Local dynamics of the perception-production link:
Age-based patterns in a Chicago community

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Speaker social characteristics and linguistic perception

Top-down speaker social characteristics can shape linguistic perceptions of phonetic features, reflecting sociolinguistic production patterns

- Gender (e.g. Strand 1999, Strand et al. 1999)
- Age (e.g. Koops et al. 2008; Drager 2012)
- Geographic background (e.g. Niedzielski 1999; Hay, Warren & Drager 2005)
- Personae (e.g. D'Onofrio 2018)

Less work on **listener** social characteristics' effects on linguistic perception

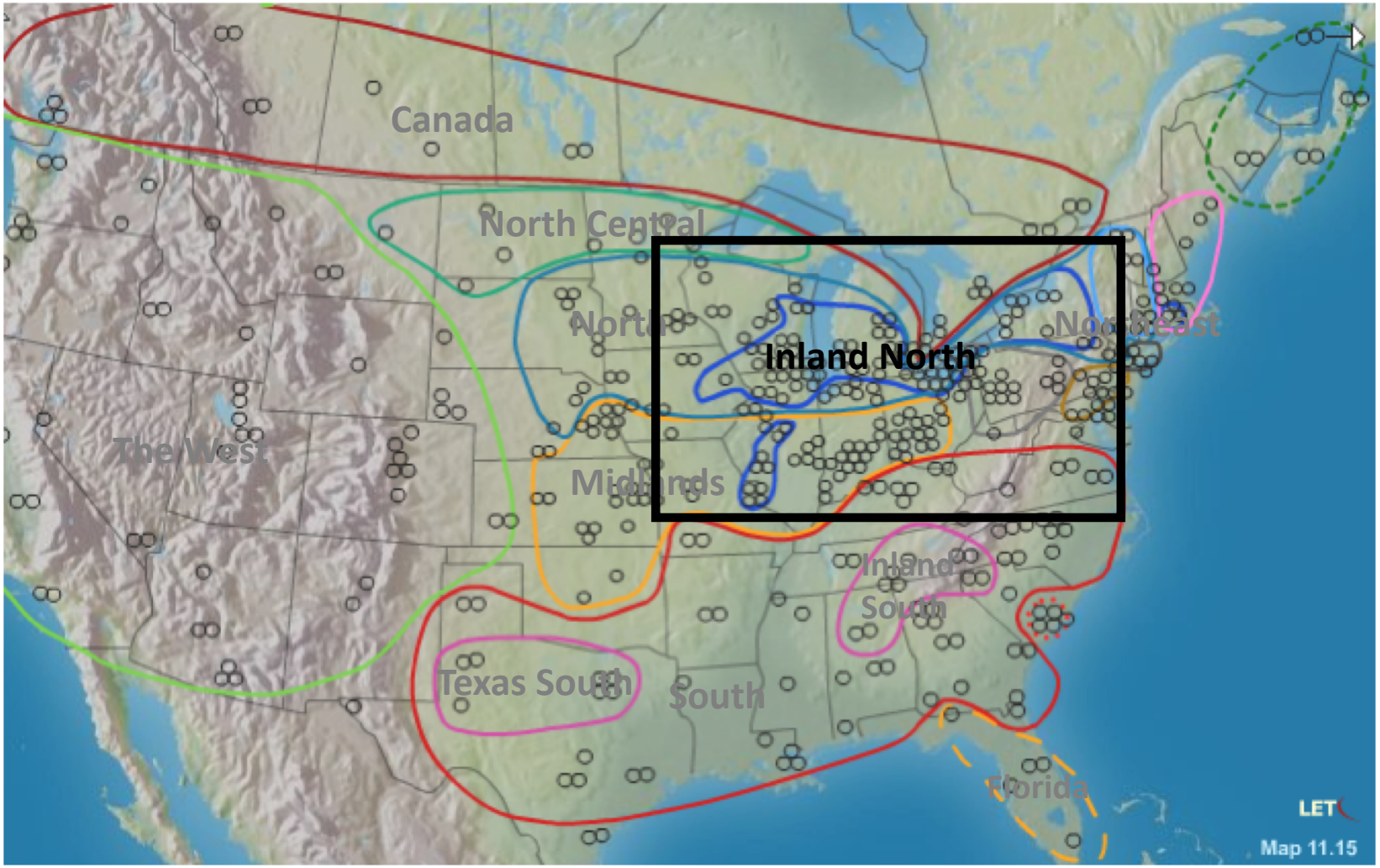
Listener social characteristics and linguistic perception

Community-wide social differences in production sometimes reflected in same listener social differences in linguistic perception:

- Dialect region (Fridland & Kendall)
- Gender (De Decker 2010)
- Age (e.g. De Decker 2010, Drager 2012)

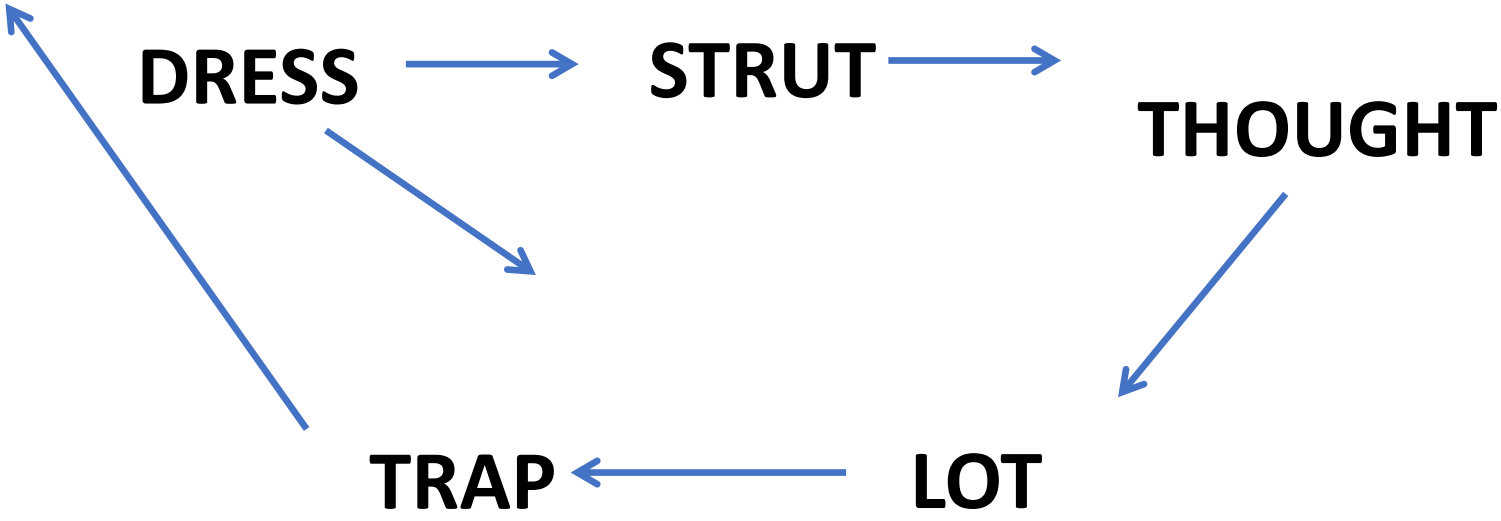
…but **not always** (e.g. Kettig & Winter 2017; Sumner & Samuel 2009)

