Devoicing and voicing in similar German and English word pairs by native speakers of German

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INTRODUCTION

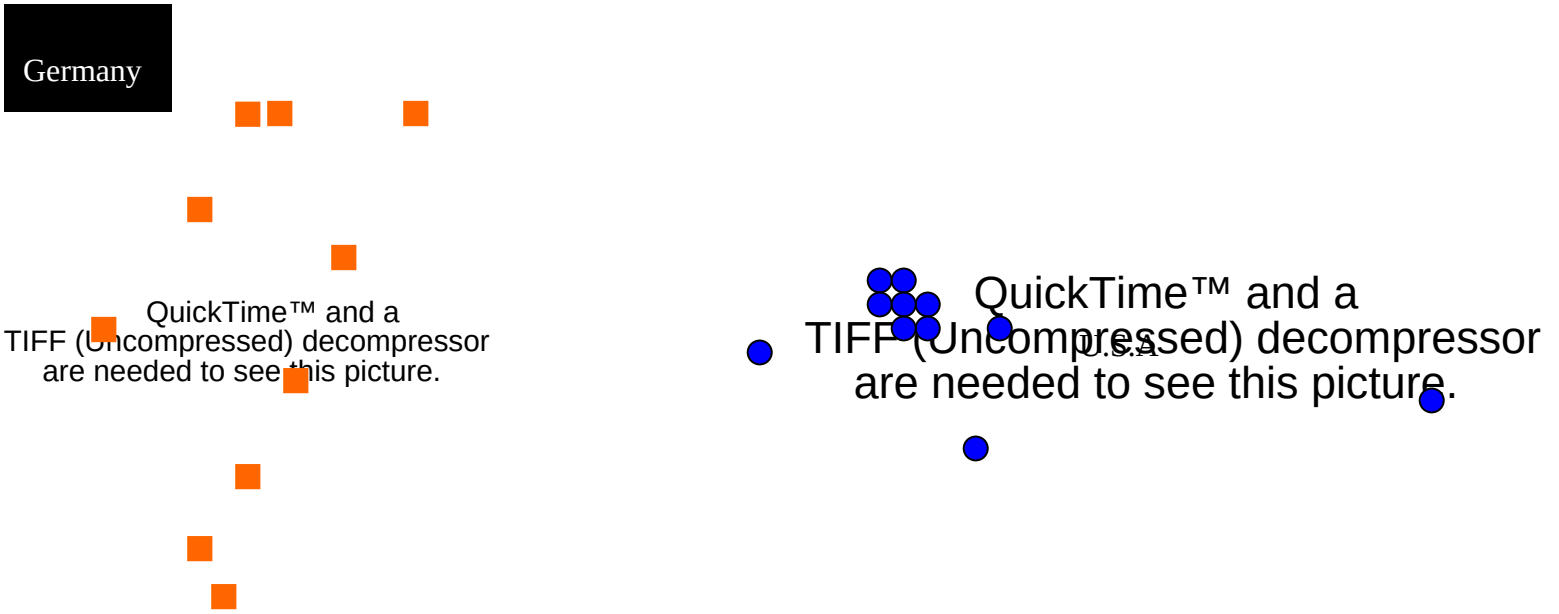
A number of languages manifest a pattern of "word-final obstruent devoicing," i.e., words ending with underlying voiced obstruents are pronounced so as to be (largely) indistinguishable from words ending with final voiceless obstruents. An important issue regarding this tendency is what occurs when native speakers of such a language learn a second language that has a word-final obstruent voicing contrast. For example:

Do German speakers neutralize word-final voicing contrasts in English as they tend to in German, or can they learn to produce final, voiced obstruents in English despite devoicing them in German?

METHOD

Subjects: 10 native German (***NG***) speakers living in the U.S. for an average of about 2 years (avg. age: ~25 yrs.; 6 F, 4 M); 11 native English (***NE***) speakers (avg. age: ~22 yrs.; 10 F, 1 M).

General areas where NG and NE speakers were raised



Stimuli: ***NG*** speakers produced 10 repetitions of 26 different words, including various minimal pairs (none within the same sentence) that are phonologically-similar in German and English.

Target words were embedded in non-final and final position of German and English carrier phrases:

German: Leid/leit, Rad/Rat, seid/seit, Tod/tot, Log/lock, bad/bat

English: lied/light, rod/rot, side/sight, toad/tote, log/lock, bad/bat

Carrier Phrases

German: Ich habe schon oft ____ gesagt, jetzt sage ich nur noch ___.

