

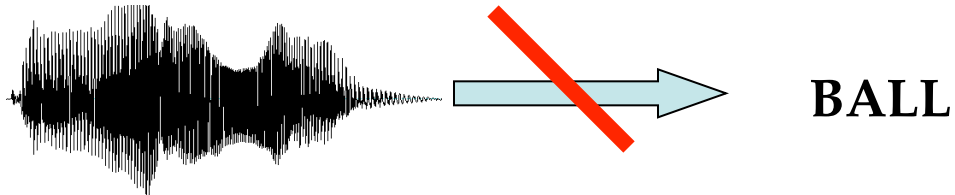
Evidence for lexically driven adaptation to novel accents in early development

CIMSA

April 7, 2013

The problem with accents

- The goal: understand meaning
- The task:



Adults and accents

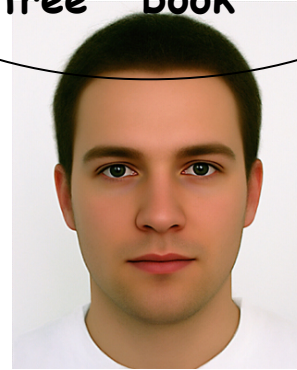
- Role of top-down feedback in driving adaptation
 - Failure to adapt with non-words (Norris et al., 2003)
- Systematic generalization to untrained items
 - New words (McQueen et al., 2006; Maye et al., 2008)
 - New stops (Kraljic & Samuel, 2006), syllable positions (Jesse & McQueen, 2011; Eisner, yesterday)

What about younger learners?

baby dog



baby airplane bag
dog shirt table
tree book

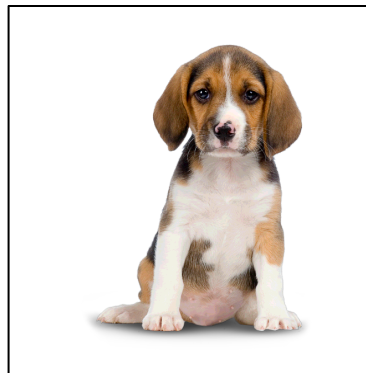


How do they cope with accents?

- Maybe they just don't care.
- **Less specified representations** (Barton, 1976; Charles-Luce & Luce, 1995; Schwachkin, 1948; Garnica, 1973; Eilers & Oller, 1976; Halle & deBoysson-Bardies, 1996; Walley, 1993, 2005)
- Greater tolerance for variability?

They do care

- Language-specific phonetic knowledge by 12 mos (Anderson, Morgan & White, 2003; Werker & Tees, 1984; Rivera-Gaxiola et al., 2005)
- Sensitivity to language-relevant phonetic changes in referential tasks (Swingley & Aslin, 2000; White & Morgan, 2008)



“Look at the paby!”

How do they cope with accents?

- Maybe they can't.
 - Weaker lexical knowledge
 - Less use of contextual cues
 - Smaller vocabulary, word learning biases
 - Format of representation that doesn't allow for generalization

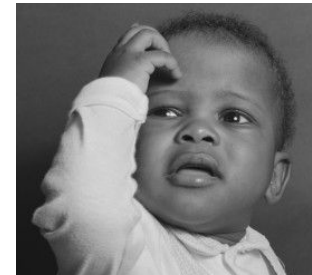
Toddlers and accents

- 15-17-mos-olds fail to recognize highly familiar words if they are pronounced in a new accent (Best et al., 2009; VanHeugten & Johnson, in press)
- 15-mos-olds and many 19-mos-olds fail to map accented words onto the appropriate referent (Mulak et al., 2013)

Toddlers and accents

- Australian toddlers listening to Jamaican English (Mulak et al, 2013):

*Look
at the
BALL!*



Can they really not adapt?

1) Does exposure help younger learners adapt?

Is it the same process as in adults?