The Northern Cities Shift

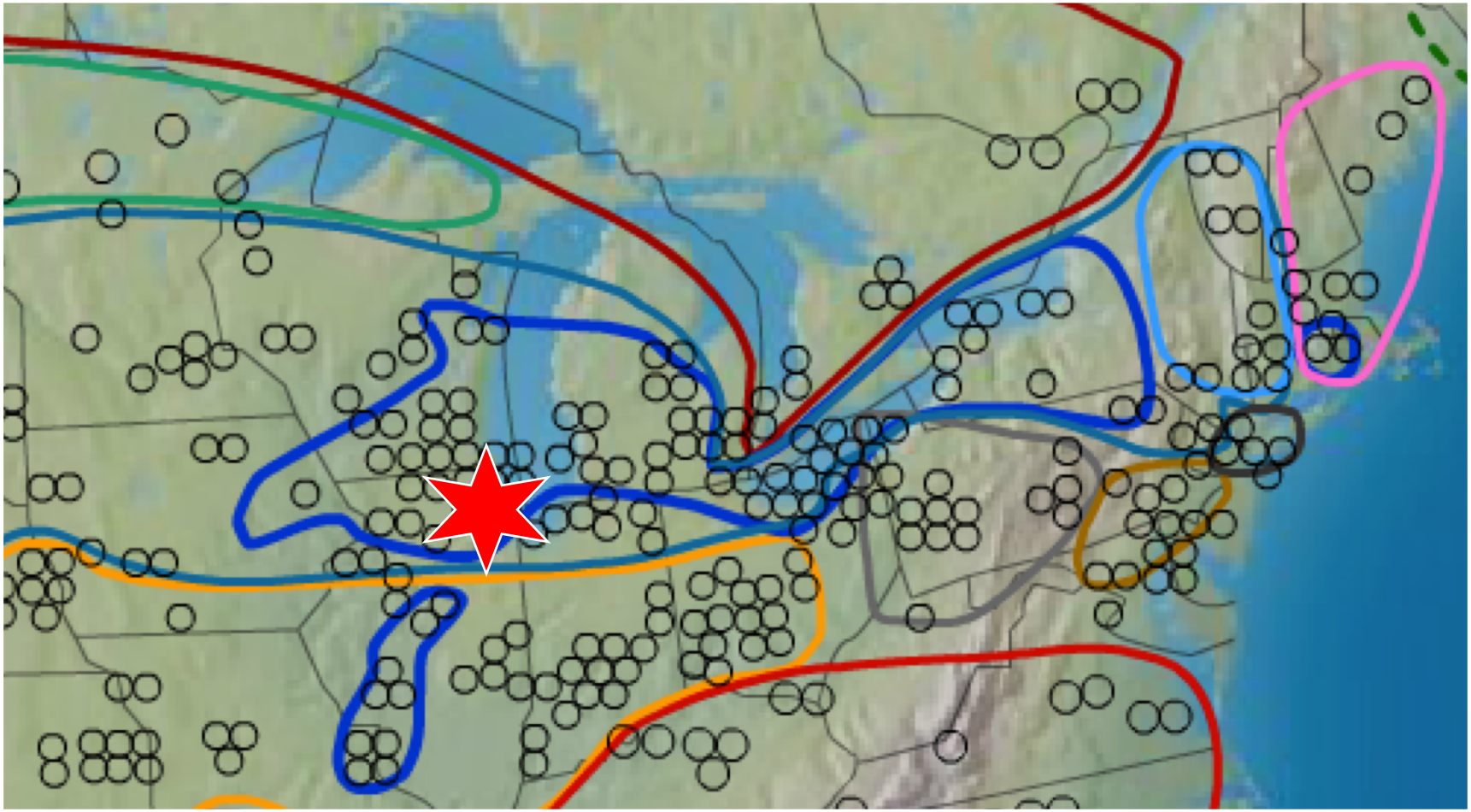


Atlas of North American English (Labov, Ash & Boberg 2005)

