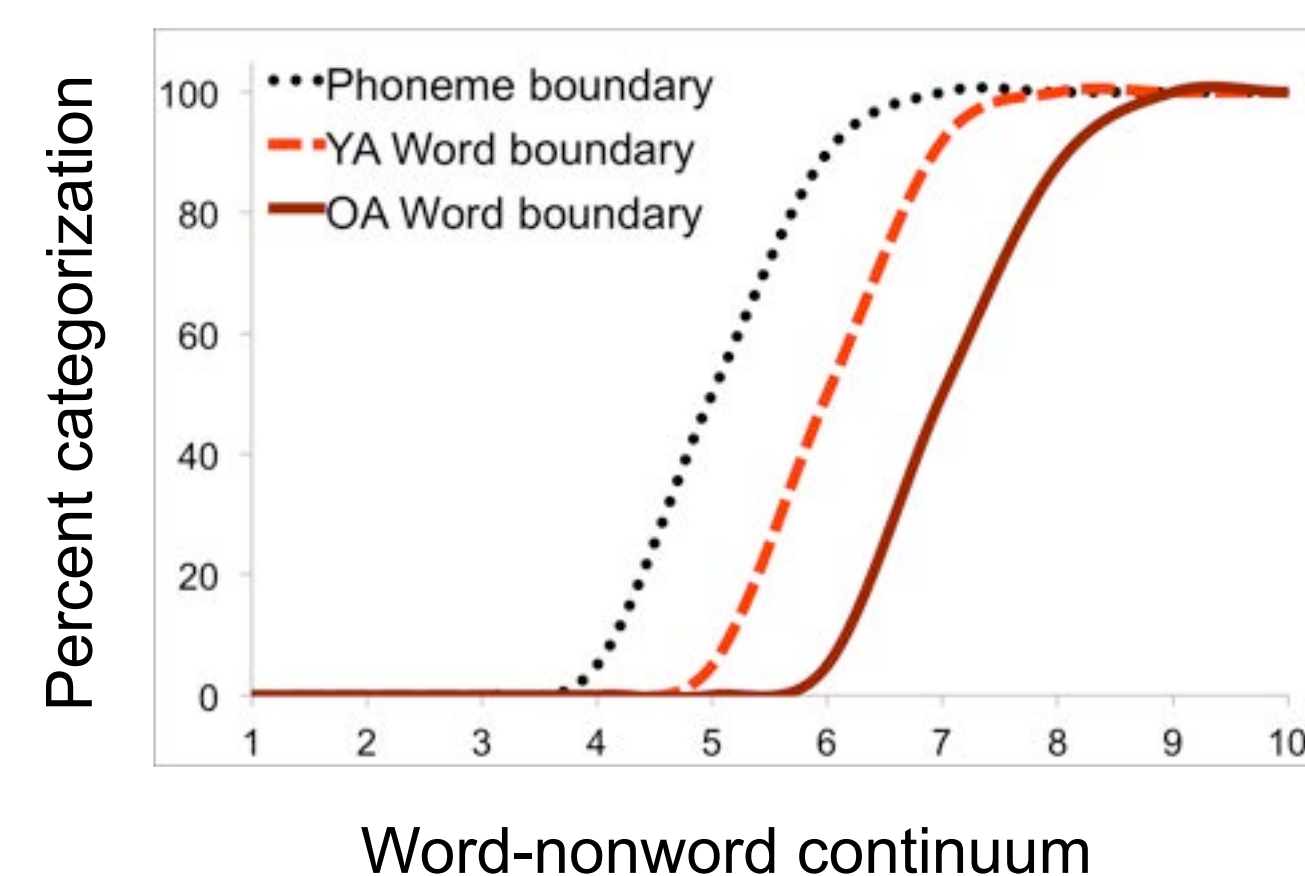
Lexical effects in older adults' sensorimotor adaptation for speech

