L2 knowledge facilitates perception of L3

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Background

- Language transfer / cross-linguistic influence:

When learners apply sounds, forms or rules from one language in another language.

  - Facilitation, or positive transfer: based on similarities between languages (e.g., cognates)

  - Interference, or negative transfer: based on differences between languages (e.g., pronunciation errors)

Background

- Language transfer has been studied for a long time

(e.g., Odlin 1983, Gass & Selinker 1983, Kellerman & Sharwood Smith, eds., 1986)

But focus on:

- Influence between L1 and L2

- Negative transfer

  In phonetics/phonology:

  - production: e.g., sound substitution
  - perception: e.g., failure to discriminate between sounds

Background

- Recently, emerging field of third or additional language acquisition
  - Studying transfer phenomena between more than two languages (see e.g. Cenoz, Hufeisen & Jessner, eds., 2001)

- Also, more awareness that positive transfer not fully explored

(see e.g. Marx & Mehlhorn 2009 for discussion)

  - So far mostly focus on how learning typologically close languages might be easier because of similar sound inventory, syntax, lexicon, etc.

(but see e.g. Pater & Tessier 2006 for a study on how L1 phonotactic knowledge can help to learn certain phonological alternations in L2)

This study

- Main goals:
  - To contribute to understanding transfer between L2 and L3
  - To study potential facilitative effects of transfer
  - To look at transfer more systematically: study one phonetic feature in more detail
  - To investigate a less studied perceptual challenge: instead of looking at perception of novel contrasts, study features that are not novel but require reinterpretation of function, for example:
    - Allophones vs. phonemes
    - Pitch differences used emphatically vs. contrastively
    - Segment duration used emphatically or as a prosodic cue vs. contrastively (used in this study)

This study: feature tested - duration

- In many languages duration used contrastively:

e.g. Italian 'be**ll**o' vs. 'be**l**o' ('beautiful' vs. 'I bleat') (geminate vs. singleton)

Finnish '**tuu**li' vs. 't**u**li' ('wind' vs. 'fire')

- In others, duration primarily a prosodic cue:

e.g. American English – duration signals stress or prosodic boundaries (Klatt 1976)

  - Vowel duration is never contrastive in Am. English; it correlates with the tense-lax distinction (e.g., *beat* vs. *bit*) and depends on the voicing of the following segment (e.g., *cad* vs. *cat*).
  - Consonant duration is generally not considered contrastive in Am. English; long consonants are attested but only at morpheme boundaries (e.g., *dissatisfied*) (Benus et al. 2003); minimal pairs are rare (e.g., *unnamed* vs. *unaimed*), and for most speakers the contrast is neutralized (Kaye 2005).
  - By 18 months of age, English-learning infants process duration contrasts differently from infants learning a language that contrasts duration (e.g., Dutch or Japanese) (Dietrich et al. 2007, Mugitani et al. 2008)

This study: overview

- Testing perception of the geminate/singleton contrast by native speakers of American English in a novel language
- Half of the participants have no previous exposure to languages with contrastive duration
- The other half of the participants has previously learned a language with contrastive duration
- The test language is novel to all participants: the geminate/singleton contrast implemented slightly differently
- Looking at differences between the two groups of participants, as well as differences within the second group:
  - Is there any facilitation in perception for the second group?
  - Is there any generalization to novel contexts and/or novel segments?

Experiment: method

- Materials:
  - Nonce words phonotactically legal in Moroccan Arabic (recorded by a native speaker of Moroccan Arabic)
  - Conditions:
    - 2 segments: /s/ and /z/
    - 4 contexts: V_V, V_CV, #_V, # _CV

	prevocalic	**preconsonantal**
word-medial	**V_V** assa~asa azza~aza	**V_CV** assta~asta azzda~azda
word-initial	**#_V** ssa~sa zza~za	**#_CV** ssta~sta zzda~zda

  - 10 different tokens of each word used in the experiment
  - The fricatives spliced into different vowel or consonant+vowel frames (in order to control for potential cues on the vowels)

Experiment: method

- Design
  - AX discrimination task: same/different
    - Different pairs: e.g., assa ~ asa
    - Same pairs: e.g., assa ~ assa, asa~asa
  - Each participant heard 12 repetitions of each test condition
  - ISI = 500ms