The Northern Cities Shift



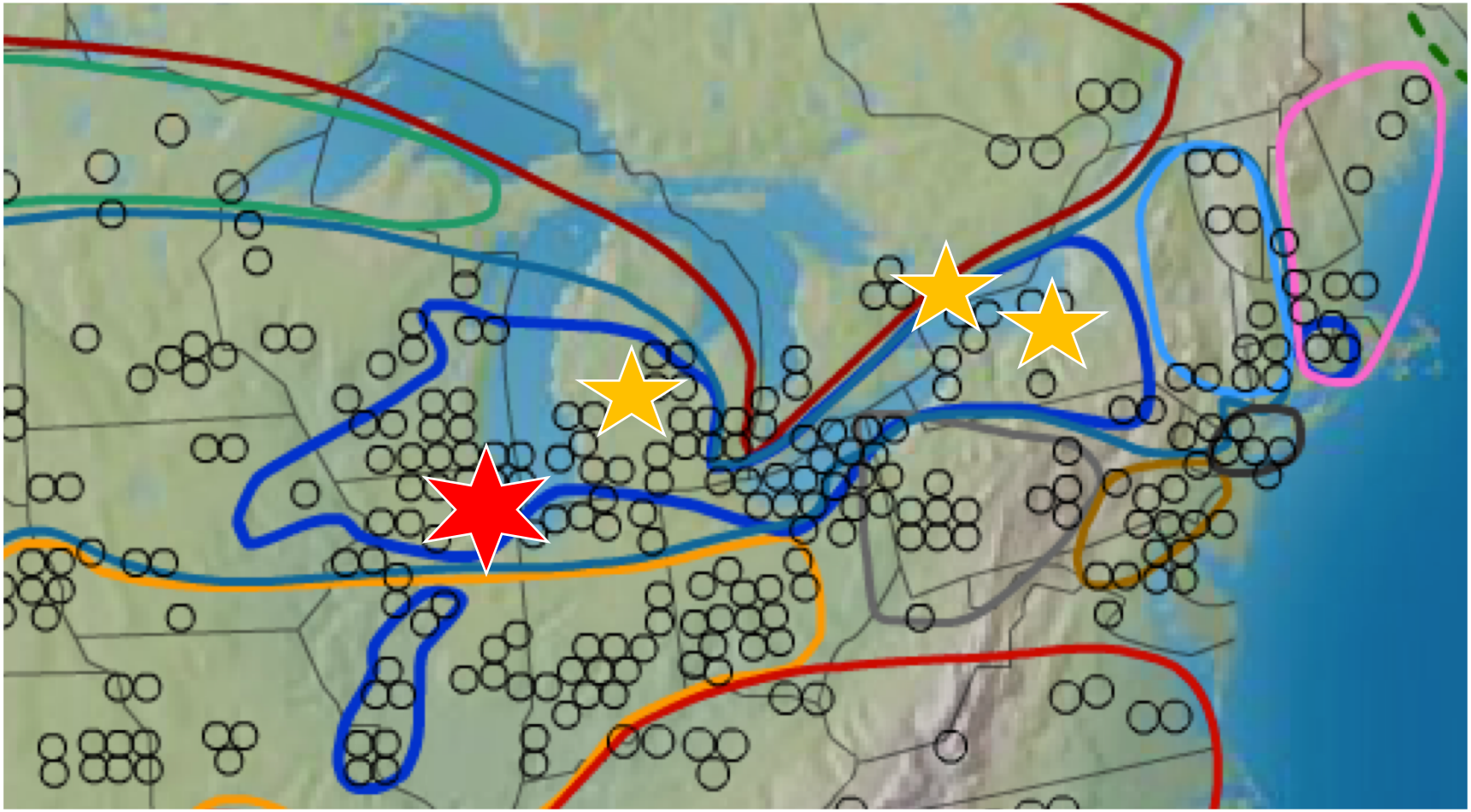
The Northern Cities Shift



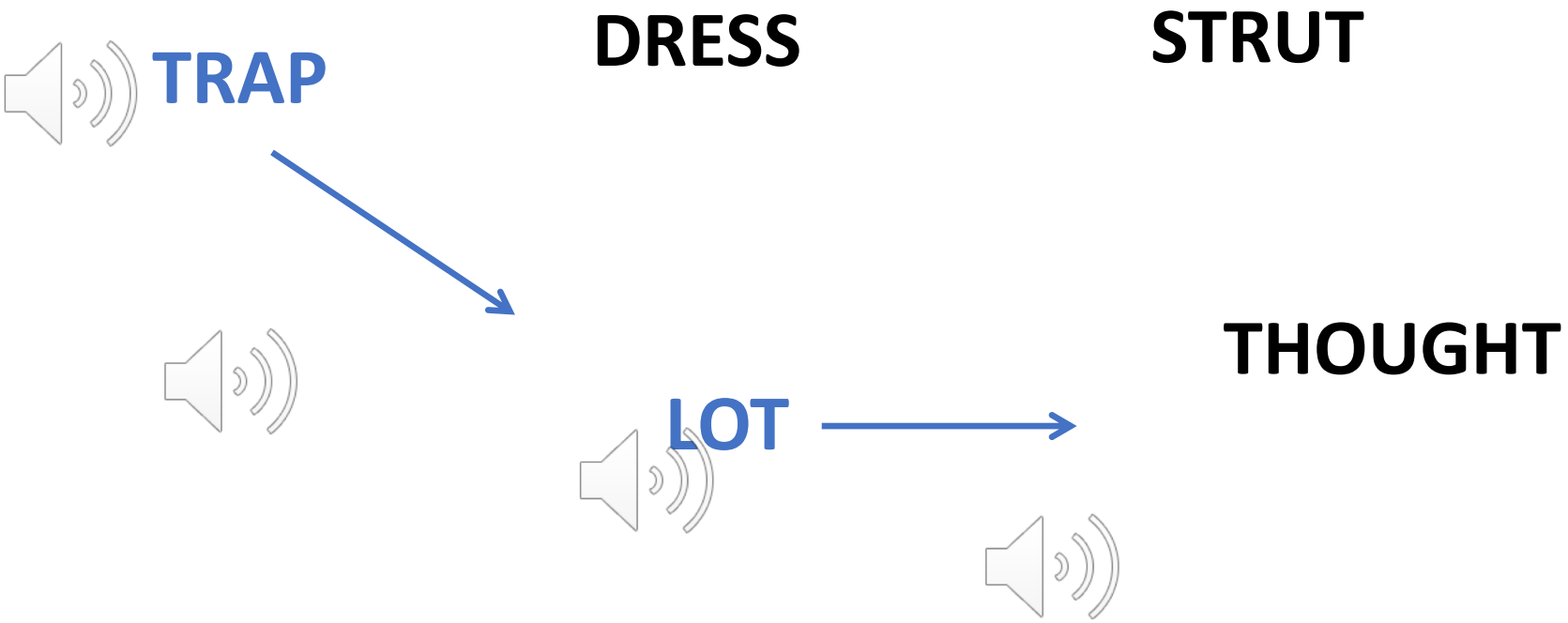
Atlas of North American English (Labov, Ash & Boberg 2005)

Recent **reversal** of the Northern Cities Shift

Driscoll & Lape, 2015;
Thiel & Dinkin, 2017;
Wagner et al., 2016
D'Onofrio & Benheim 2018



Reversal of the Northern Cities Shift



What is the relationship between production and perception of a reversing regional vowel shift at a local community level?

Within one Chicago neighborhood area:

*Do speaker age patterns in vocalic productions correspond to the same **listener** age patterns in linguistic perception?*

→ Word list productions by speaker age

→ Phoneme categorization of NCS-implicated vowels by listener age

Participants

- 51 white lifelong Chicagoans, all with some post-secondary education
- Spread of ages from 20-79 (mean age 54)
- All grew up in and/or currently living in Beverly or Morgan Park
- Recorded sociolinguistic interviews, **word lists, phoneme categorization task**

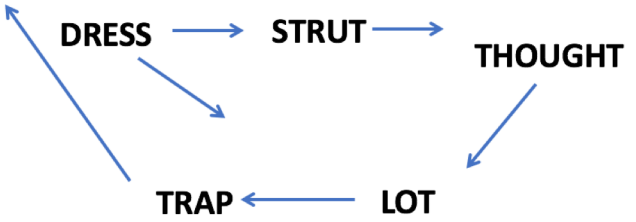
Production data

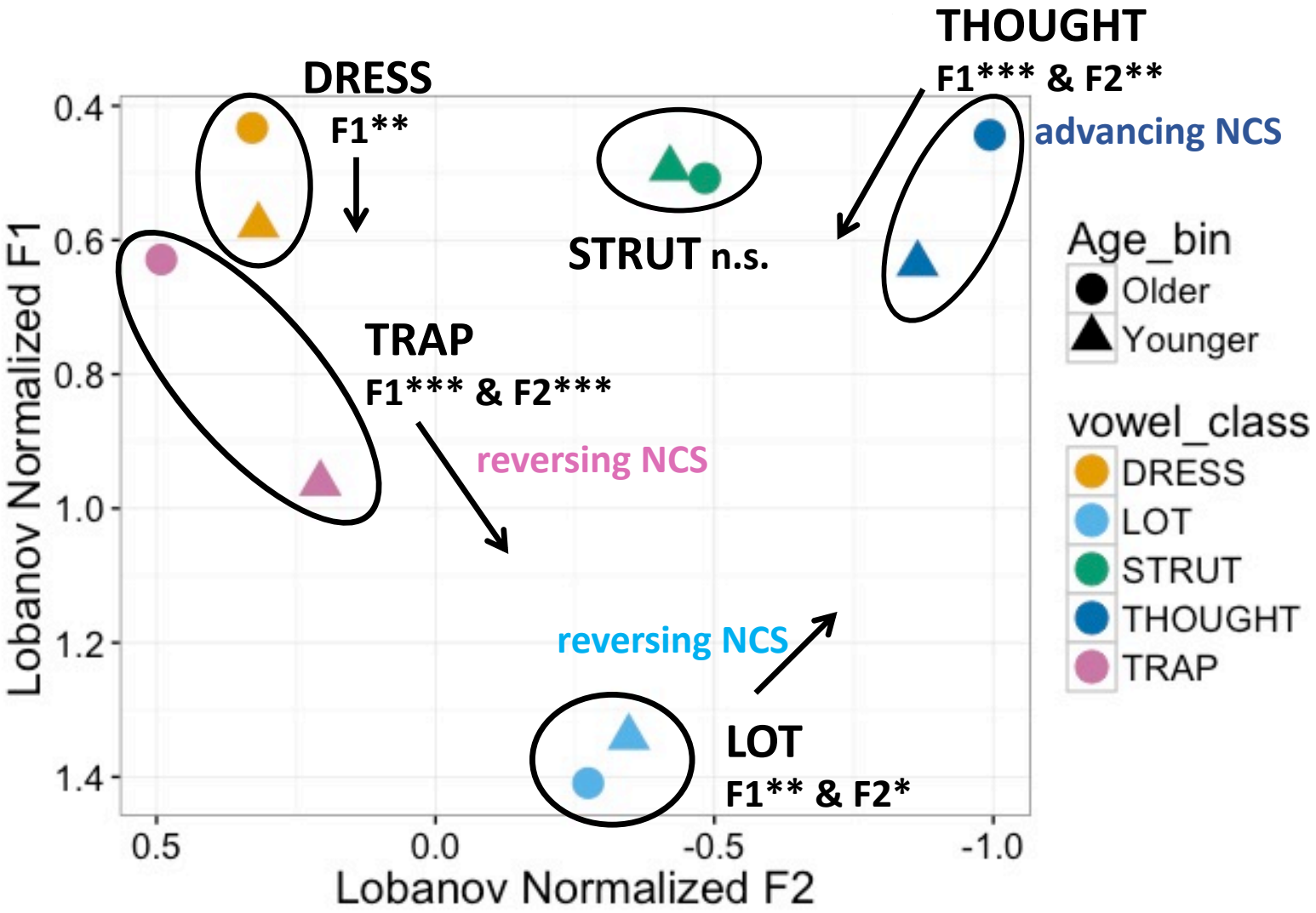
- Word list productions included tokens of all vowels of interest (TRAP, LOT, THOUGHT, STRUT, DRESS), as well as other anchor vowels for normalization (N= 36 per speaker)

- Vowels Lobanov-normalized; midpoint F1 and F2 measured

- Linear mixed effects regression models fit to F1 and F2 for each vowel class; fixed effects of speaker year of birth; random effects of speaker, word