English: I like to say ____ some of the time, but today I say ___.

NE speakers produced only the English carrier phrase and target words.

Acoustic Analyses: Temporal measurements made of all ***NG*** and ***NE*** speakers' productions included:

1) vowel duration (VowDur) preceding voiced (V+) and voiceless (V-) final consonants
2) final consonant closure duration (ConsDur)
3) duration of voicing (VCE) during final consonants
4) final consonant release burst duration (BurDur)

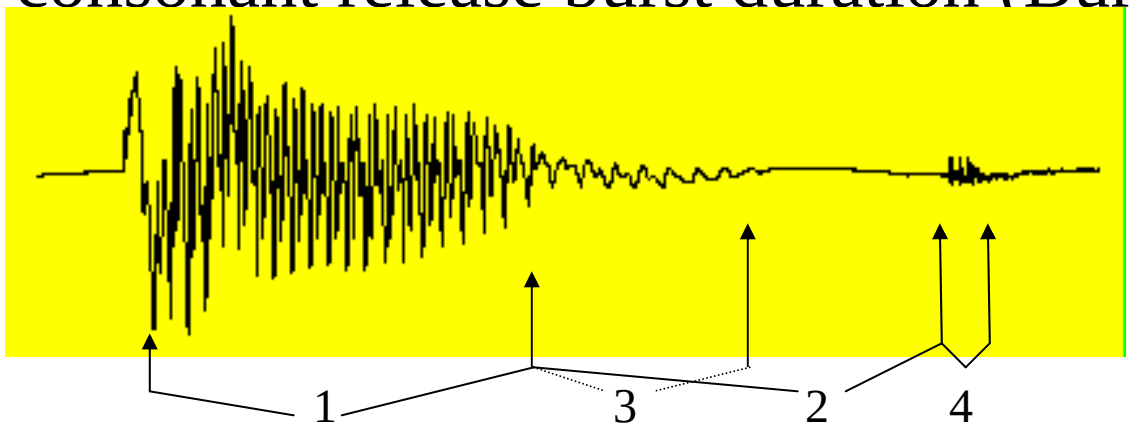


Figure 1: ***NGs'*** vowel durations were greater before final V+ than final V- consonants in both German (19 ms) and English (50 ms); thus, their vowels in English words with V+ consonants were more like ***NE*** (48 ms) than ***NG***.