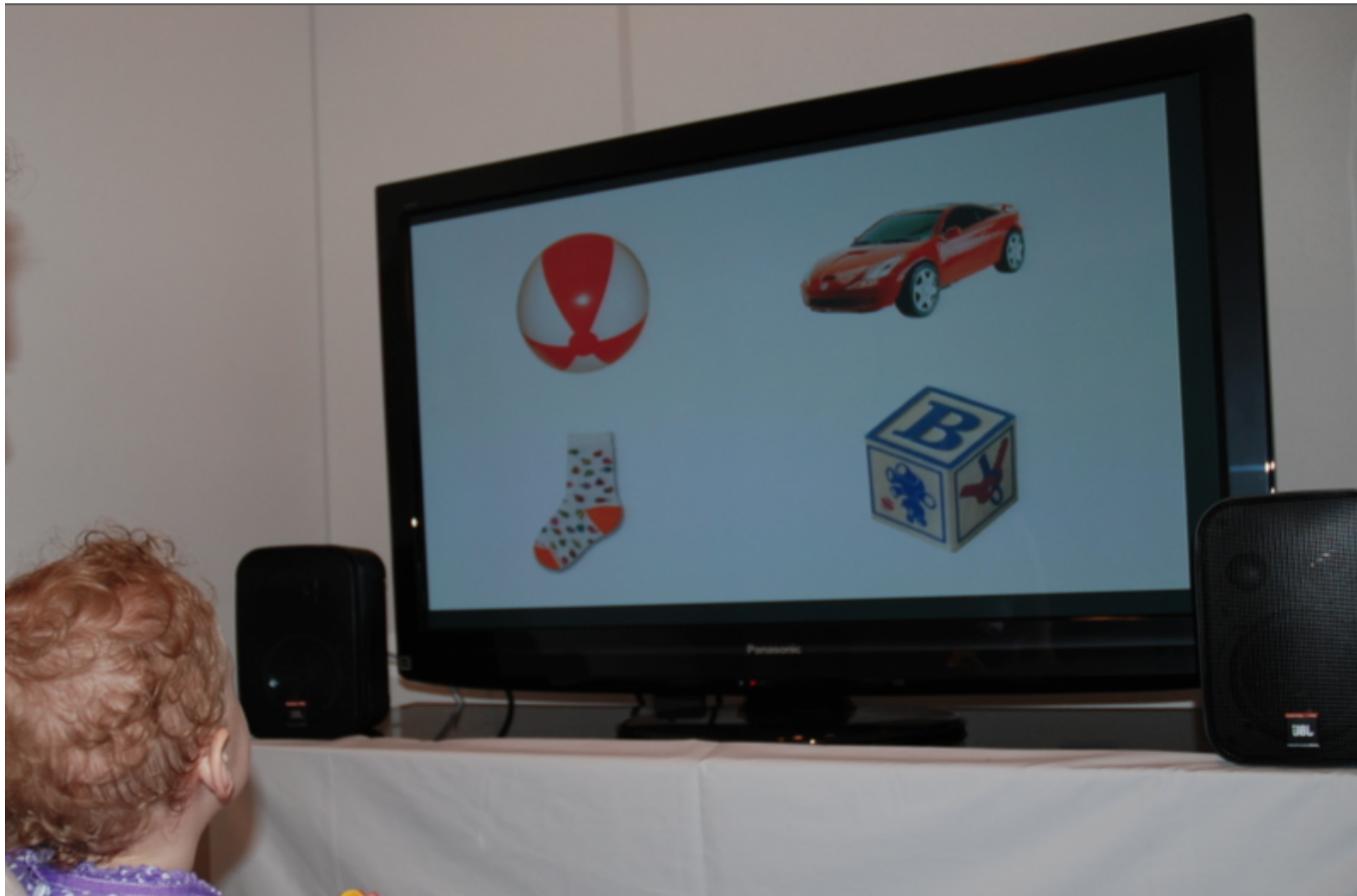
2) Do younger learners make use of lexical feedback?