Word List Productions





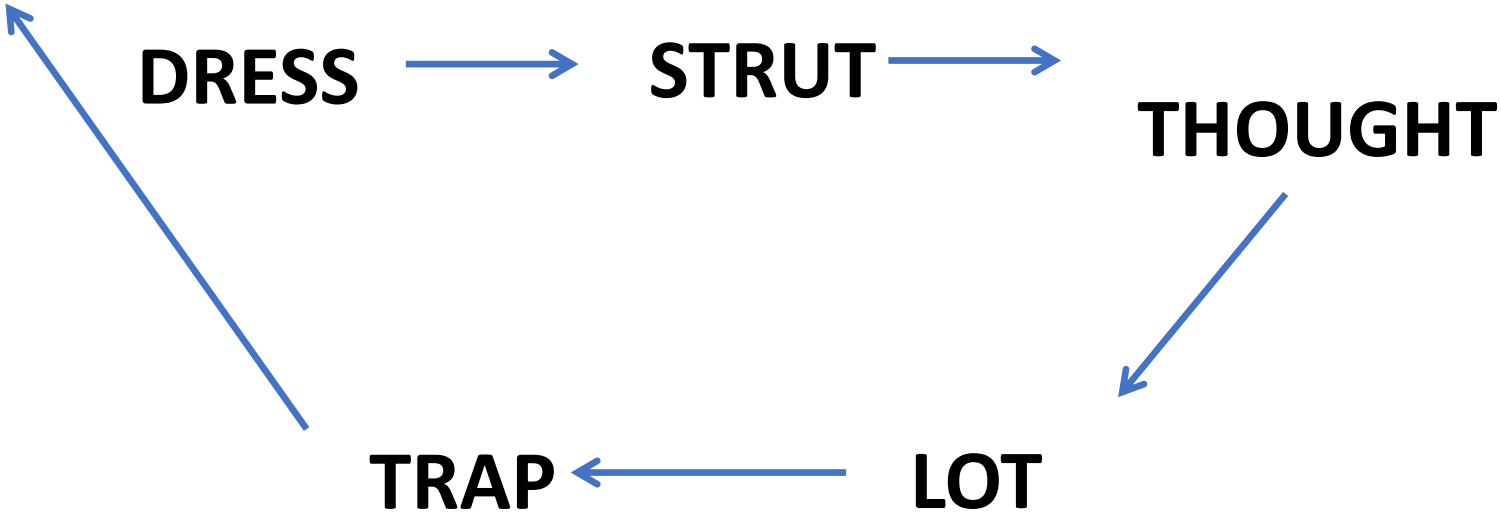
Phoneme categorization

- Listeners categorize a series of tokens on a continuum between two phonemes, elicits perceptual boundary between two phonemes

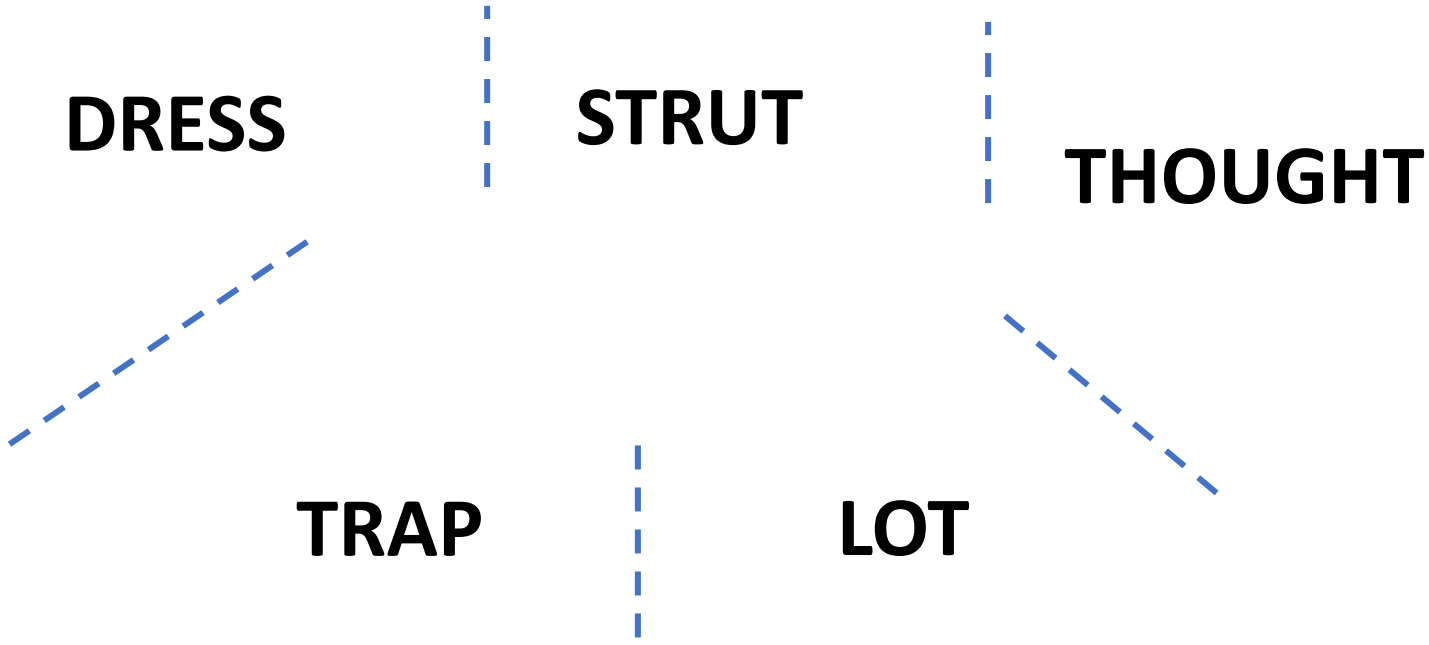
- Has been used to show that top-down social *expectations* about a speaker can affect linguistic perception (Drager, 2011; Strand, 1999; Hay & Drager 2010; Hay, Warren & Drager 2005; D'Onofrio 2018)

- Used to assess listener differences and links with production patterns (De Decker 2010; Fridland & Kendall 2012; Kettig & Winter 2017)

The Northern Cities Shift



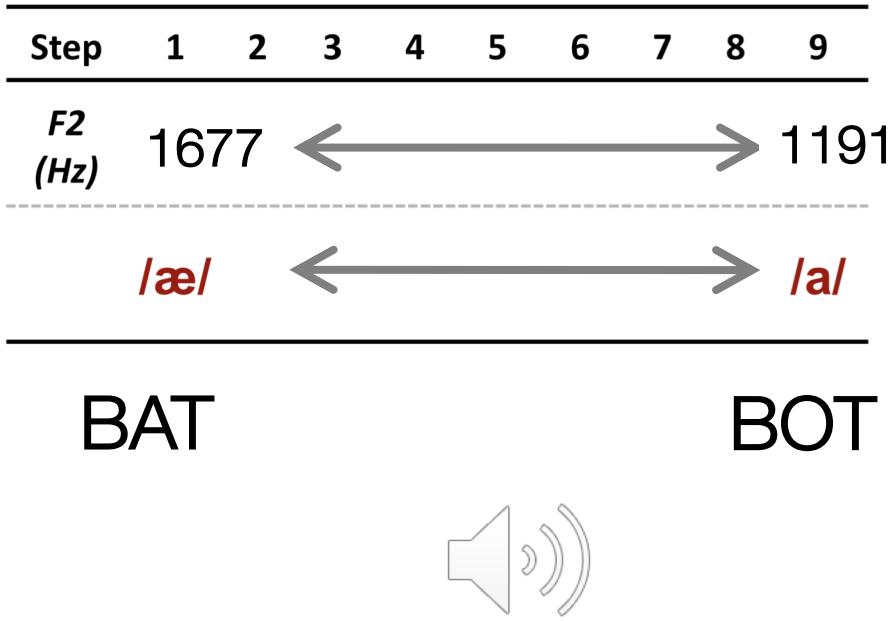
The Northern Cities Shift



Phoneme categorization: Stimuli

8-step resynthesized continua created from read minimal pairs using Akustyk produced by 30-year-old white male from North dialect region

Phonemes	Word pairs
DRESS-TRAP	*bat-bet; had-head*
TRAP-LOT	*bat-bot; sack-sock*
LOT-THOUGHT	*bot-bought; cot-caught*
DRESS-STRUT	*bet-but; beg-bug*
STRUT-THOUGHT	*but-bought; thud-thawed*



Phoneme categorization: Design

- 2-alternative forced choice

COT

[1]

CAUGHT

[0]

Phoneme categorization: Design

- 2-alternative forced choice
- All participant responded to every step on every continuum (8 steps x 2 frames x 5 phoneme pairs) twice, in pseudo-randomized order
- Two blocks, repeating full list, left/right configuration of choices reversed (Drager 2012)
- No *a priori* information provided about speaker, follow-up survey collected social impressions of voice for subset of participants
- Listeners surveyed heard voice as in 20s/30s regardless of their own age