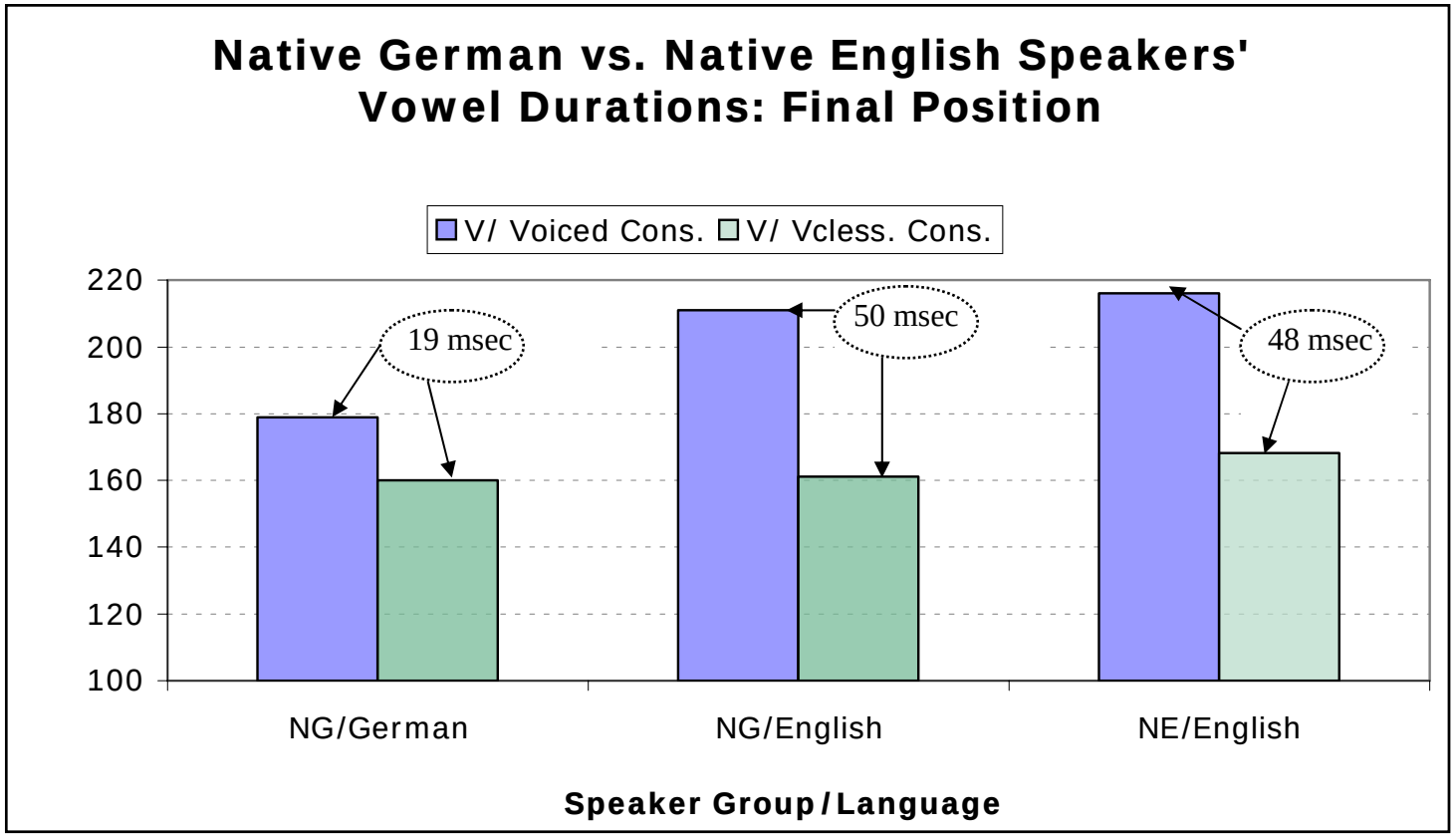


Figure 2: In relative terms, ***NGs*** lengthened vowels before V+ obstruents in German words by about 12%# versus 31%* lengthening in English words, which was thus more similar to ***NEs'*** 28%@ vowel lengthening.

