Inhibition predicts lexical competition in older adults’ spoken word recognition

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Introduction
- With age, perceptual sensitivity to certain phonetic contrasts decreases (Anderson et al., 2012) and uncertainty becomes more pronounced in speech perception.
- Becomes harder to inhibit similar-sounding high frequency lexical competitors (Revill & Spieler, 2012).
- Inhibitory deficits suggested to play a role in older adults’ speech perception difficulties (Hasher & Zacks, 1988).
- McMurray et al. (2014) found increased lexical competition, not perception deficit, in adolescents with SLI.

Research Questions
Do older and younger adults differ in their sensitivity to VOT?
- Change in looks to competitor with varying VOT
- How does lexical competition affect older adults’ word recognition?
- Overall increased looks to competitor
Do individual differences in inhibition modulate lexical competition?

Results
- Mixed-effects models investigating effect of age group, relative continuum step, and inhibition on log-transformed proportion looks to the competitor image
  - Separate models for /p/- and /b/- side of continuum (Clayards et al., 2008); only ‘correct’ responses included in analysis
- Older adults do not show increased lexical competition nor decreased VOT sensitivity (No main effect of Age group nor of Age group x Continuum step)
- Poorer inhibition predicts more looks to the competitor as stimulus becomes more ambiguous (/p/: Simon x Continuum step interaction – \( \beta =-0.98, p=0.03 \))
- Different effect of inhibition on continuum step in younger and older adults (/p/: Simon x Continuum step x Age group interaction – \( \beta =-2.65, p=0.01 \))

Method
Participants
- 23 Older adults (ages 60-76, \( M_{\text{age}}=67.1 \))
- 19 Younger adults (ages 18-33, \( M_{\text{age}}=22.1 \))

Stimuli
- 6 /b/-/p/- minimal pairs (bin-pin, beach-peach, etc.)
- 9-step VOT continuum made in Praat (Boersma & Weenik, 2016)

Procedure
Visual World Paradigm
- 2 /b/-/p/- competitor images, 2 distractor images
- Participants click circle to hear target word, click on image which matches, while eye movements are recorded
- 6 min. pairs x 9 steps x 10 repetitions = 540 test trials + equal number of fillers = 1080 trials

Simon Task (Craft & Simon 1970; Mueller, 2011)
- Measure of domain-general inhibition
- Participants respond based on colour of stimulus, while inhibiting presentation side
  - Red circle = left shift key; blue circle = right shift key
  - Simon score = RT incongruent trials – RT neutral trials

References

Conclusion
- Sensitivity to VOT and overall lexical competition remain similar in older and younger adults
- General inhibitory ability and age important for how well competitors can be ignored, especially in increasingly ambiguous speech
  - YA with poorer inhibition pay little attention to weak competitors, more distracted by strong competitors than YA with better inhibition
  - OA with poorer inhibition may be more distracted by increasingly ambiguous competitors

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