Experiment: participants

- Undergraduate students at UC San Diego:
  - 40 “monolinguals”:
    - native speakers of English with no exposure to geminates
  - 40 “bilinguals”:
    - native speakers of English w/previous exposure to geminates in L2 (non-dominant language)
      - with varying proficiency in L2 (measured as self-reported on a 1-5 scale)
      - with varying manner of exposure (school vs. home)
      - (speakers of a total of 17 different languages)

Experiment: participants

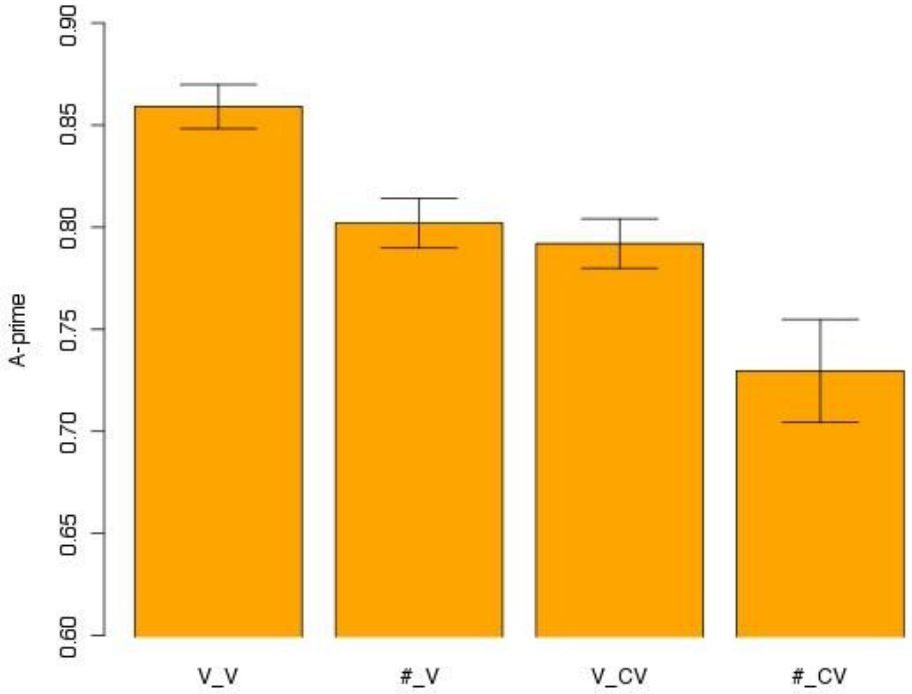
- The bilingual participants divided into groups:
  - By context of geminates present in their L2:
    - “intervocalic bilinguals”: from the tested contexts, L2 only has V_V
    - “intervocalic+ bilinguals”: from the tested contexts, L2 has V_V plus at least one of the others
  - By segments present as geminates in their L2:
    - “[ss] bilinguals”: from the tested segments, L2 only has [ss]
    - “[ss] & [zz] bilinguals”: from the tested segments, L2 has both [ss] and [zz]

Predictions

- Phonetic transfer & facilitation in processing
  - If the feature of consonant duration can be transferred from L2 to L3 and facilitate L3 processing, then the bilingual listeners should perform better than the monolingual listeners.
  - The degree of proficiency in L2 might matter.
- Generalization to novel contexts
  - If consonant duration can be generalized to novel contexts, then all the bilingual listeners should perform equally, regardless of the context of geminates in their L2.
- Generalization to novel segments
  - If consonant duration can be generalized to novel segments, then all the bilingual listeners should perform equally, regardless whether their L2 has both geminate /s/ and /z/ or only /s/.

