Inhibitory and Lexical Frequency Effects in Older and Younger Adults' Spoken Word Recognition

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BACKGROUND

Older adults show larger top-down effects compared to younger adults
- Increased lexical bias (Mattys & Scharenborg, 2014)
- More difficulty recognizing words with many phonological neighbours (Sommers & Danielson, 1999)
- Possibly due to deficit inhibiting irrelevant top-down information
  - E.g., Poorer inhibition affects target word recognition (Helfer & Jesse, 2015)

Revill & Spieler (2012) investigated the role of lexical frequency on the time course of spoken word recognition in older and younger adults
- Older adults pay more attention to high frequency items
- High frequency advantage: Beneficial to increase weight of high frequency items to compensate for slowed processing

RESEARCH AIMS

Replicate and extend the findings of Revill & Spieler (2012) by investigating lexical frequency and individual inhibitory ability

Do individual differences in inhibition predict ability to resolve lexical competition in older adults?

RESULTS

Mixed-effects linear regressions to investigate effect of age group, lexical frequency, and inhibitory ability on proportion looks to (1) the target image; (2) the competitor image; and (3) discrimination (Target looks - Competitor looks) during 200-500 ms post-stimulus onset
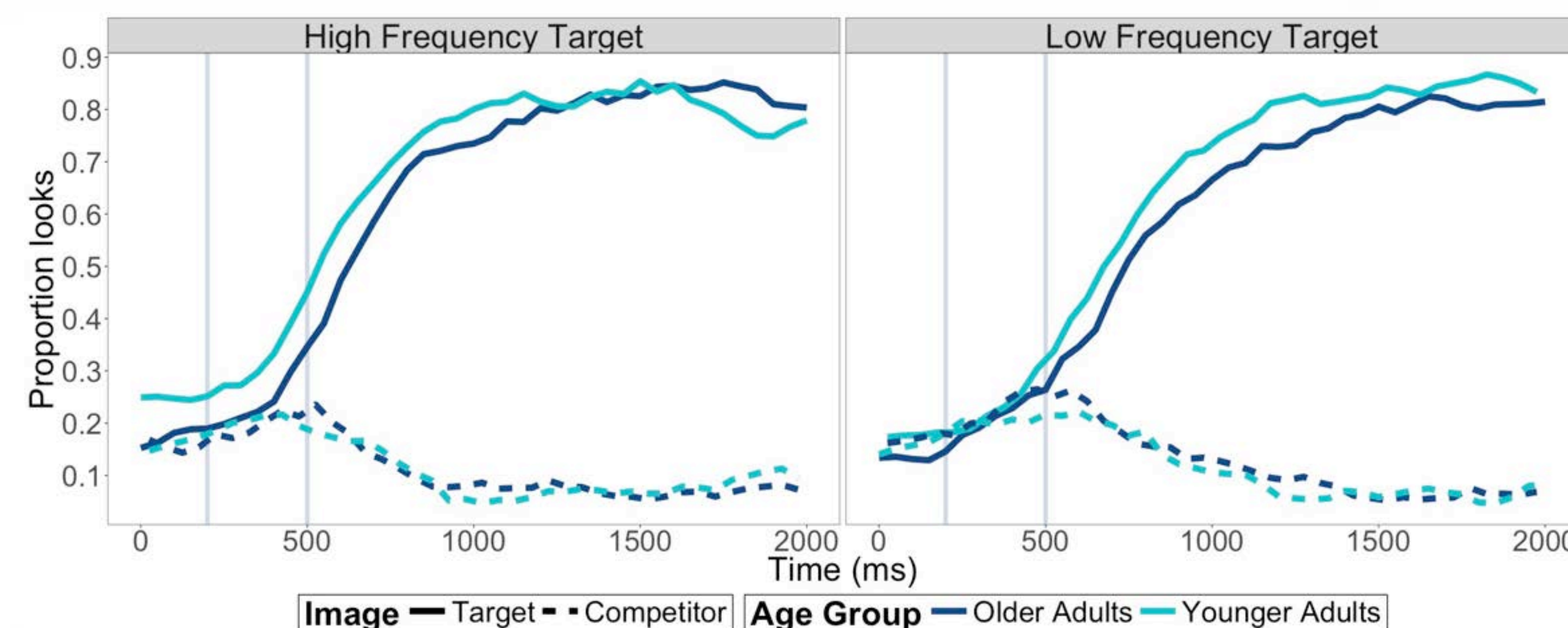
Proportion of looking time to the target and competitor image by age group and target type for 2000 ms following stimulus onset.