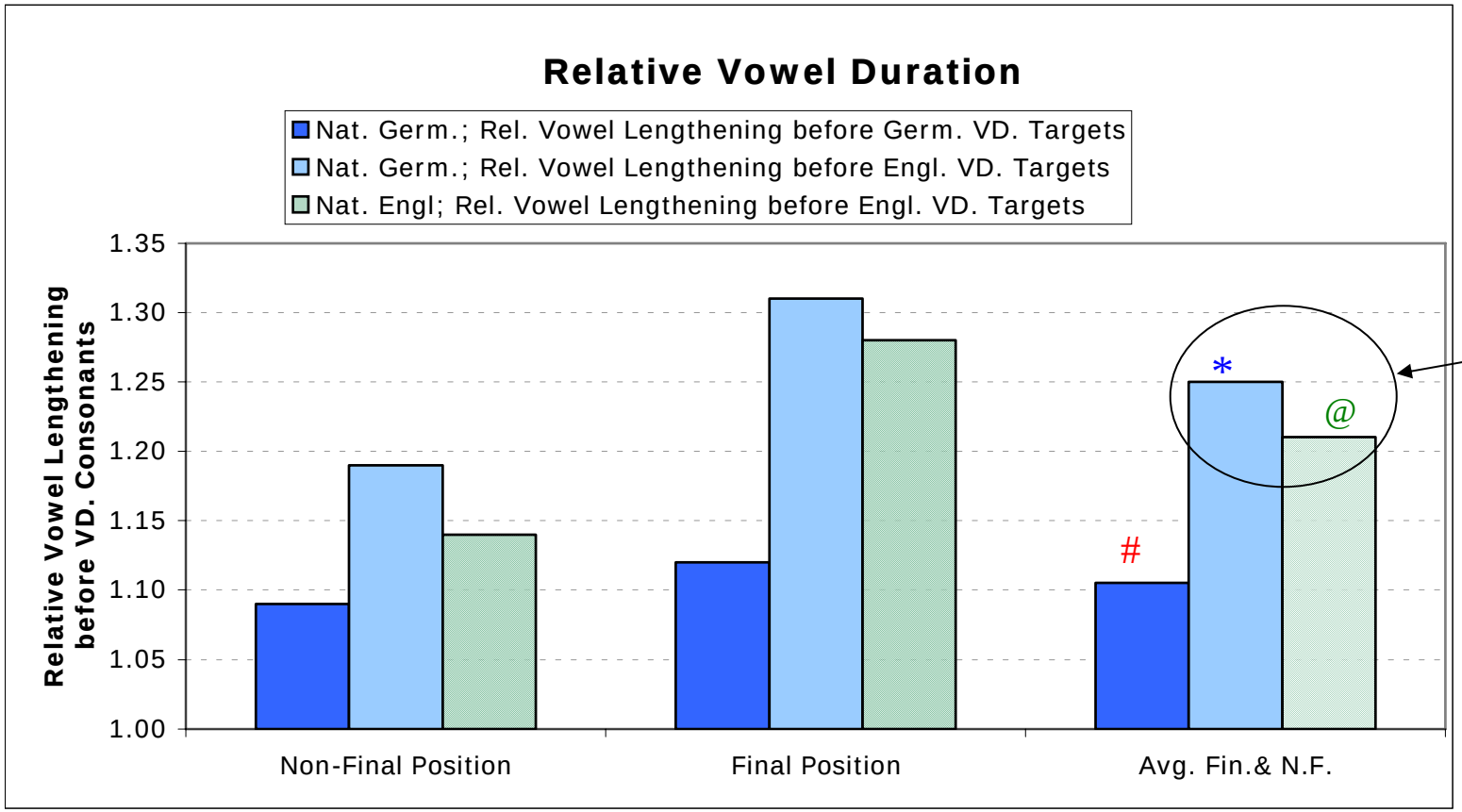


Figure 3: ***NGs'*** consonant closure duration was slightly greater for V- vs. V+ final consonants in both German (2 ms) and English (10 ms), whereas ***NE*** speakers had a 59 ms FCD contrast for final V- vs. V+ consonants.