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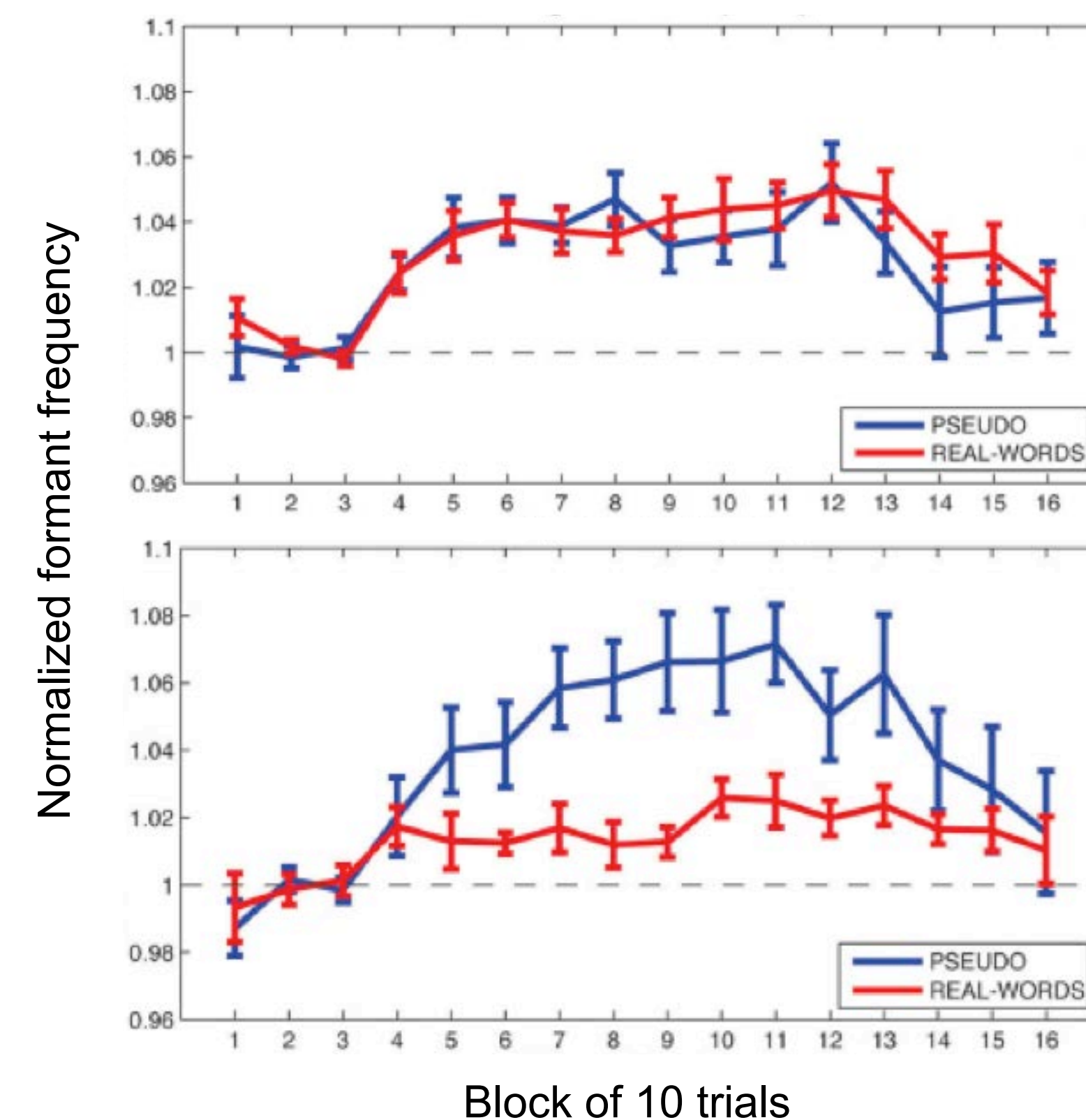
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Introduction

- Listeners will categorize more tokens as real words along a word-nonword continuum (Ganong, 1980)
- Older adults show larger lexical effects compared to younger adults (Mattys & Scharenborg, 2014)