Older adults have more difficulty discriminating targets from competitors (Age on discrimination: p=0.04).
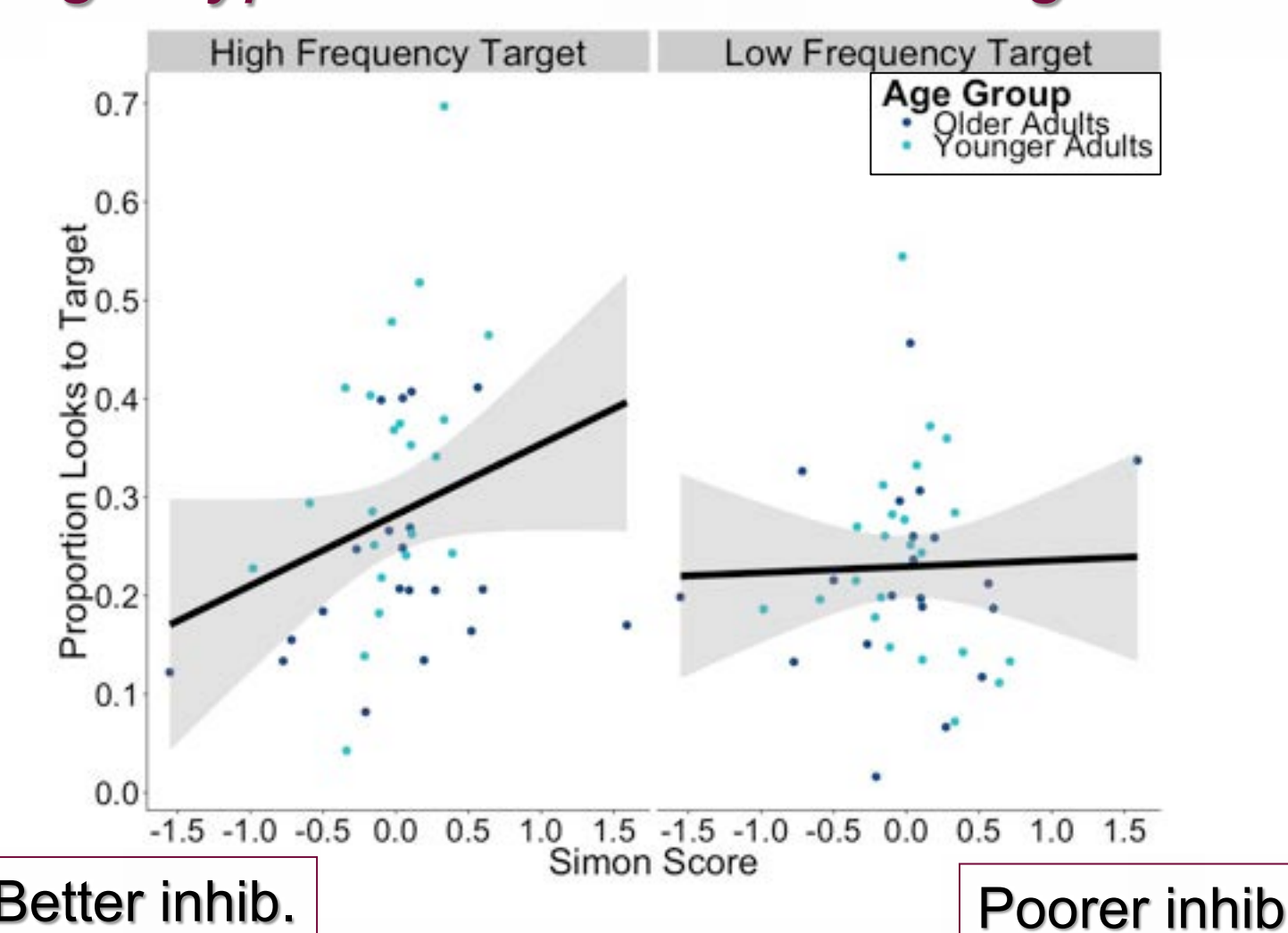
Participants with poorer inhibition look more to high