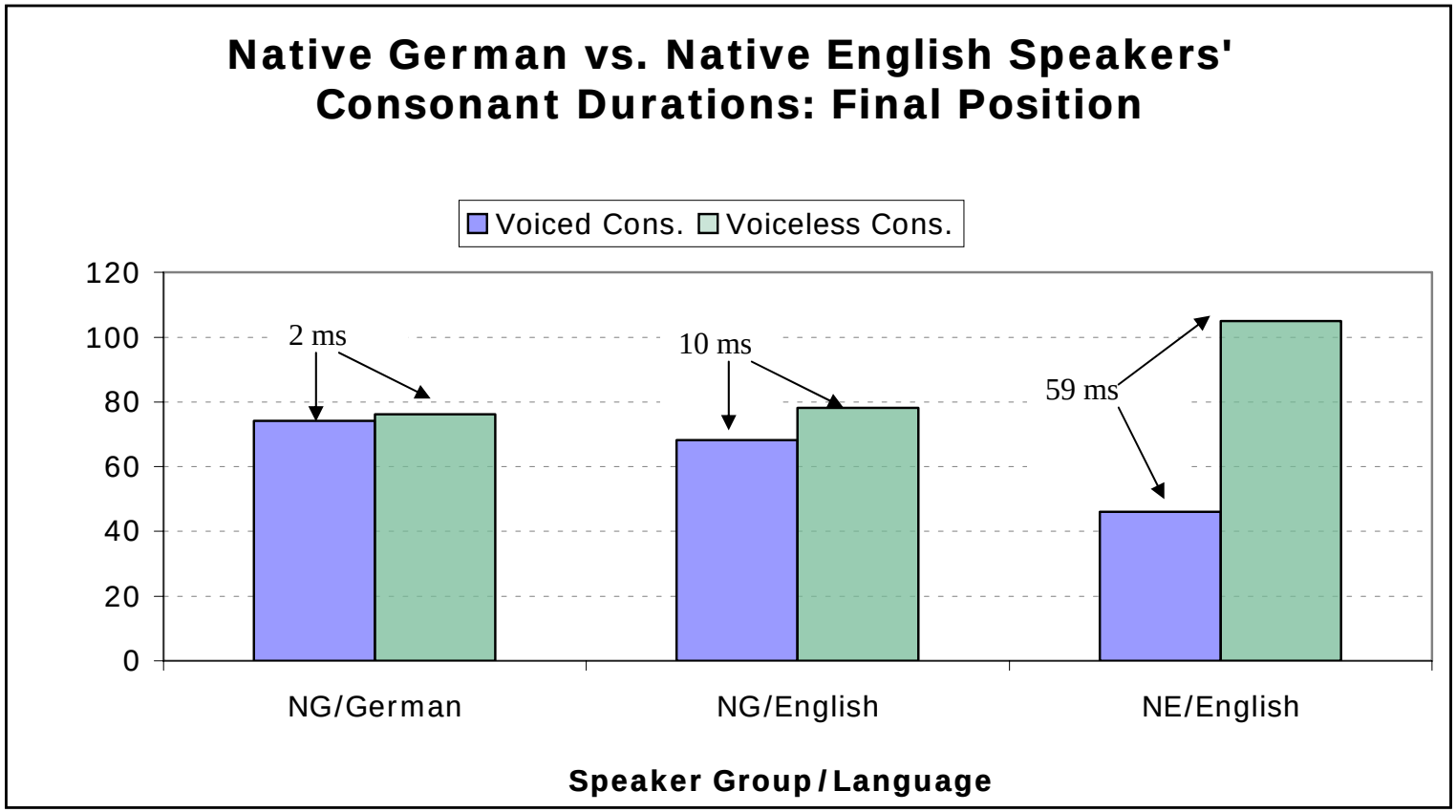


Figure 4: ***NGs'*** voicing during consonant closure was similar (3 ms difference) for V+ vs. V- targets in German and somewhat greater in English (12 ms), but not as large as the 28 ms. VCE difference by ***NEs***.