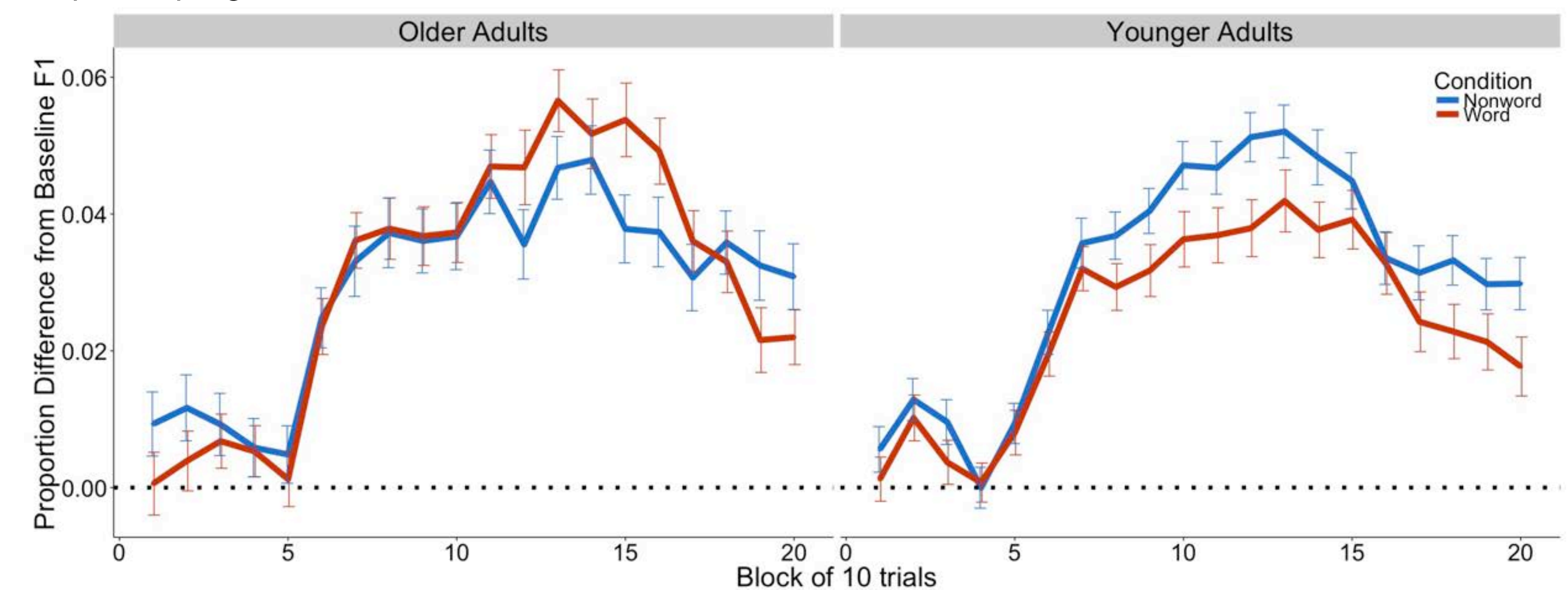
- Listeners compensate to altered auditory feedback by shifting their productions in the opposite direction of the feedback shift
- If feedback affects lexical status, the direction of lexical change affects magnitude of response (Bourguignon, Baum, & Shiller, 2014)
 - Suggests lexical effect reflects implicit shifts to perceptual boundary



Change in F1 frequency when producing real words versus nonwords under altered auditory feedback. **Top panel:** No lexical change (eg., head-hid, bep-bip). **Bottom panel:** Lexical change (e.g., kess-kiss, less-liss). From Bourguignon, Baum, & Shiller (2014).

Results

- Linear mixed-effects model investigating effect of age group and condition on proportion change from baseline F1 for trials during shift phase (Trials 51-150)
- As the shift phase progresses, older and younger adults compensate differently to the two conditions (Interaction between age, condition and trial: $p=0.009$)
 - Younger adults compensate more to nonwords than words
 - Older adults compensate more to words than nonwords, difference between conditions increases as shift phase progresses



Change in F1 frequency when producing words versus nonwords under conditions of lexical change. The feedback manipulation starts after block 5 and ends after block 15.

Research Question

What is the nature of the lexical bias in older adults? Is the increased lexical effect in older adults implicit or a post-hoc decision bias?