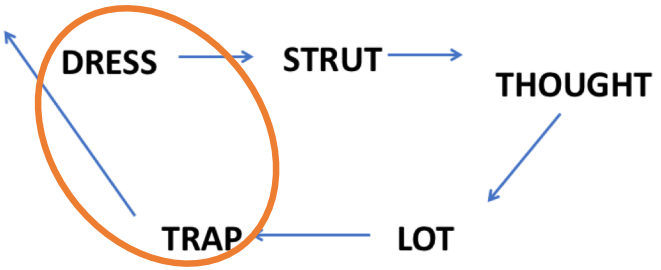
Analysis

Mixed effects logistic regression fit on each phoneme pair:

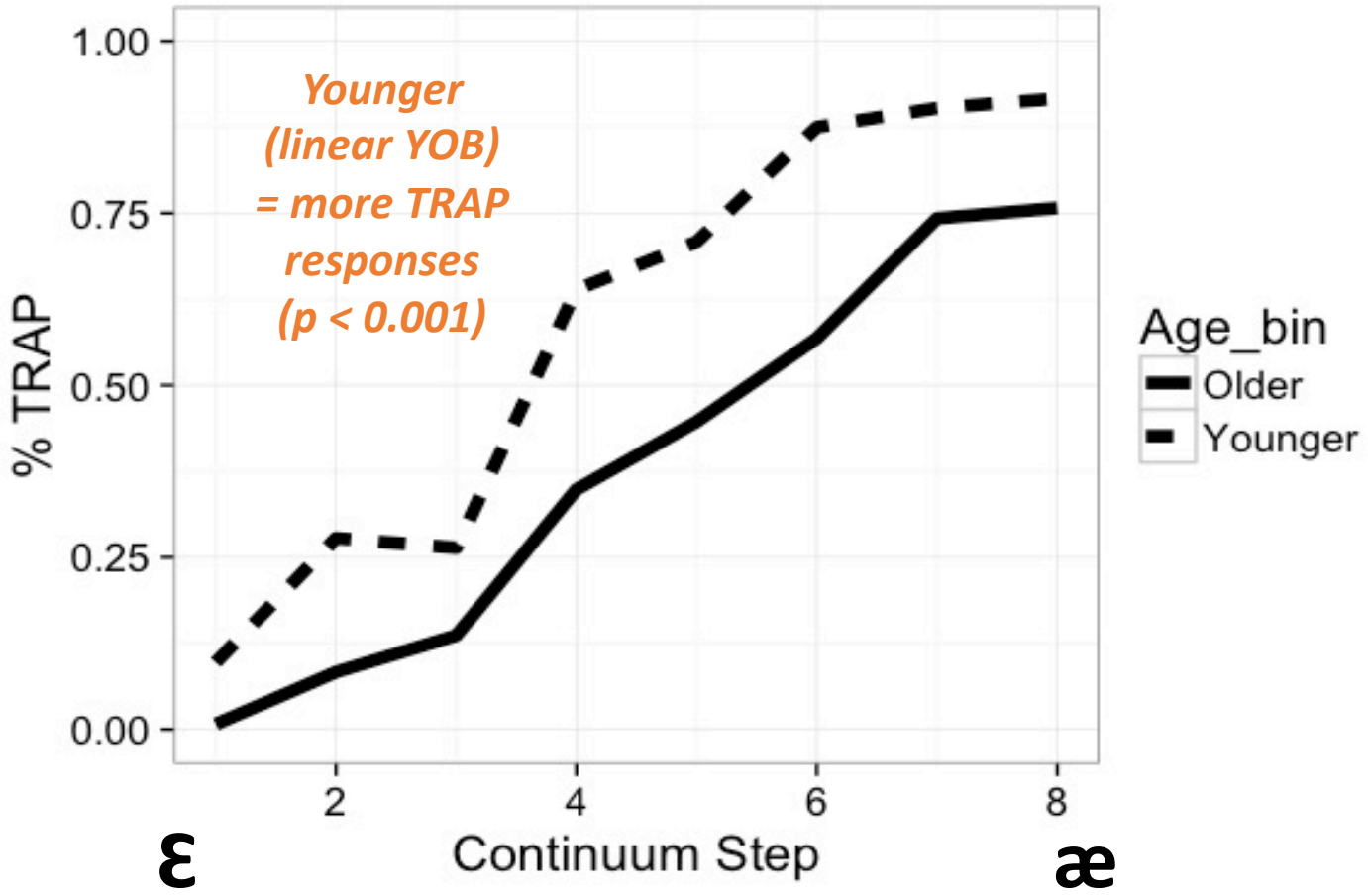
- Dependent variable: phoneme selection (binary)
- Random slope of continuum step by participant
- Fixed effects of:
    - Participant age (linear)
    - Participant mean formant values of phonemes in production (linear)

    Control fixed effects:
    - Continuum step (linear)
    - Word pair (categorical, two-factor)