Results: bilinguals (N=40)

- Mean A' = 0.79
- Significant effect of context (p<.001)
- No effect of proficiency in the L2 (no correlation between fluency and A', t<1)
- No effect of manner of exposure: school vs. home (N=34, F<1)
- Conclusion 1:
  - Some contexts are more difficult than others
  - Proficiency in L2 doesn't seem to matter in this task



Results: bilinguals & monolinguals (N=80)

- Significant effect of language background (p<.001)
  - Bilinguals: mean A' = 0.79
  - Monolinguals: mean A' = 0.72

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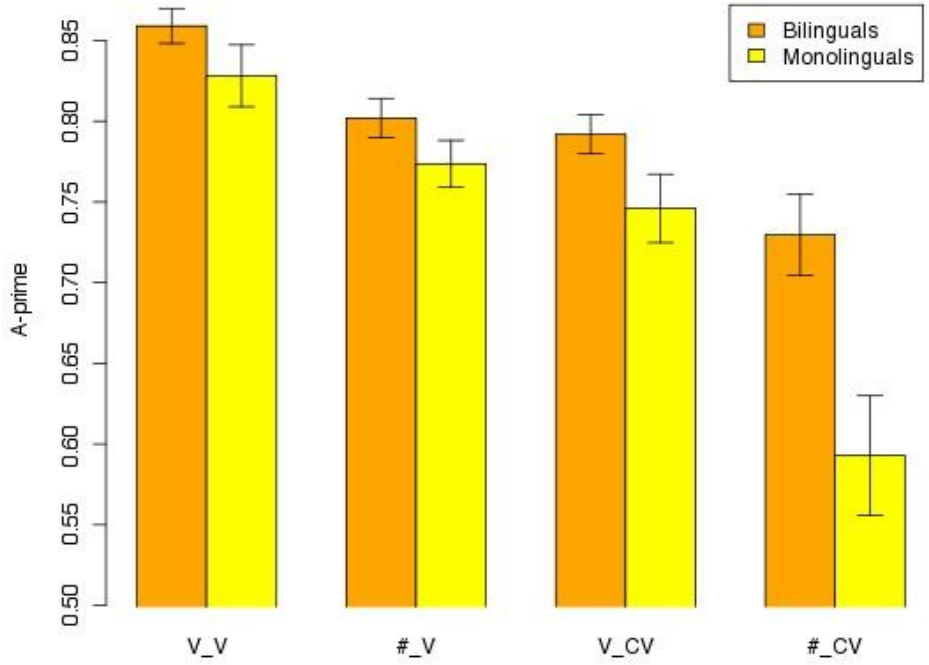
- Conclusion 2:
  - Phonetic transfer of consonant duration occurs and facilitates L3 processing



Results: bilinguals & context (N=32)

- Significant effect of context of geminates in L2 ($p<.05$)