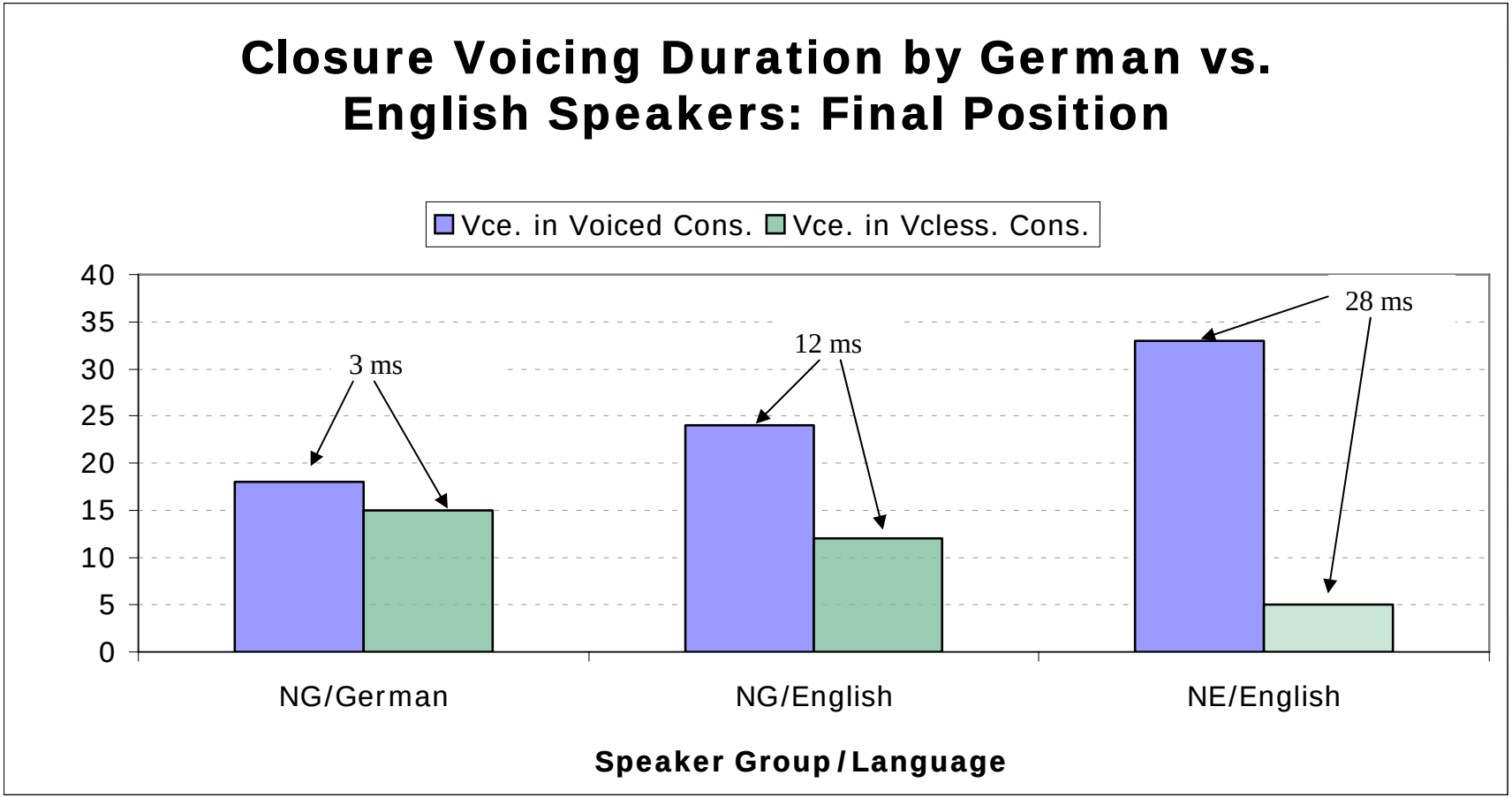


Figure 5: Relative *voicing* during final consonants averaged 24% (V+) vs. 20% (V-) in obstruents produced by ***NGs*** speaking German, compared with 36% (V+) versus 15% (V-) for their English productions. However, ***NE*** speakers showed a contrast of 71% (V+) vs. 5% (V-).