Method

Participants

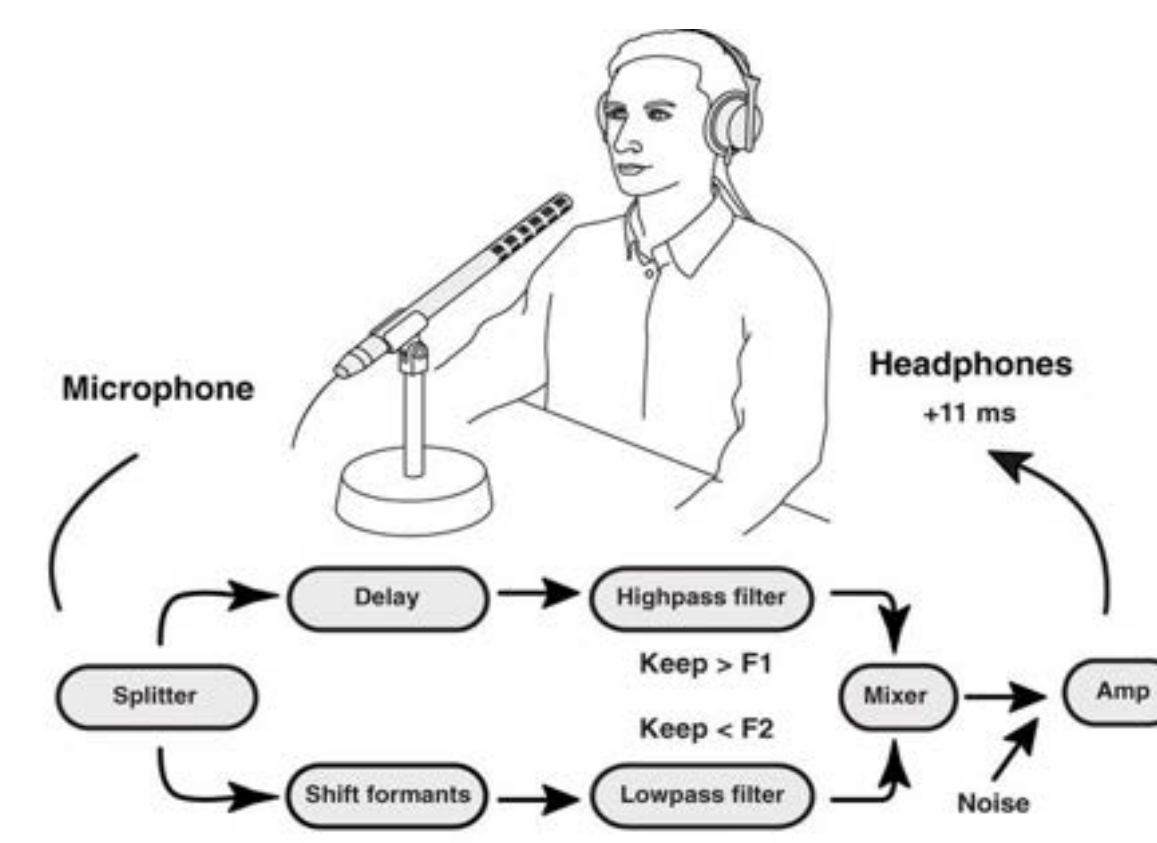
- 27 Older adults ($M_{age}=69.1$)
- 33 Younger adults ($M_{age}=20.7$)

