

Lexically Conditioned Phonetic Variation Across Languages

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Introduction

- Bilinguals process cognates differently from noncognates in speech production (e.g. Costa et al., 2000; Gollan & Acenas, 2004)
 - Within lexical and phonological processes, cross-language interactions are influenced by word-level properties; i.e., they are **lexically conditioned**.
- Does lexical conditioning extend to fine-grained phonetic properties?
 - It is well known that there is phonetic transfer across languages
 - Phonetic realization of L2 segments is similar to that of L1 (e.g. Crowther & Mann, 1992)
 - Phonetic processes from L1 affect L2 production (e.g. Davidson, 2006).
 - Previous studies of L1 → L2 transfer: Methodological issues
 - Cognates and noncognates not phonologically matched (Flege et al., 1998)
 - Only a single item (Flege & Munro, 1994).

Focus of the current study

Is cross-language transfer lexically conditioned?

- Examine transfer in German-English bilinguals.
- Compare degree of transfer for matched cognates vs. noncognates.

Summary of results

In certain cases, cross-language transfer is lexically conditioned.

- Transfer from dominant language is influenced by cognate status.

Methods and Materials

English has a word-final voicing contrast (e.g., bed-bet), while German exhibits incomplete neutralization (e.g. Piroth & Jancker, 2003).

- Examined how this difference in voicing contrast influences production in L1 and L2.

Participants

10 German-English bilinguals & 10 English monolinguals

Speech Materials: English

Quadruplets of words: 1 German-English cognate/false friend ending in voiced consonant, 1 cognate ending in voiceless consonant, 1 voiced noncognate, 1 voiceless noncognate
Matched for lexical frequency and the following phonetic properties:

- Syllable and phoneme length.
- Final consonant in each quadruplet.
- Vowel preceding final consonant.
- Phonotactic probability (sum segmental and biphone probability).

10 /t/-d/ final quadruplets, 10 /k/-g/ final quadruplets

Sample quadruplet: <suite> - <tweed> (cog.) & <teat>, <bleed> (noncog.)
Critical words embedded in a list with mono- and bisyllabic fillers.

Speech Materials: German

Cognate/noncognate quadruplets as in English.

- Matched for lexical frequency and
 - Syllable and phoneme length.
 - Final consonant in each quadruplet.
 - Vowel preceding final consonant.

6 /t/-d/ final quadruplets, 4 /k/-g/ final quadruplets

Sample quadruplet: <Suite> - <Tweed> (cog.) & <riet>, <Ried> (noncog.)
Critical words embedded in a list with mono- and bisyllabic fillers.

Procedure

Words were presented visually for self-paced reading.

- English block followed by German for bilinguals.
- All instructions given in the language of the block.
- Within each block, stimulus list repeated in three random orders.

Analysis

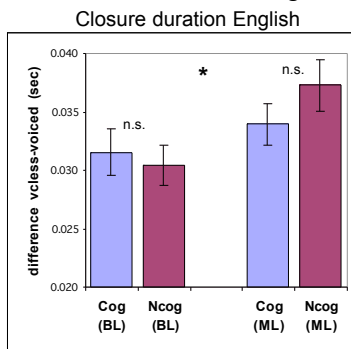
Measurements were taken of acoustic cues to the final voicing distinction:

- Vowel duration
- Closure duration
- Center of gravity of burst
- F1 offset of vowel
- Voicing into closure
- Release duration
- Proportion stops released

Results

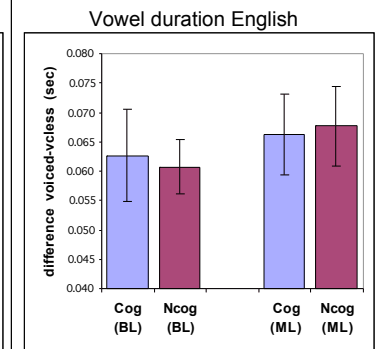
L1 → L2 transfer?

- Transfer
- No lexical conditioning



- Paired two sample t-tests over speakers
- Voicing distinction sign. bigger for monolinguals than bilinguals, $p < 0.01$
- Voicing dist. not sign. different for cognates and noncognates, $p > 0.05$
- Similar results for F1 offset, voicing into closure, burst center of gravity, release duration, proportion stops released

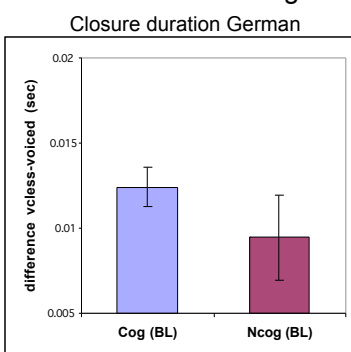
- No transfer



- Paired two sample t-tests over speakers
- Voicing distinction not sign. different for monolinguals and bilinguals, $p > 0.05$
- Voicing dist. not sign. different for cognates and noncognates, $p > 0.05$

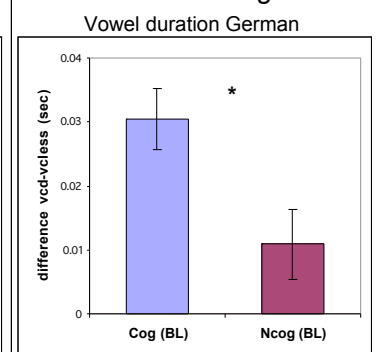
L2 → L1 transfer?

- No lexical conditioning



- Paired two sample t-tests over speakers
- Voicing dist. not sign. different for cognates and noncognates, $p > 0.05$
- Similar results for F1 offset, voicing into closure, burst center of gravity, proportion bursts released, release duration

- Transfer
- Lexical conditioning



- Paired two sample t-tests over items
- Voicing dist. sign. different for cognates and noncognates, $p < 0.05$

Discussion

Implications for theories of speech production:

- In certain cases, L2 → L1 transfer is lexically conditioned.
 - Consistent with lexically conditioned phonetic variation in monolinguals (Baese & Goldrick, 2007).
 - Cognate effects have been used to argue for cascading activation between lexical and phonological processes (Costa et al., 2000) – these results suggest similar interactions are present between lexical, phonological and phonetic level processes.

Why absence of lexical conditioning in L1 → L2?

- Proficiency/dominance:** all bilinguals were highly proficient in English and reported predominantly using English in their daily lives.
 - English may have become their dominant/most proficient language.
 - Current analyses: Examine for contrasting effects in lower-proficiency German-English bilinguals.
- Task order:** unlikely because Paterson & Goldrick (in progress) using the same task order found cognate effects in the L2 but not L1 with lower proficiency Portuguese-English bilinguals.

References

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