frequency targets (Simon x Target freq on target looks: p=0.04)
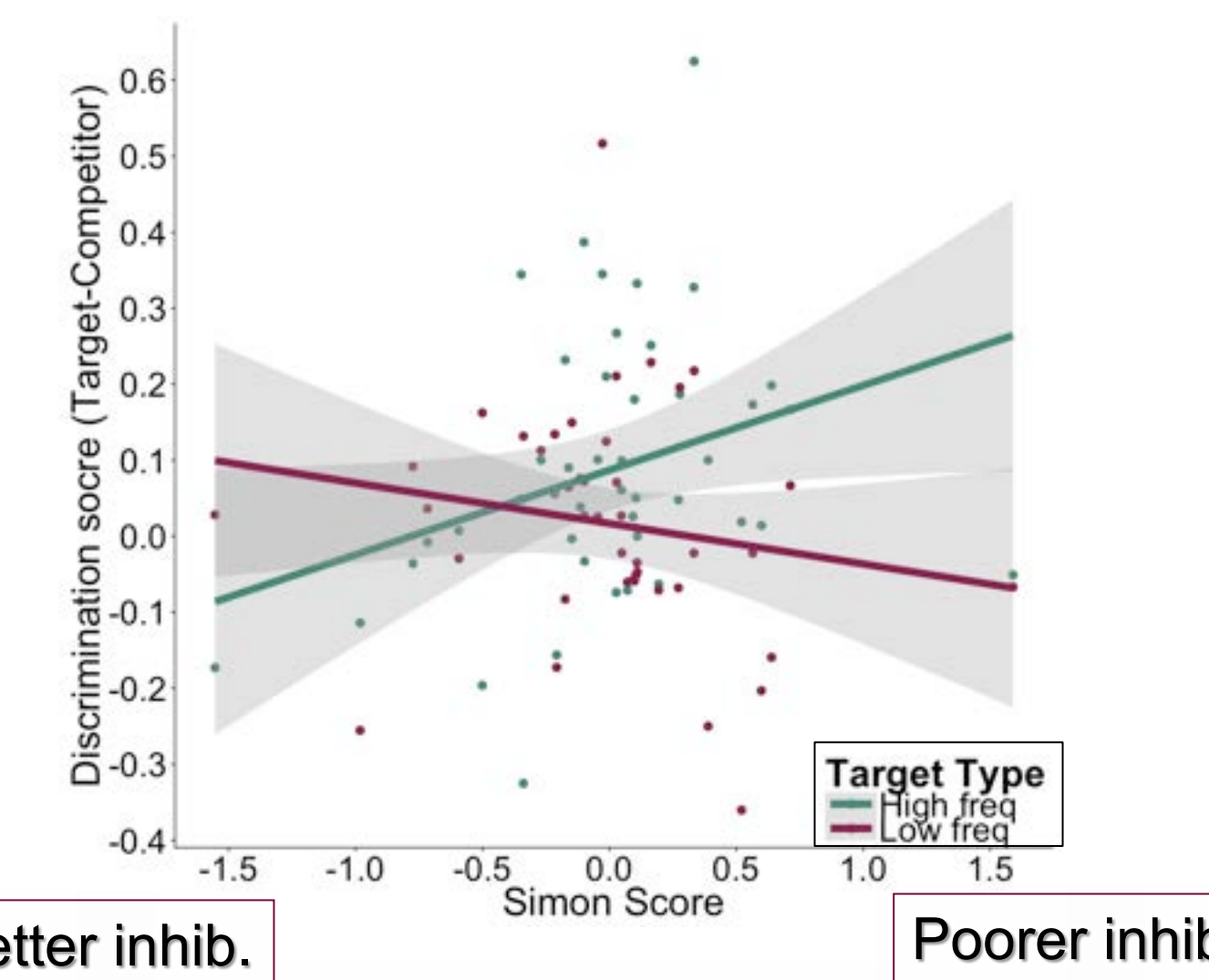
Participants with poorer inhibition discriminate high frequency targets better than low frequency (Simon x Target freq on discrimination: p=0.01)
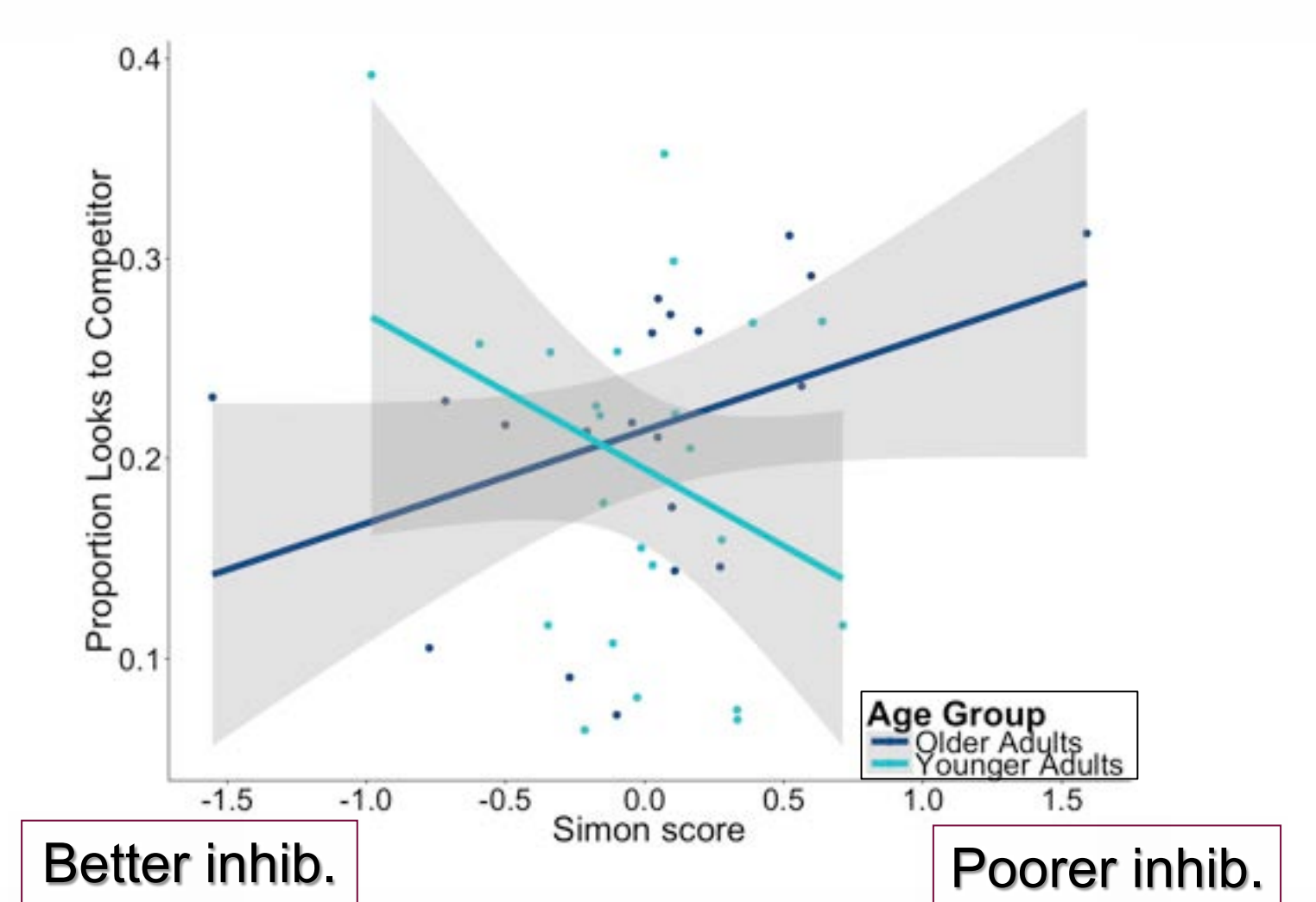
Older adults with poorer inhibition are more distracted by competitors (Age x Simon on competitor looks: p=0.02)