3) If they can adapt, is it item-specific or (like adults) more generalized process?

Exposure Phase

- 19-mos-olds exposed to familiar word-picture mappings
 - Control Group: typical pronunciations of words
 - Accent Group: simplified “accent” in which /a/ vowels pronounced as /ae/
- 8 total repetitions of each training word
- Displays contain unlabelled pictures with same vowel

/baɪ/! or /baɪl/!



Test phase

- In test, familiarized objects paired with novel objects

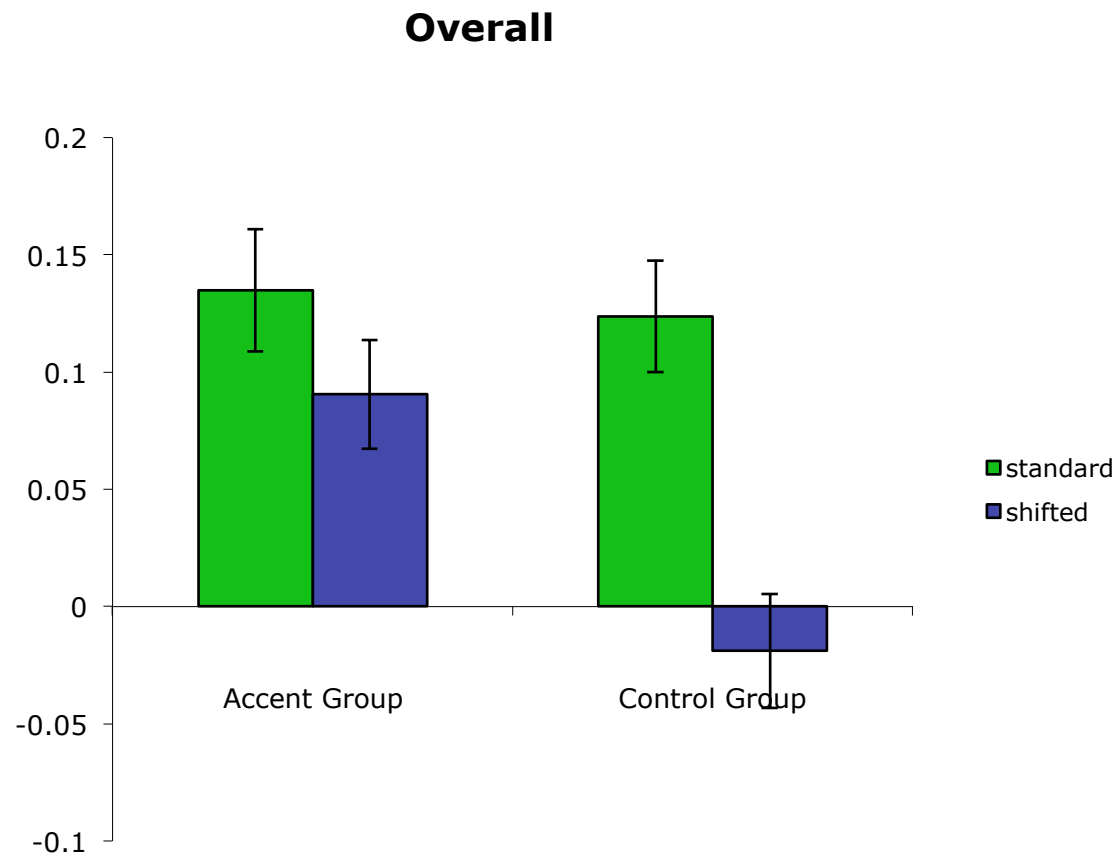


- “Find the X!”
- Words pronounced either with standard pronunciation or shifted pronunciation