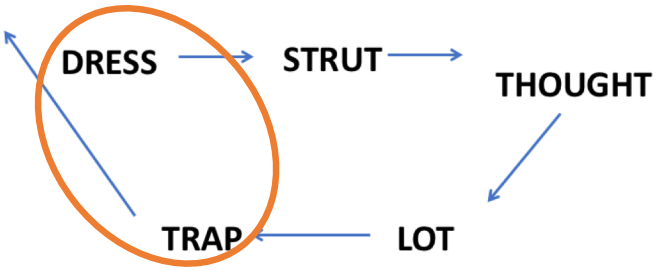
DRESS-TRAP



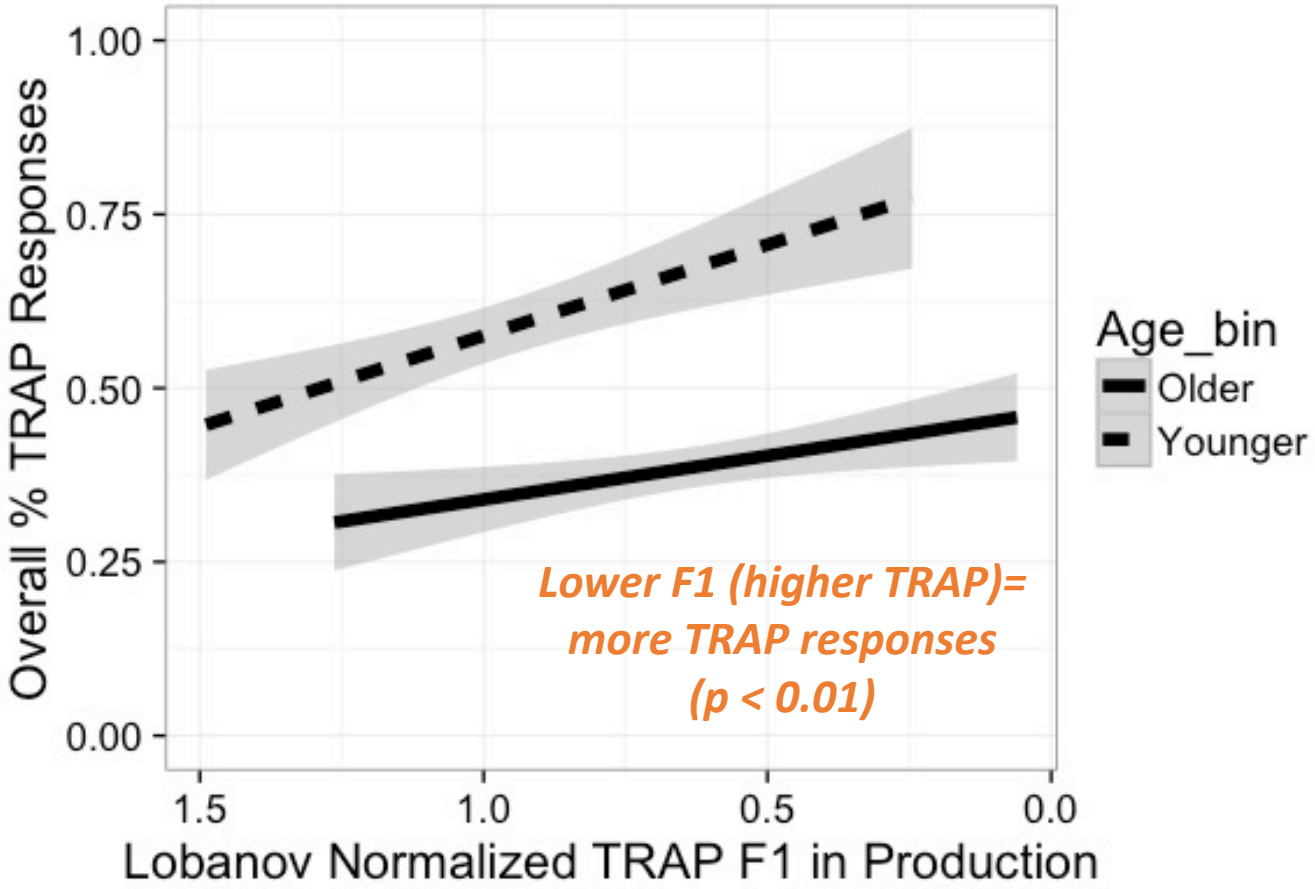
more NCS shifted



DRESS-TRAP

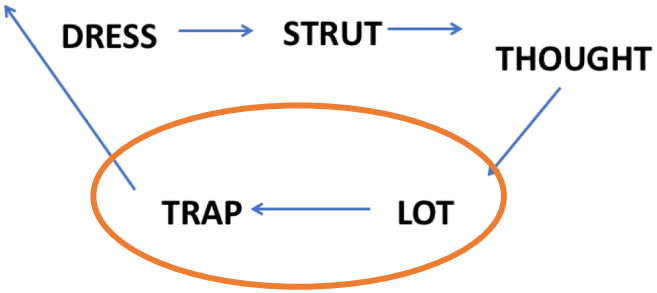


more NCS shifted in categorization

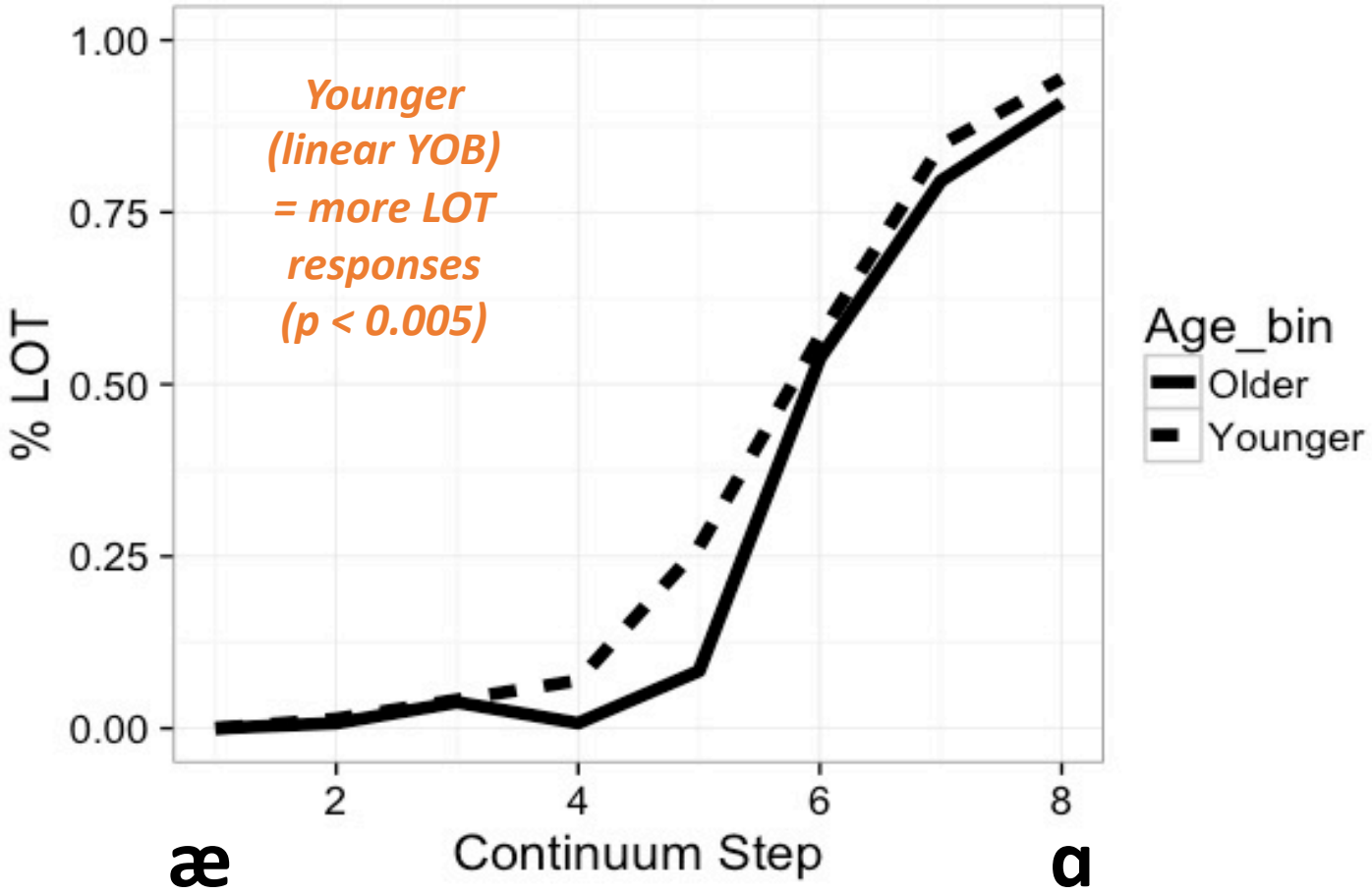


more NCS shifted in production

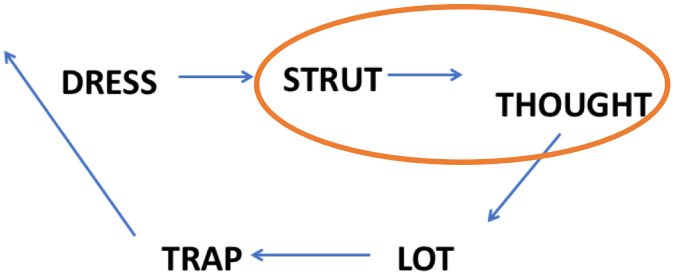
TRAP-LOT



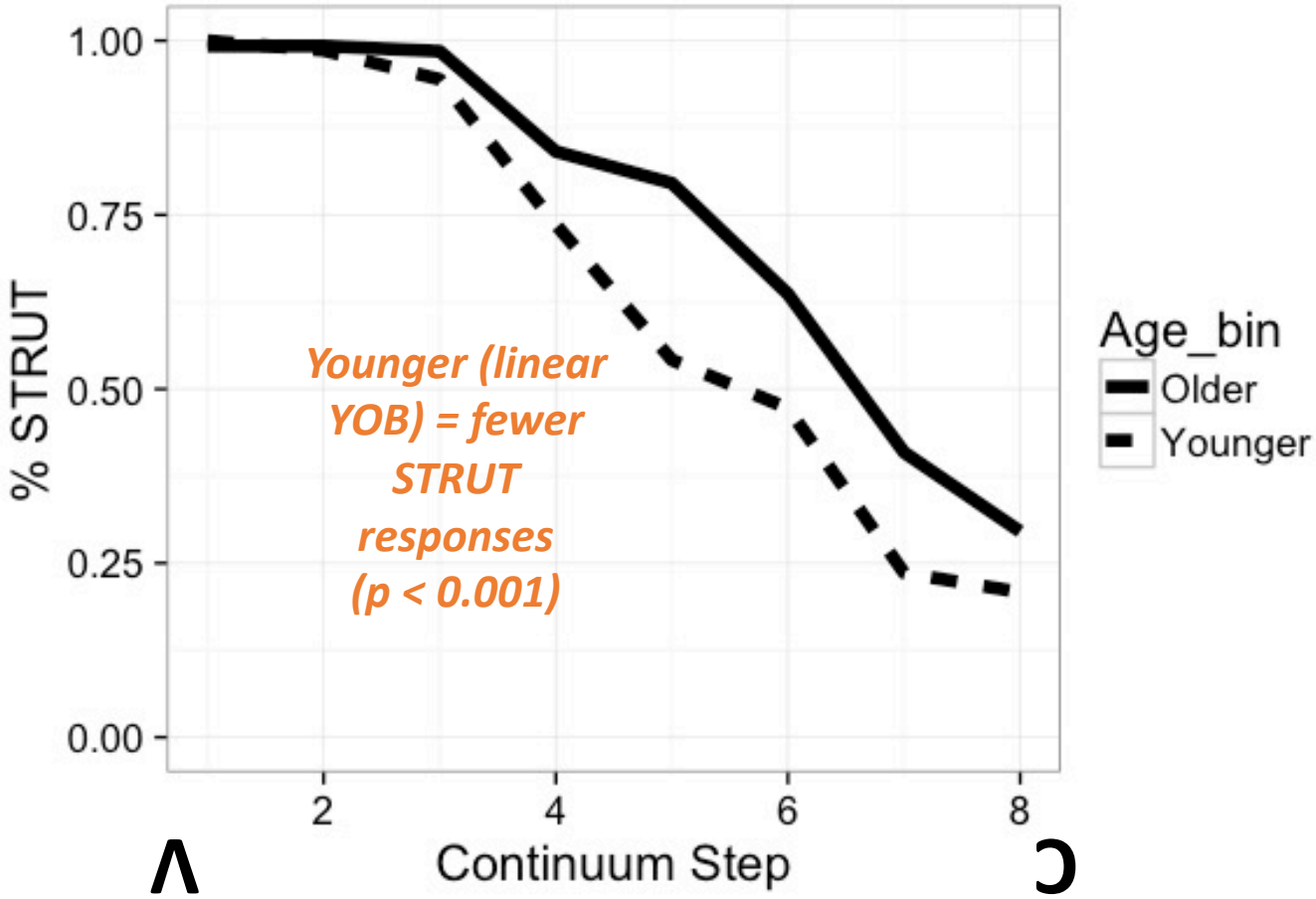
more NCS shifted



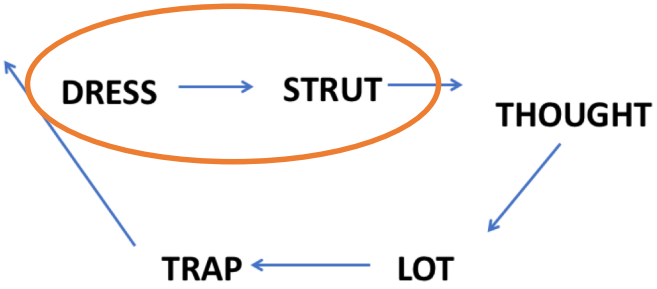
STRUT-THOUGHT



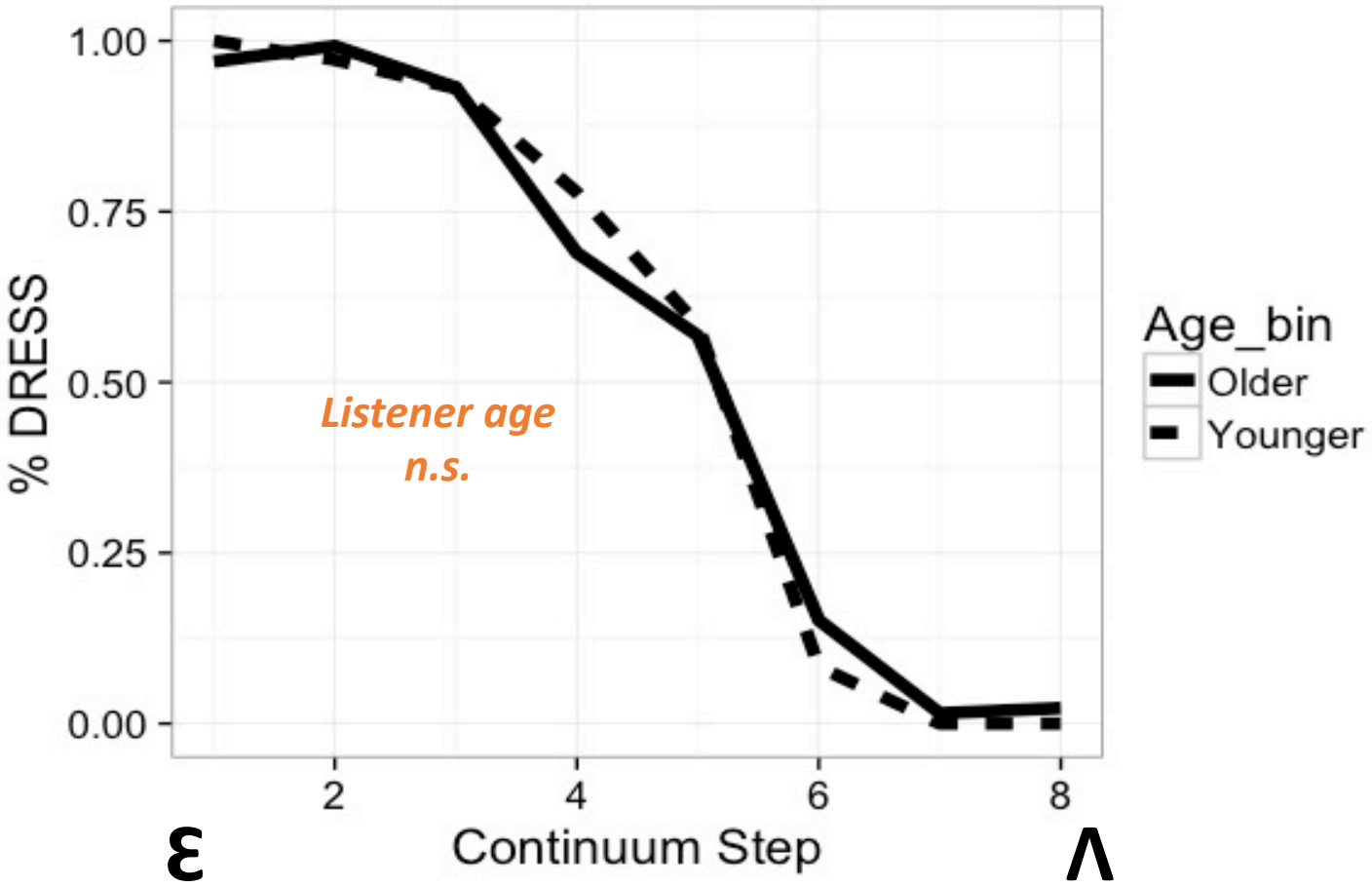
more NCS shifted



DRESS-STRUT

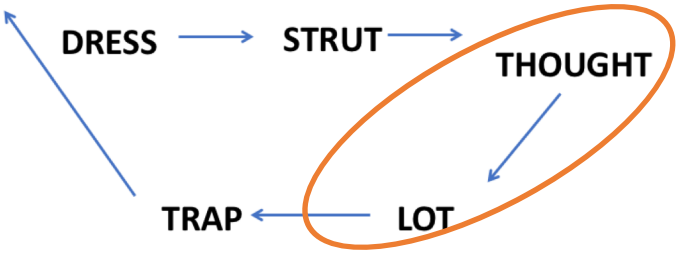


more NCS shifted

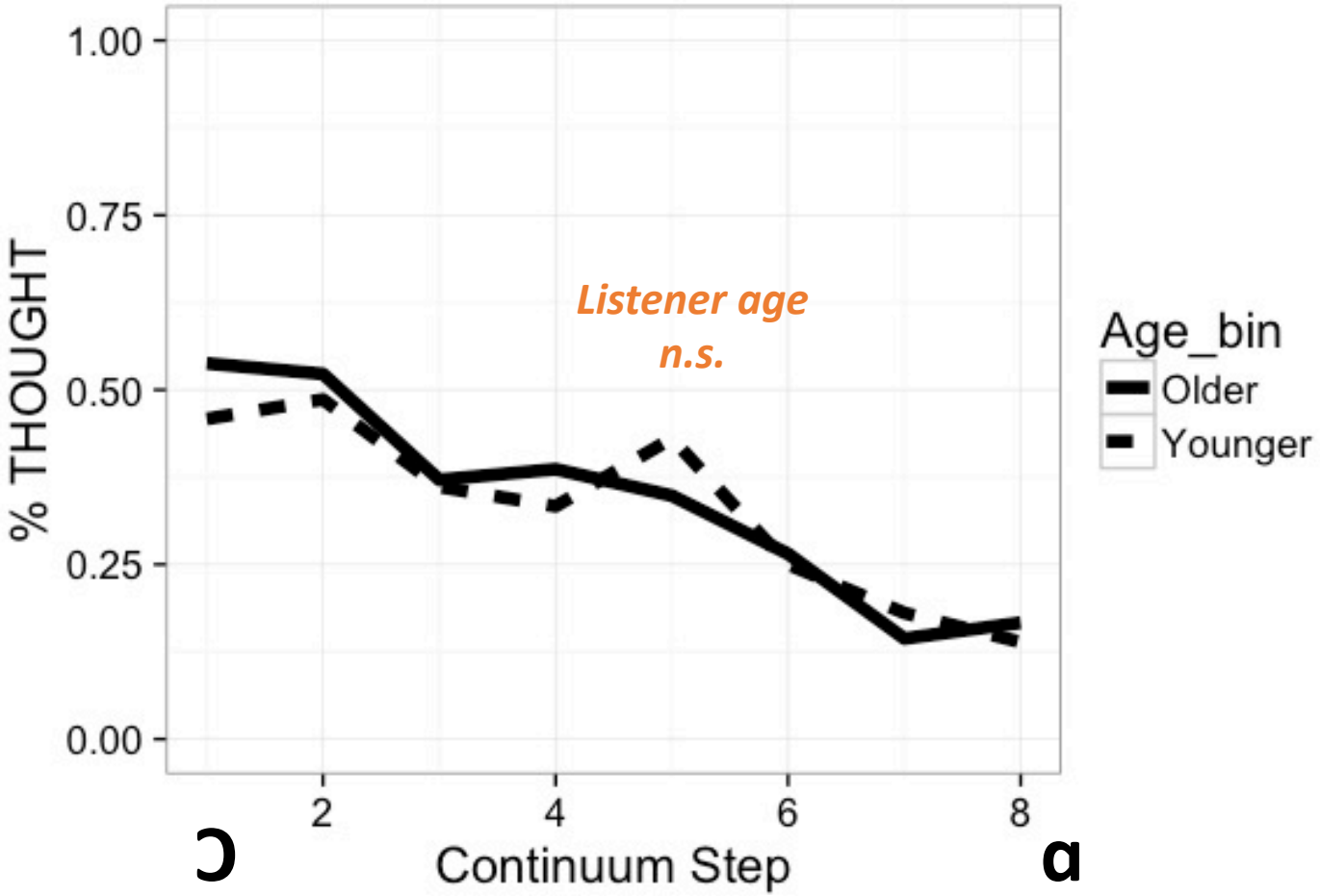


Listener age n.s.

THOUGHT-LOT



more NCS shifted

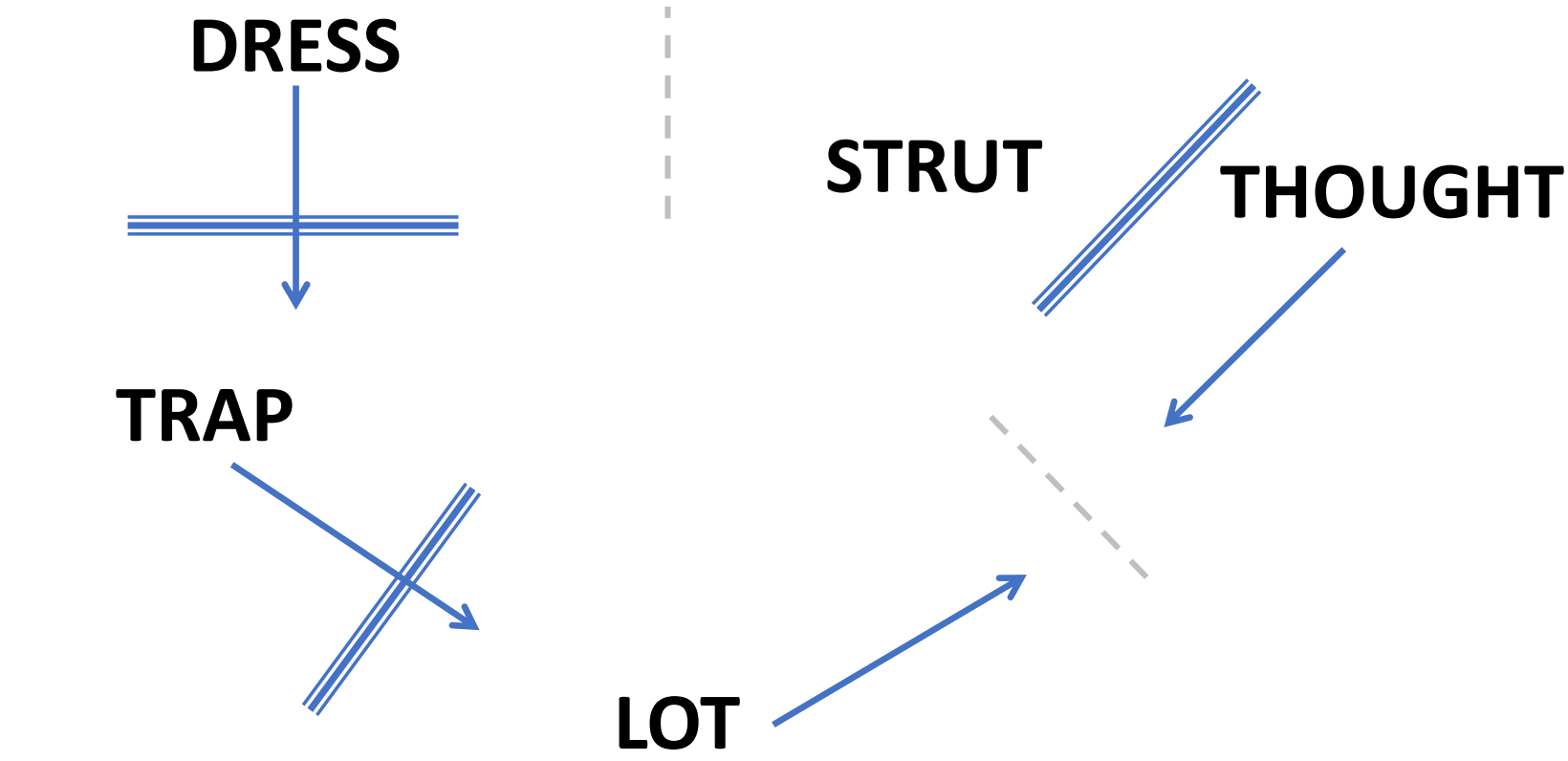


Summary of phoneme categorization results

- **Younger = *more* NCS-shifted boundaries:**
  - DRESS-TRAP (younger = higher/backer boundary)
  - TRAP-LOT (younger = fronter boundary)

- **Younger = *less* NCS-shifted boundary:**
