Within-subjects measures of dialect perception across the lifespan

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Background

We are interested in how perception of regional dialects develops across the lifespan. Previous research has established a few patterns in different perceptual skills:

Attitudes
- Attitudes about dialects can be measured implicitly by having listeners rate individual talkers on different traits
- For adult listeners, talkers of higher prestige varieties tend to be rated higher on status dimensions, like intelligence, and talkers of local varieties higher on solidarity dimensions, like friendliness (Luhman, 1990; Levin, Giles, and Garrett, 1994)

Intelligibility
- The effect of dialect variation on speech processing can be measured using intelligibility tasks, in which participants listen to speech mixed with noise and report the words they hear
- For adult listeners, dialects which are familiar, either because they are local or prestigious, are more intelligible than unfamiliar dialects (Labov and Ash, 1997; Clopper and Bradlow, 2008)

Classification
- Explicit awareness of regional phonetic variation can be examined using a free classification task, in which participants divide a set of talkers into groups based on where they sound like they're from, with no pre-determined geographical labels
- Adults can classify unfamiliar talkers by their regional dialect, although their overall accuracy is typically low (Clopper and Pisoni, 2007; Jones et al, 2017)

These skills develop throughout childhood, with adult-like performance emerging by or during adolescence (Nathan et al, 1998; Williams et al, 1999; Kinzler and deJesus, 2013; Wagner, Clopper, & Pate, 2014; Jones et al, 2017)

Research Question

How are these perceptual skills connected to each other over the course of development?

Methods

Participants
- 304 monolingual American English speakers, ages 4-74, mostly from the **Midland** region

Age	4-5	6-7	8-9	10-11	12-13	14-15	16-17	18-34	35-50	50+
N	30	29	32	27	32	28	28	41	29	28

- Tested in the Language Sciences Research Lab at a science museum in Columbus, Ohio (indicated with a star on the map below)

Stimuli
- Recordings of words and sentences spoken by 12 female talkers, 3 from each of 4 U.S. dialect regions: **Midland**, **North**, **Mid-Atlantic**, and **South**
- These dialects are distinguished by dialect-specific phonetic patterns as well as social perceptions:

Dialect	Local to Ohio?	Social Prestige
Midland	Yes	Ideologically standard
North	Yes	No social marking
Mid-Atlantic	No	Socially stigmatized
South	No	Socially stigmatized
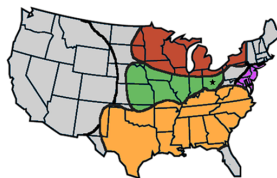
Procedure
Each participant completed three perceptual tasks in one experimental session:

| Task	Materials	Procedure
Attitude ratings and locality judgments	Stimulus sentence "These take the shape of a long, round arch, with its path high above, and its two ends apparently beyond the horizon."	• Participants heard each talker reading the sentence and were asked to rate her on a particular trait, on a labeled scale of 1-5 • Each talker was rated for each trait: Intelligence, Friendliness, Locality (from Ohio)
Intelligibility in noise	24 individual words mixed with speech-shaped noise at a signal-to-noise ratio of +6dB	• Words were presented one at a time over headphones • Participants reported each word they heard
Free classification	The stimulus sentences that were used in the attitudes rating task	• Participants were presented with identical icons linked to recordings of each talker reading the sentence • They sorted the icons into groups based on where they sounded like they were from

Results

A series of linear mixed-effects regression models was used to explore the effects of talker region and age group on responses to each task
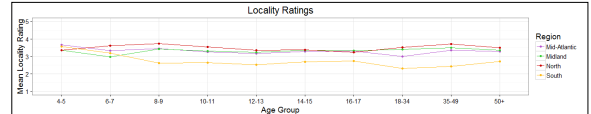

- **Southern** talkers were rated as sounding less local than all other talkers, and **Northern** were rated as more local than **Mid-Atlantic** ($\chi2$ = 118.2, df = 3, p < .001)
- This adult-like locality judgement pattern was first observed at ages 8-9 ($\chi2$ = 8.1, df = 3, p =.04)
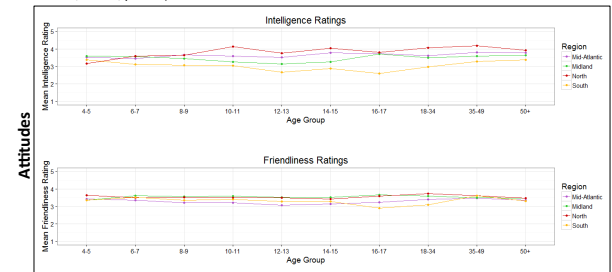
- A four-way talker dialect distinction was found for intelligence: **North** > **Mid-Atlantic** > **Midland** > **South** ($\chi2$ = 160.3, df = 3, p < .001)
- **Southern** and **Mid-Atlantic** talkers were less friendly than **Northern** and **Midland** talkers ($\chi2$ = 31.97, df = 3, p < .001)
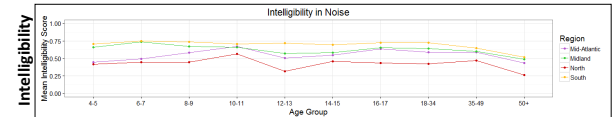
- **Midland** and **Southern** talkers were more intelligible than **Mid-Atlantic** and **Northern** talkers ($\chi2$ = 368.2, df = 3, p < .001)
- Overall intelligibility declined for the oldest participants ($\chi2$ = 12.87, df = 1, p = .006)
- For the **Mid-Atlantic** talkers, intelligibility was also relatively low for the youngest children, but improved by ages 10-11 ($\chi2$ = 11.99, df = 3, p = .007)
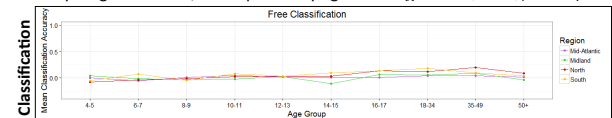
- Participants struggled with correctly classifying talkers by their regional dialect, although they improved somewhat with age ($\chi2$ = 5.85, df = 1, p = .01)

Discussion

Locality and attitudes
- By age 8-9, children showed adult-like patterns in their locality judgments
- Locality judgments were correlated with attitudes: local-sounding talkers sounded more intelligent and friendlier (p = .01)
- However, regions which did not show significant differences in locality judgments were not necessarily equally friendly and intelligent; the **Midland** and **North** differed in intelligence and **Midland** and **Mid-Atlantic** differed in friendliness and intelligence

Locality and intelligibility
- Locality judgments and intelligibility scores were not correlated
- The local, prestigious dialect (**Midland**) and identifiably non-local dialect (**Southern**) were the most intelligible, while the non-socially marked **Northern** dialect was judged as sounding local, but was less intelligible
- The **Mid-Atlantic** and **Midland** talkers were not judged significantly differently for locality, but **Mid-Atlantic** talkers were less intelligible, especially for young children

Locality and free classification
- Behavior on these two tasks was not correlated: classifying talkers by dialect proved to be a more difficult task than rating them for locality

Conclusion: The phonetic variation across these regional dialects impacts speech processing and social perception, even when listeners aren't aware of the links between these patterns of variation and geography