Results: Overall



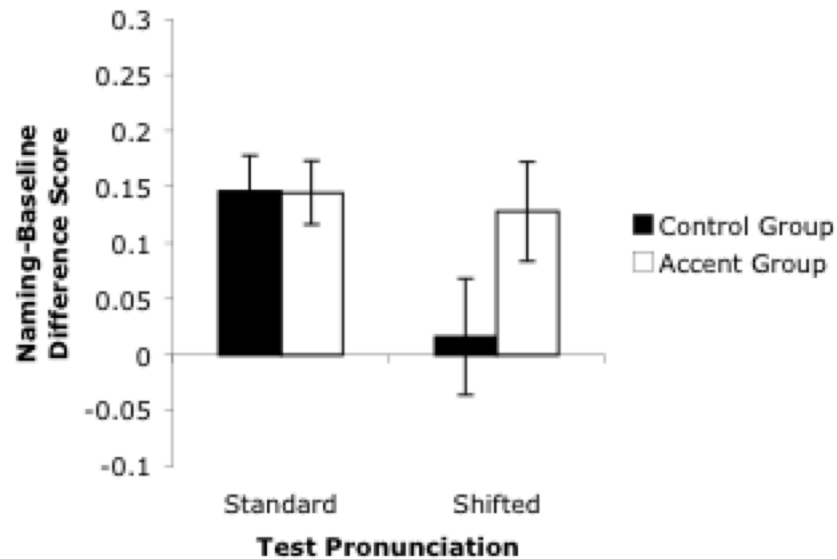
Naming-Baseline
Difference score



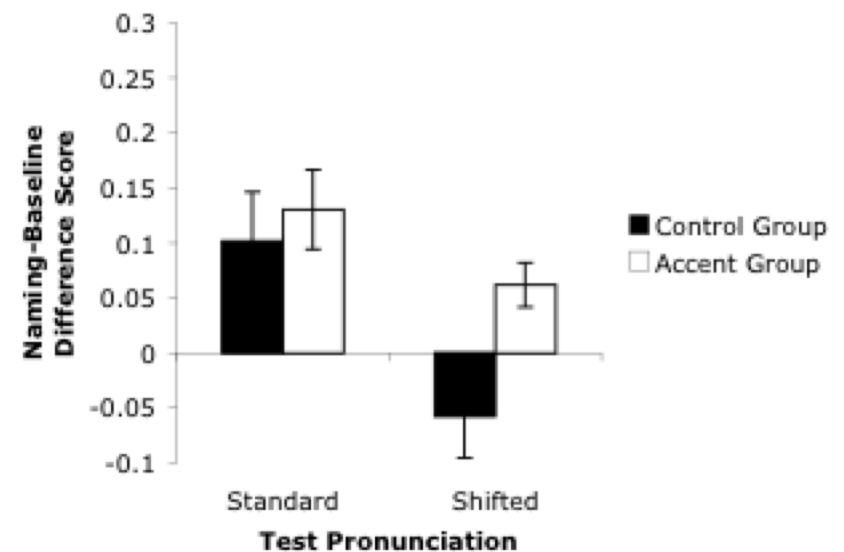
Results: By word type



Labeled items



Unlabeled items



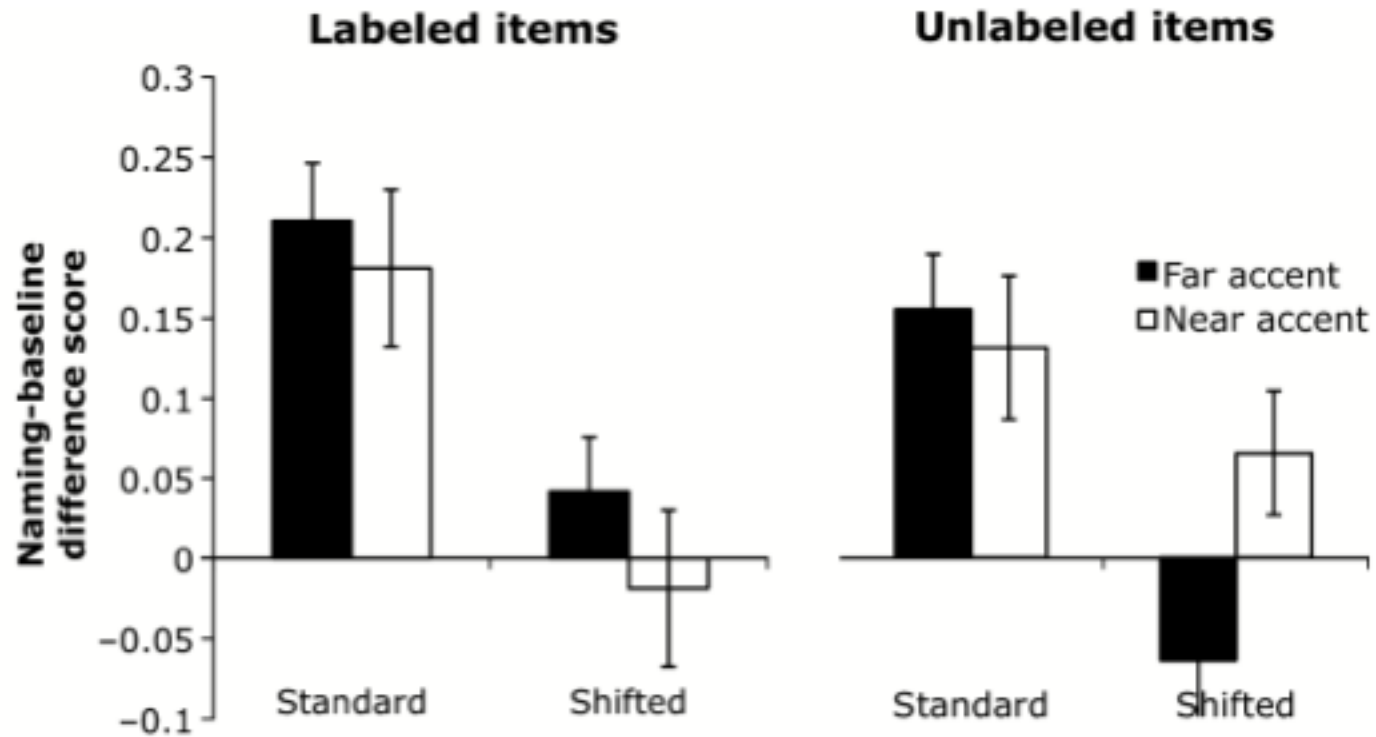
Results

- As with adults, top-down knowledge → adaptation
- Not item-specific, but generalized shift
- Accent learning or tolerance for sloppy pronunciations?
 - Adult learning fairly specific

New vowel test

- Exposure: Same as previous Accent Group
/a/ --> /ae/
- Test:
 - Standard pronunciations
 - Shifted pronunciations with new vowel /E/ (near) or /I/ (far)
- Learning specific vowel change or increased tolerance?

How specific?



Block effects

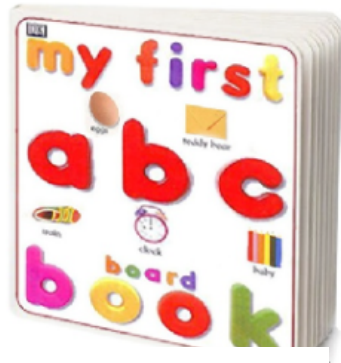
- Exp 1 control group: significant increase in recognition of accented words from Block 1 to Block 2
- Near and Far vowel groups: no change in recognition of accented words from Block 1 to Block 2

What about consonants?