  - STRUT-THOUGHT (younger = fronter boundary)

- **No significant age effects on:**
  - DRESS-STRUT boundary
  - LOT-THOUGHT boundary


DRESS
STRUT
THOUGHT
TRAP
LOT
Significant speaker age effect in production
Significant listener age effects in categorization
No age effects in categorization

Phoneme categorization and word list results

- Phoneme boundaries show apparent time change in production and listener-based age differences in categorization

- Younger speakers are **reversing** NCS for TRAP and LOT in production, but expect ***more*** NCS-shifted boundary for DRESS/TRAP and TRAP/LOT than older speakers

- Younger speakers are **advancing** NCS for THOUGHT, expect ***less*** NCS-shifted boundary for STRUT/THOUGHT

Listener age differences in perceptual categorization *opposite* of community-level age differences in production

Discussion

- Different listener age groups perceive speaker as similarly aged, no effect of perceived age on categorization

- Perceptual categorization may reflect **age relation** between listener and speaker:
  - Older speakers expect a younger speaker than them to be more **advanced** with respect to community-wide patterns

  - Younger listeners expect the speaker older than them to be more **conservative** w.r.t. community-wide patterns

- Opposing age patterns in production v. perception may be conditioned by a listener's age with respect to speaker

Conclusions

- Socially-stratified patterns of variation in production can also indicate stratified patterns of variation in perception

- Listener social characteristics that predict perceptual categorization do not mimic (and, in fact, oppose) social patterns in production

- Considerations of social effects on linguistic perception should be couched within social relations between speaker and listener in community context

Thank you!

Questions?

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