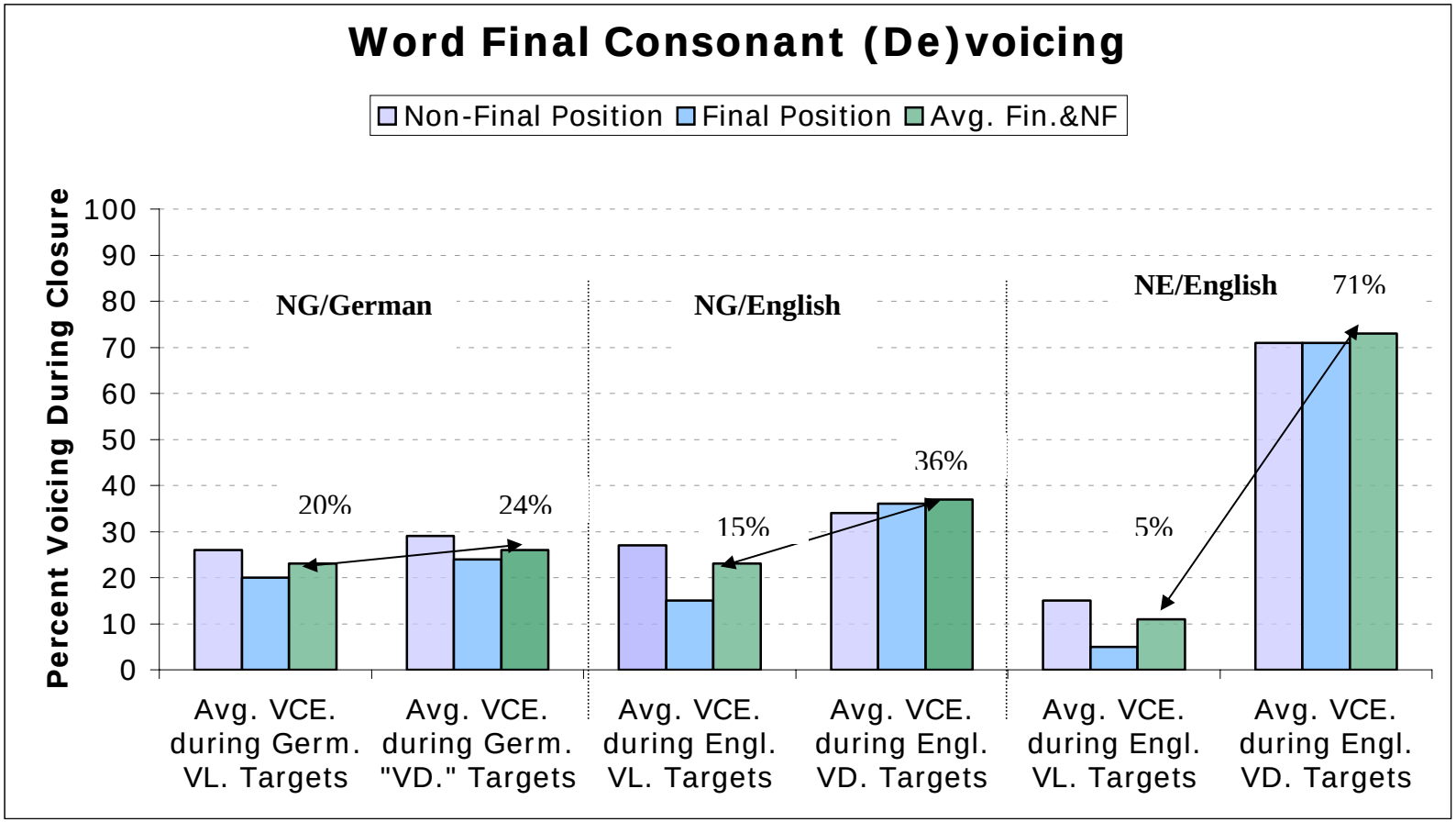


Figure 6: ***NGs'*** final release bursts averaged 30-40 ms. longer for V+ and V- consonants in both their German and English words compared to release bursts produced by the ***NE*** speakers.

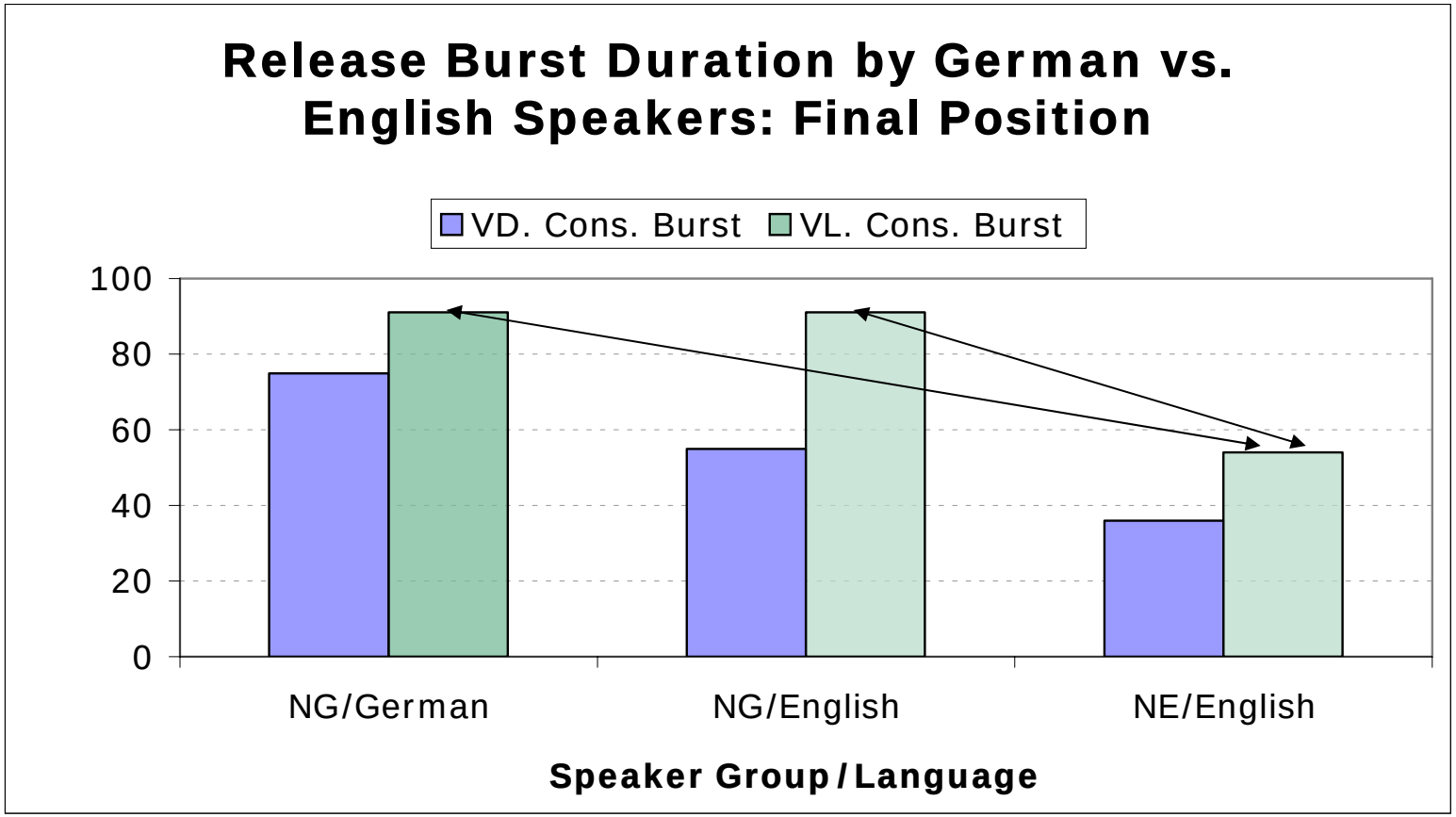


Figure 7: Thus, some acoustic properties of the ***NGs'*** English were more similar to their German production patterns (e.g., *Cons. Dur. for VL targets); others were more similar to patterns of *NE* talkers (e.g., #Avg. Vowel Dur. before VD Targets).

