



Talker specificity effects in the perception of foreign-accented speech

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ABSTRACT

Our research examines the circumstances in which talker variability affects spoken word perception. Based on previous time-course work, we hypothesized that talker specificity effects would be more robust when processing is relatively slow. We further hypothesized that spoken word processing would be significantly slower for listeners presented with foreign-accent speech than for listeners presented with speech produced by native speakers (and thus produced without a foreign accent). Consequently, we predicted that more robust talker specificity effects would be obtained for listeners presented with foreign-accent speech. Our results confirmed these hypotheses: Listeners presented with foreign-accented speech made lexical decision responses significantly more slowly than listeners presented with non-accented speech. Crucially, talker specificity effects were only obtained for listeners presented with foreign-accented speech. The results are consistent with previous time-course findings, and add to our knowledge of the circumstances under which variability affects the perception of spoken words.

INTRODUCTION

•Despite numerous sources of variability (e.g., talker identity, speaking rate), humans recognize spoken words both *quickly* and *accurately*.

•Talker information does *not* comprise part of the linguistic content of an utterance.

•For example, regardless of who says a given word (e.g., *telephone*), the meaning of the word does not change.

•Nevertheless, talker variability has long-term consequences for the *representations* underlying language perception (see e.g., Church & Schacter, 1994; Goldinger, 1996).

•Talker changes can cause spoken word recognition to be relatively slow (referred to as *talker effects*).

•Talker effects are observed when processing is relatively *slow* but not when processing is relatively *fast* (McLennan & Luce, 2005).

•Foreign-accented speech is more difficult to process than native-accented speech (Munro & Derwing, 1995).

•Foreign-accented speech should be processed relatively slowly.

•Therefore, greater talker effects are predicted in foreign-accented speech.

METHOD

Paradigm: Long-Term Repetition Priming

- Two blocks of spoken stimuli presented to listeners:

Prime Block → (filler task) → *Target Block*

Stimuli

- Primes* and *targets* varied in talker identity:
 - Half the stimuli in each block were spoken by a male and half by a female
- Primes* and *targets* varied in lexical status:
 - Half the stimuli in each block were real words and half were nonwords

Lexical Decision Task

- Participants were instructed to press one button to respond “word” and another button to respond “nonword” as quickly and accurately as possible.
- Reaction times (RTs) to make lexical decisions to words in the *target block* were measured as a function of *prime* type.
 - RTs were measured from the onset of the word to the onset of the participants’ button response.

Design: Three Conditions

MATCH: *Primes* and *targets* spoken by the same talker
 bacon (male) → bacon (male)
 bacon (female) → bacon (female)

MISMATCH: *Primes* and *targets* spoken by different talkers
 bacon (male) → bacon (female)
 bacon (female) → bacon (male)

CONTROL: *Primes* and *targets* differ completely
 folder → bacon

EXPERIMENTS

Experiment 1: English stimuli produced by native speakers of Castilian Spanish. Experiment conducted at CSU with native speakers of American English.

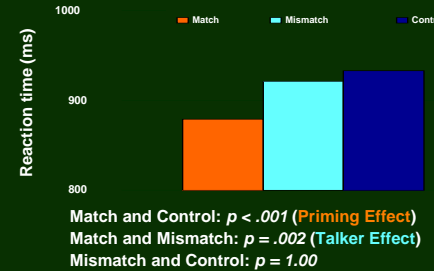
Experiment 2: Spanish stimuli produced by native speakers of Castilian Spanish.

Experiment 3: Spanish stimuli produced by native speakers of American English. Experiments 2 and 3 conducted at the University Jaume I with native speakers of Castilian Spanish.

Results

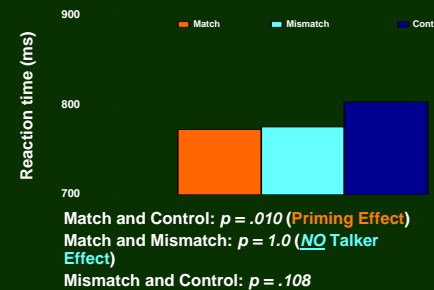
Experiment 1

- Prediction:** Robust talker effects in foreign-accented speech due to relatively slow processing.



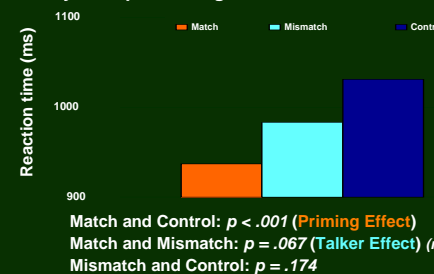
Experiment 2

- Prediction:** Native-accented speech will result in relatively fast processing and attenuated talker effects



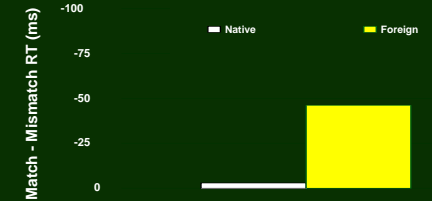
Experiment 3

- Prediction:** Foreign-accented speech will result in relatively slow processing and robust talker effects



Magnitude of Specificity

- We directly compared the role that talker-specific details play in the perception of foreign- and native-accented speech by analyzing the difference between the match and mismatch conditions in Experiments 2 and 3.



Greater talker effect in foreign-accented speech than in native-accented speech: $p = .057$ (marginal)

Conclusions

- More robust talker effects obtained with foreign-accented speech than with native-accented speech.
 - English words spoken by:
 - native speakers of American English (i.e., *native-accented*; see McLennan & Luce, 2005) (NO Talker Effect)
 - native speakers of Castilian Spanish (i.e., *foreign-accented*; current study Experiment 1) (Talker Effect)
 - Spanish words spoken by:
 - native speakers of Castilian Spanish (i.e., *native-accented*; current study Experiment 2) (NO Talker Effect)
 - native speakers of American English (i.e., *foreign-accented*; current study Experiment 3) (Talker Effect)

References

Church, B.A. & Schacter, D.L. (1994). Perceptual specificity of auditory priming: Implicit memory for voice intonation and fundamental frequency. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 20, 521-533.

Goldinger, S.D. (1996). Words and voices: Episodic traces in spoken word identification and recognition memory. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 22, 1166-1183.

McLennan, C.T. & Luce, P.A. (2005). Examining the time course of indexical specificity effects in spoken word recognition. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 31, 306-321.

Munro, M.J. & Derwing, T.M. (1995). Processing Time, Accent, and Comprehensibility in the Perception of Native and Foreign-Accented Speech. *Language and Speech*, 38, 289-306.

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