Stimuli

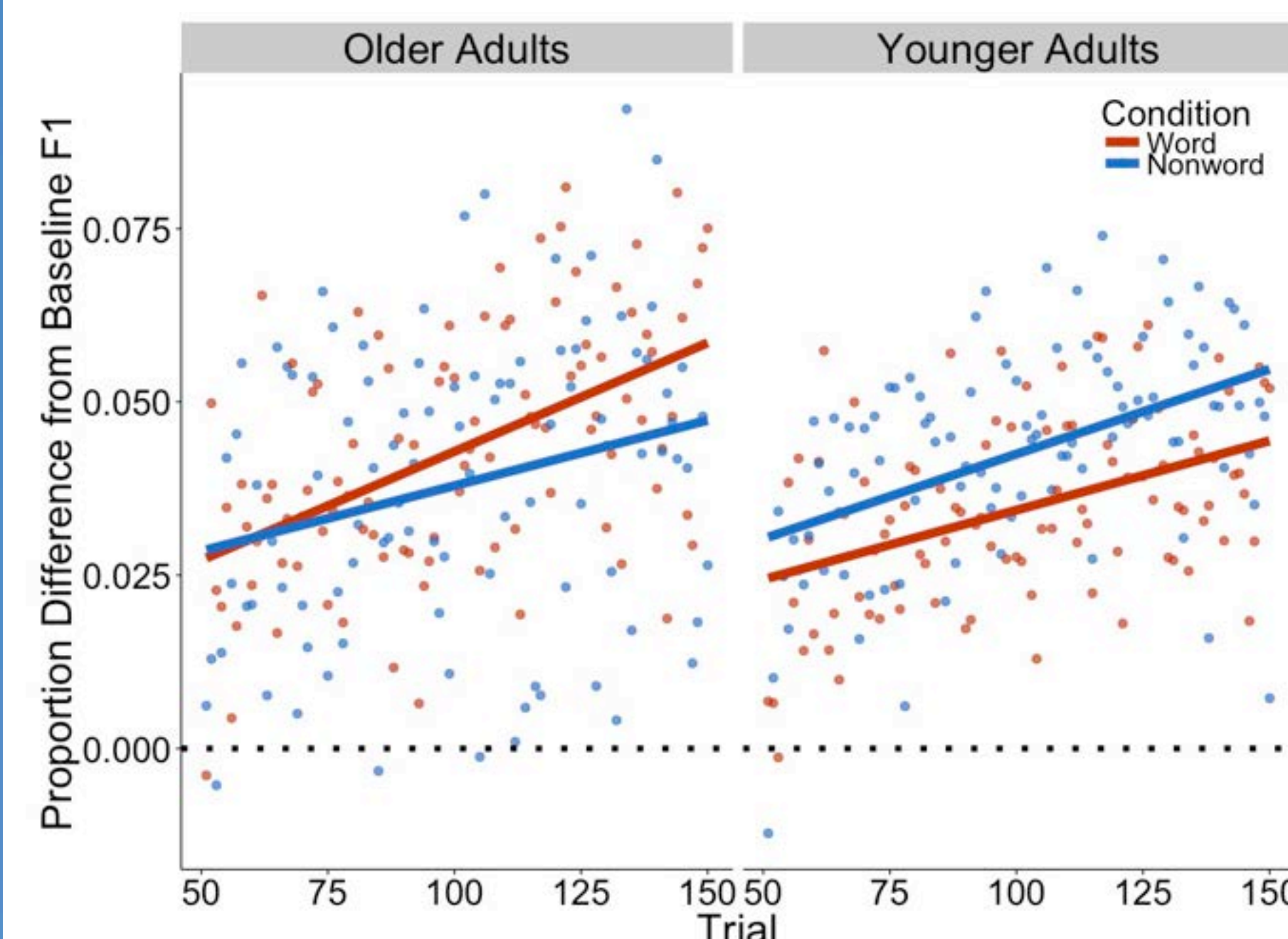
- 2 lexical change conditions: /ɛ/ targets where lexical status changes when shifted toward /ɪ/
 - 10 **Words** (ex., less, keg, death)
 - 10 **Nonwords** (ex., kess, het, steck)

Procedure

- Altered feedback shifts perceived F1 down (towards /ɪ/)
- 200 trials
 - Baseline: 50 trials
 - Feedback shift: 100 trials
 - After effect: 50 trials
- Counterbalanced order of conditions



Experimental set up of altered auditory feedback paradigm. Figure adapted from Lametti et al. (2014)



Average proportion F1 difference during the shift phase (Trials 51-150) by age group and lexical change condition.

Conclusion

- Older and younger adults show different patterns of compensation across the shift phase
- Younger adult results support the idea that the lexical effect reflects implicit shifts to the perceptual boundary
- Older adults show inverse pattern of that expected for the lexical effect
 - Suggests increased lexical bias in older adults is not due to implicit boundary shifts
- Older adult results may be explained by deficit in ability to inhibit dominant (i.e., word) response
 - Feedback from activation at lexical level may result in increased compensation to words

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