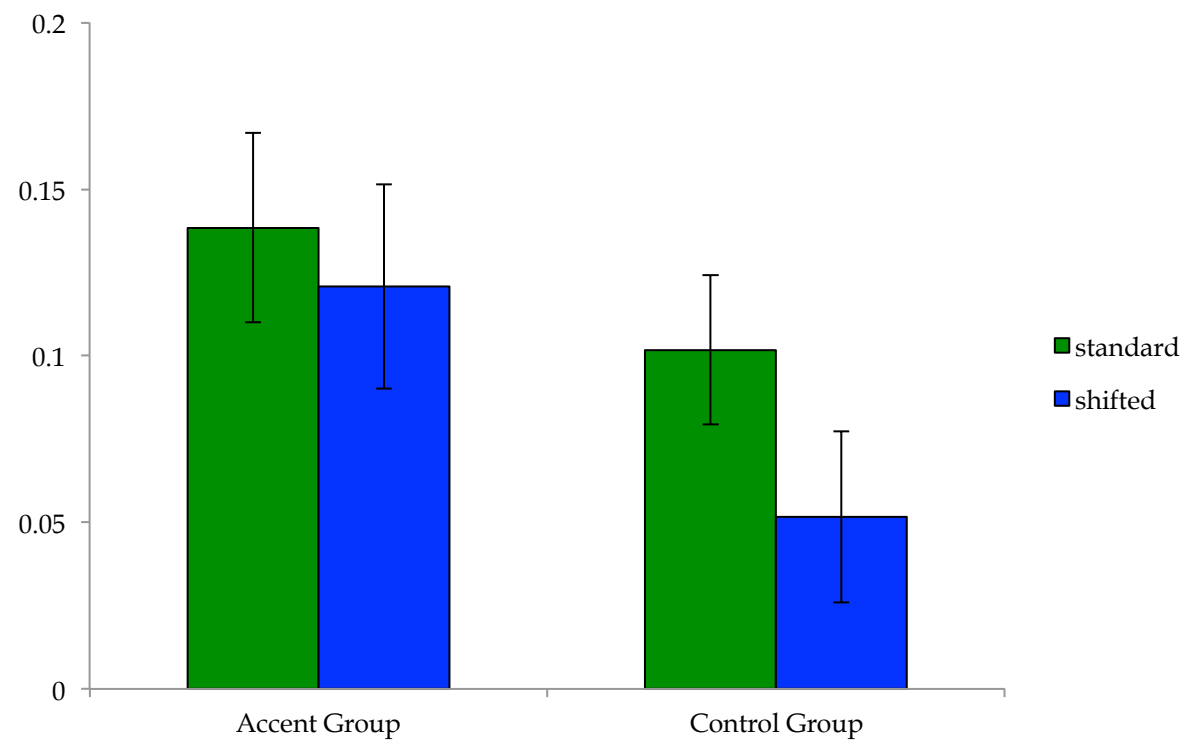
- Less variability of consonants across individuals and accents
- Consonants more important for lexical identity
 - Children pay more attention to consonants than vowels during word learning (e.g., Nazzi et al., 2005; 2009)

Consonants

- Analogous to vowel exposure study
- b-initial words
 - Control Group: typical pronunciations of words
 - Accent Group: simplified “accent” in which /b/ pronounced as /p/
- 8 total repetitions of each training word
- Displays contain unlabelled b-initial pictures