METHODS

Participants
- 21 Older adults (M_{age}=67.5)
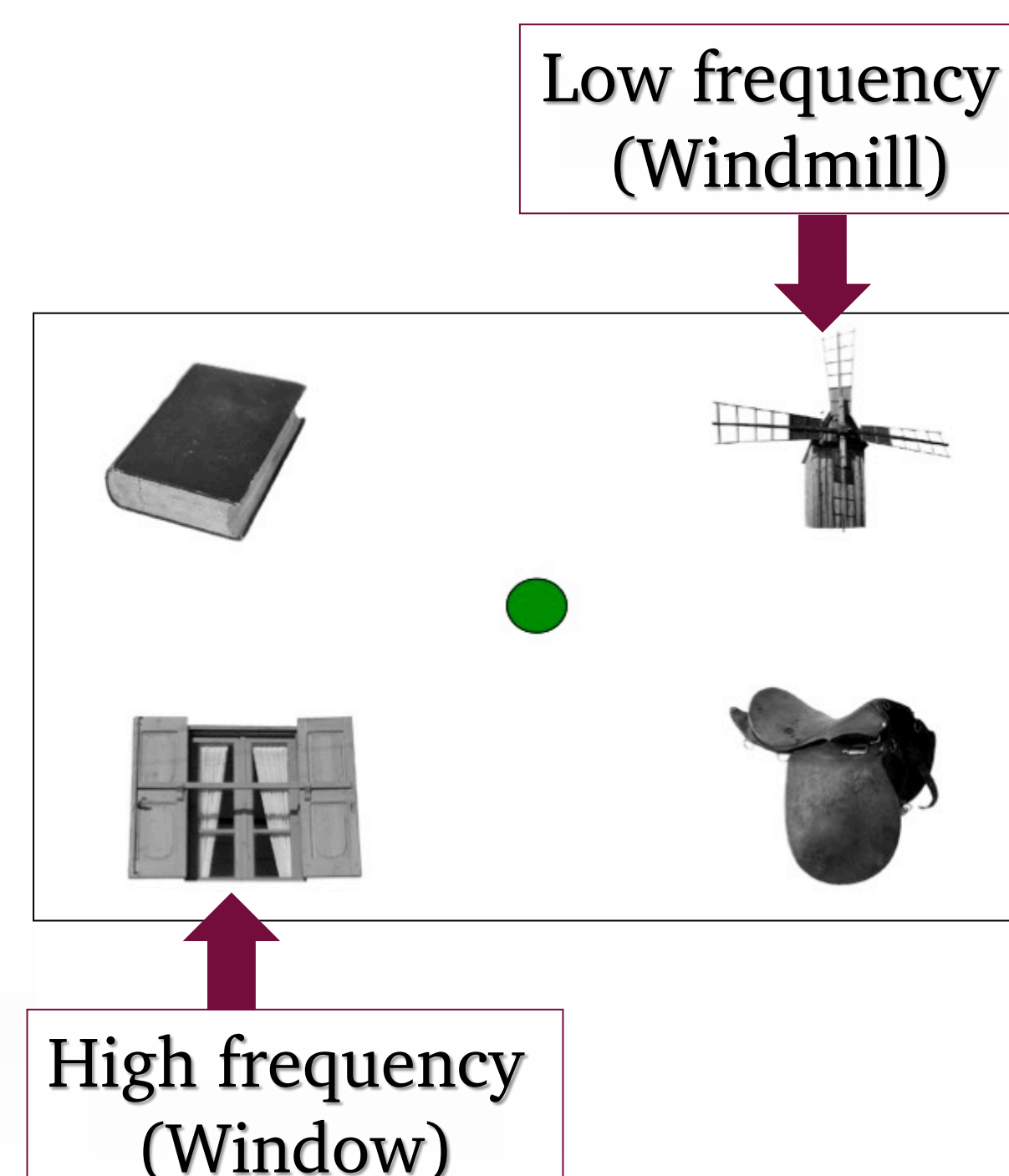- 25 Younger adults (M_{age} = 21.2)