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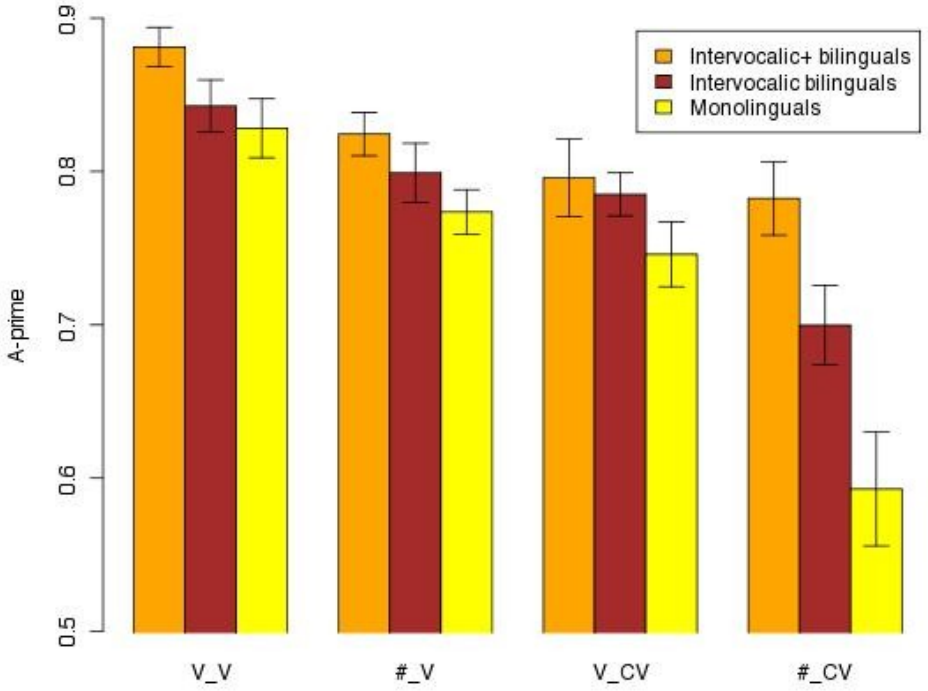
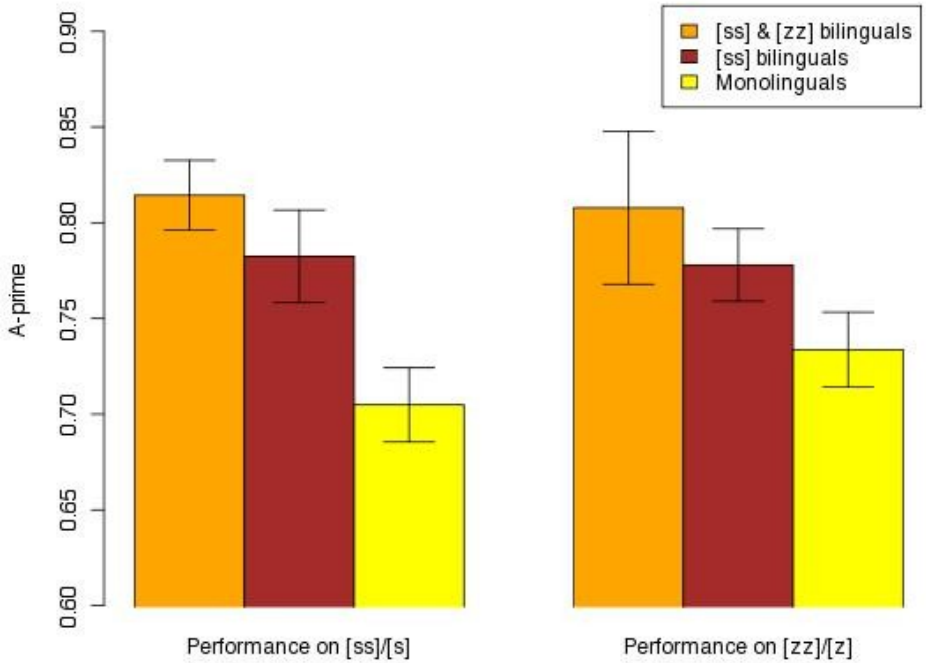
  - "Intervocalic+ bilinguals": mean A' = 0.82
  - "Intervocalic bilinguals": mean A' = 0.77



- Conclusion 4:
  - The listeners don't easily generalize across contexts
  - Experience with more contexts improves overall performance

Results: bilinguals & segments (N=20)

- No effect of geminated segments in L2 (F<1) and no interaction with voicing (F<1)
  - "[ss] & [zz] bilinguals: mean A' = 0.81
  - "[ss] bilinguals": mean A' = 0.78
- Conclusion 3:
  - The listeners generalize their L2 knowledge to novel segments



Summary

- Phonetic transfer & facilitation in processing: **yes**
  - The concept of contrastive consonant duration can be transferred from L2 to L3 and facilitate auditory processing.
  - Proficiency in L2 doesn't seem to matter – facilitation occurred for all bilingual participants (but a more objective measure of proficiency needed)
- Generalization to novel segments: **yes**
  - This concept can be generalized to novel segments (or at least across voicing).
- Generalization to novel contexts: **no**
  - This concept is not easily generalized to novel contexts.

Implications

- Proficiency required for transfer:

High proficiency in the source language might not be needed for transfer of features that only require reinterpretation of function.

- Teaching novel contrasts:

Training students on a given contrast in several different contexts might improve their overall perception of the contrast. (cf. Barlow 2005)

- Advantages of being aware of students' language backgrounds:

Teachers could take advantage of their students' previous language background to help them learn certain features.

  - Marx & Mehlhorn 2009: learners might not automatically transfer certain L2 knowledge, but teachers can explicitly focus their attention on similarities between languages

Future research

Positive transfer can possibly be encouraged, but it first needs to be well understood. Thus, more systematic research is needed on:

- Phonetic transfer & facilitation in processing
  - What other phonetic features can facilitate auditory processing of novel languages?
  - What factors influence this type of transfer?
- Making generalizations
  - What can generalize to what?
  - Can consonant duration generalize to vowel duration, and vice versa?
- Facilitation in learning
  - Can previous phonetic knowledge facilitate learning of contrasts in additional languages?

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