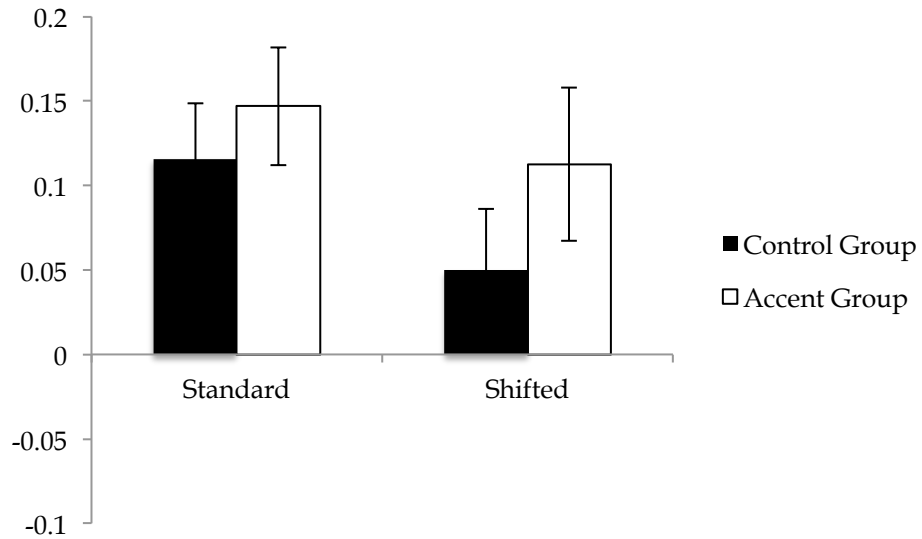


Consonants (preliminary)

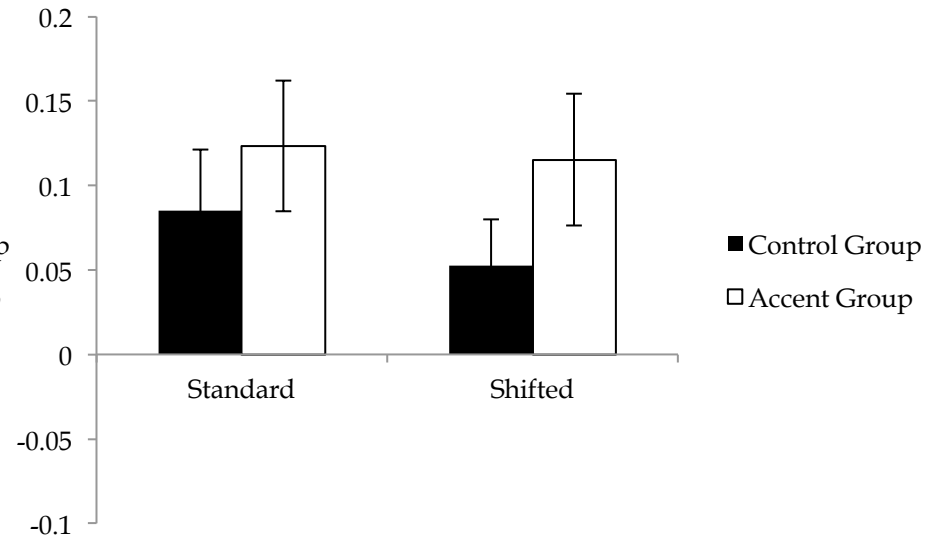


Consonants: By word type

Labeled items



Unlabeled items



Other evidence

- Lexical retuning of categories in 6- and 12-year-olds (McQueen et al., 2012)
- Ambiguous f/s heard in f- or s-biasing words (*giraffe, platypus*)
- Following exposure, respond to sounds on a continuum (*simpie* or *fimpie*?)

Natural accents

- Lexical exposure improves the recognition of accented familiar words in 15-mos-olds

(VanHeugten & Johnson, in press)

No exposure

Unfamiliar accent



Non-lexical exposure

Unfamiliar accent



Lexical exposure

Unfamiliar accent



Effects of vocabulary size

- Improved performance with higher vocabulary/age (Mulak et al., 2013)
- Why?
 - Increased linguistic knowledge permits recognition of “equivalent” forms?
 - Exposure to more variability in the environment?
 - Stronger top-down feedback?

Conclusions

- Evidence for lexically driven adaptation in toddlers
- Like adults, retuning generalizes across the phonological system
- How general is the retuning of categories?
 - Generalization across positions in adults (Jesse & McQueen, 2011), but in infants? (Thiessen & Yee, 2010)
 - Generalization across speakers?

Thanks

Parents and Children

NIH

National Sciences and Engineering Research
Council of Canada