Visual World Paradigm
Stimuli
- 15 onset competitor pairs that differ in lexical frequency
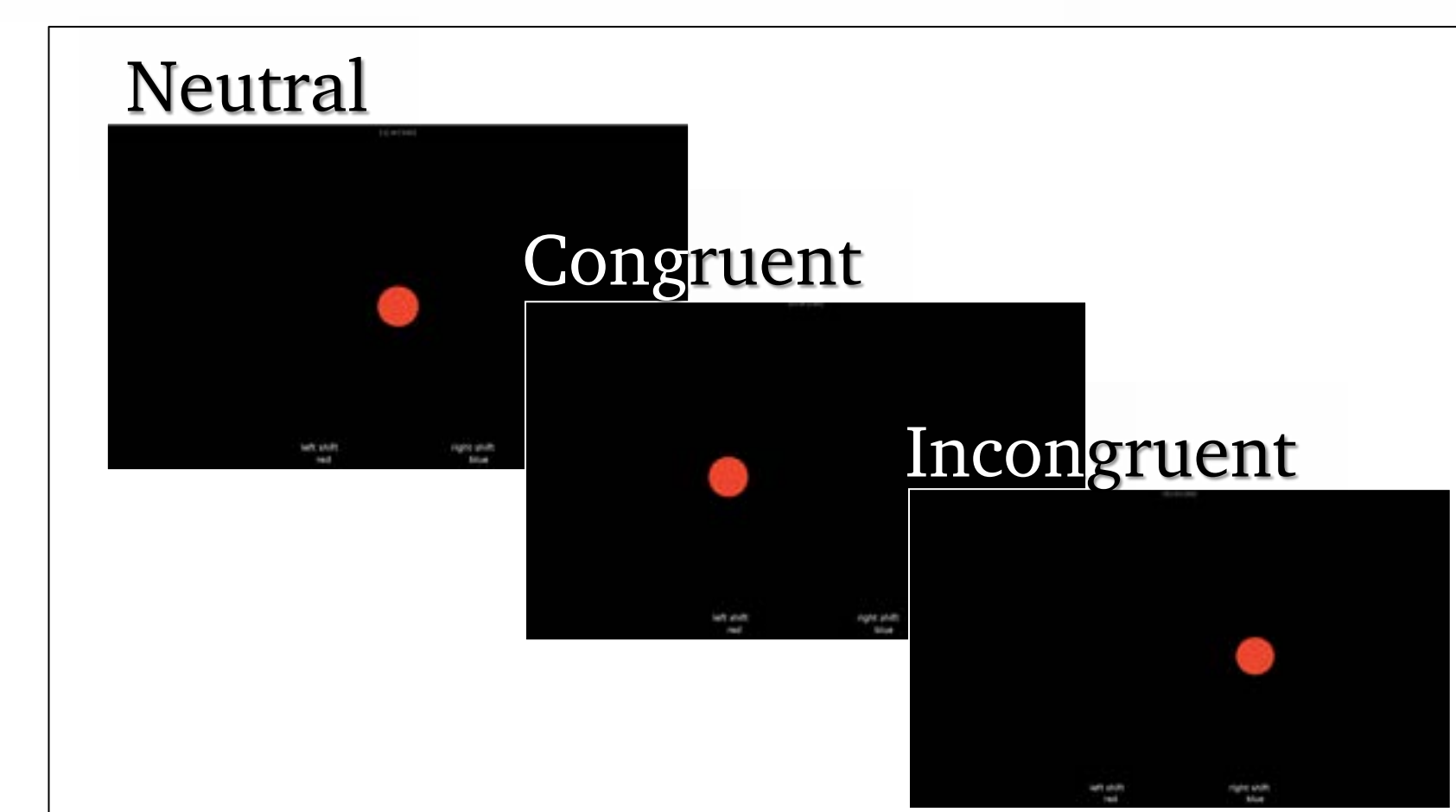
Procedure
- Each word acts as target once, paired with its competitor and two unrelated distractors on screen (30 test trials)
- While eye movements are recorded, participants click circle to hear target word, then click on the image that matches

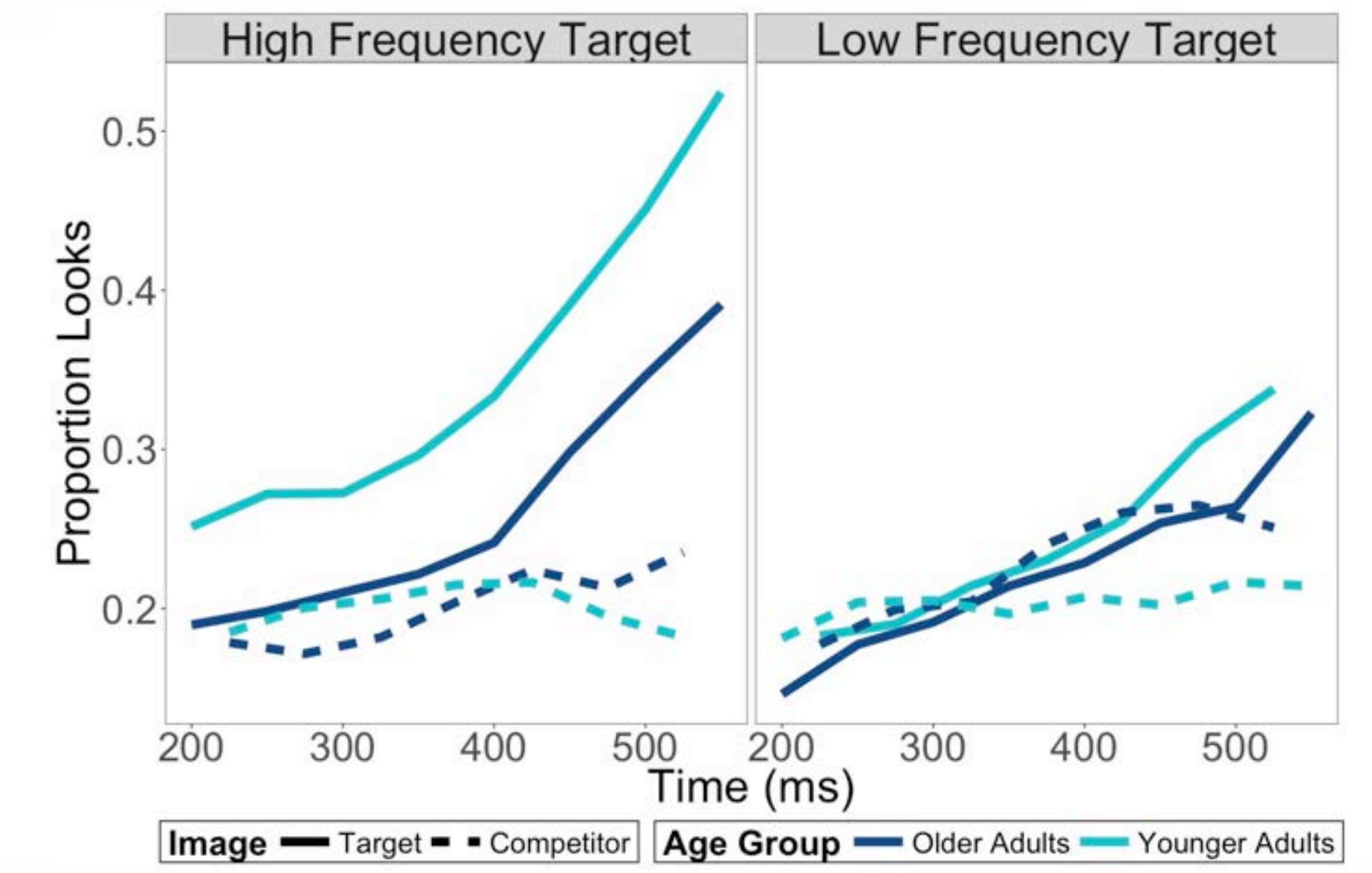Low frequency (Windmill)

High frequency (Window)

Simon Task
- Participants must respond based on colour of stimulus while inhibiting presentation side

Simon score = RT incongruent trials – RT neutral trials

Neutral

Congruent

Incongruent

CONCLUSIONS

High-frequency advantage found by Revill & Spieler (2012) may be driven by individual inhibitory ability

Older adults' difficulty ignoring competitors is related to poorer domain-general inhibitory ability
- Age-related top-down suppression deficit may drive distraction by high-frequency competitors

REFERENCES

Helfer, K. S., & Jesse, A. (2015). Lexical influences on competing speech perception in younger, middle-aged, and older adults. The Journal of the Acoustical Society of America, 138(1), 363–376. https://doi.org/10.1121/1.4923155. **Mattys, S. L., & Scharenborg, O.** (2014). Phoneme categorization and discrimination in younger and older adults: A comparative analysis of perceptual, lexical, and attentional factors. Psychology and Aging, 29(1), 150–162. https://doi.org/10.1037/a0035387. **Revill, K., & Spieler, D.** (2012). The effect of lexical frequency on spoken word recognition in young and older listeners. Psychology and Aging, 27(1), 80–87. https://doi.org/10.1037/a0024113.The. **Sommers, M. S., & Danielson, S. M.** (1999). Inhibitory processes and spoken word recognition in young and older adults: The interaction of lexical competition and semantic context. Psychology and Aging, 14(3), 458–472.