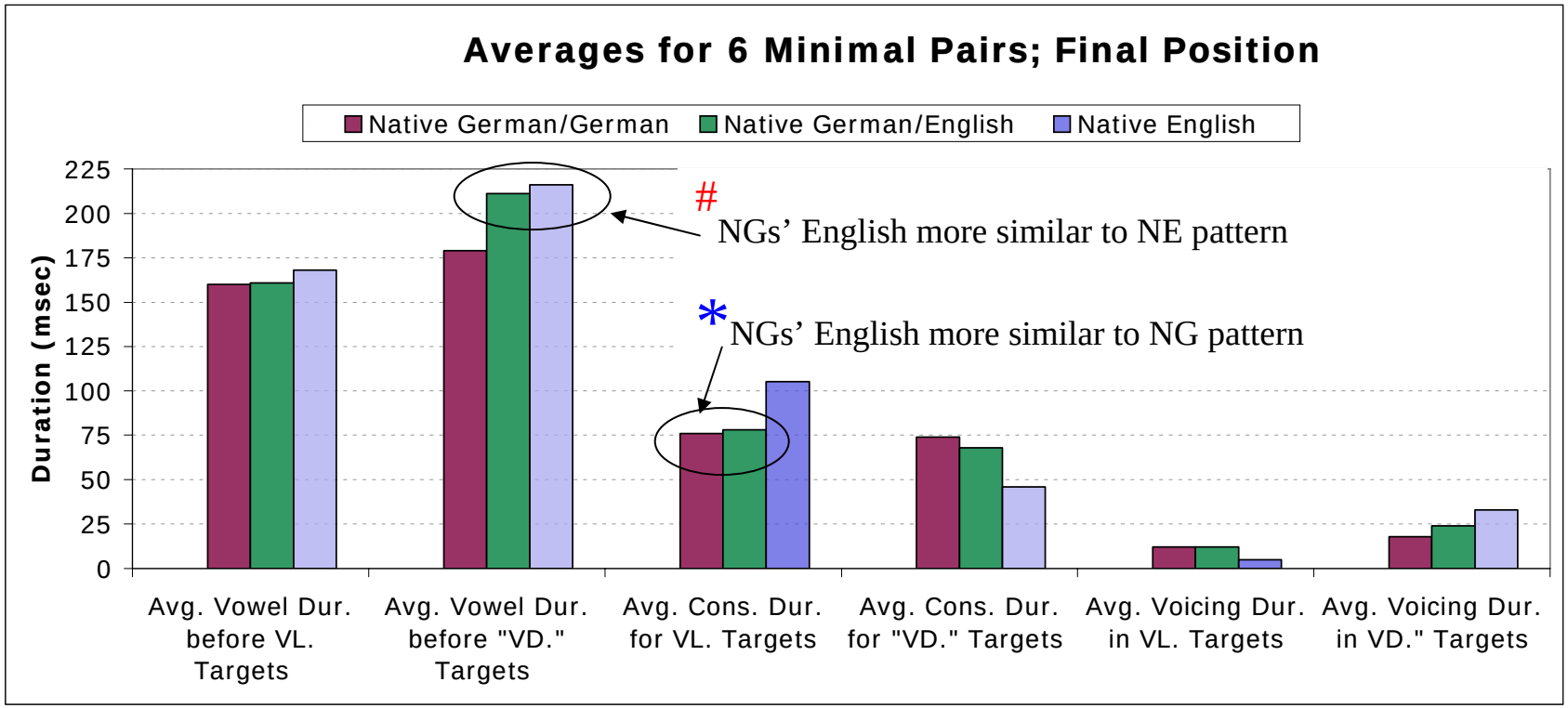


Figure 8: All 10 *NGs* showed some vowel lengthening before V+ vs. V- consonants (1.0 = no difference) in German words (solid bars), and they all showed even more lengthening in their English words (striped bars).

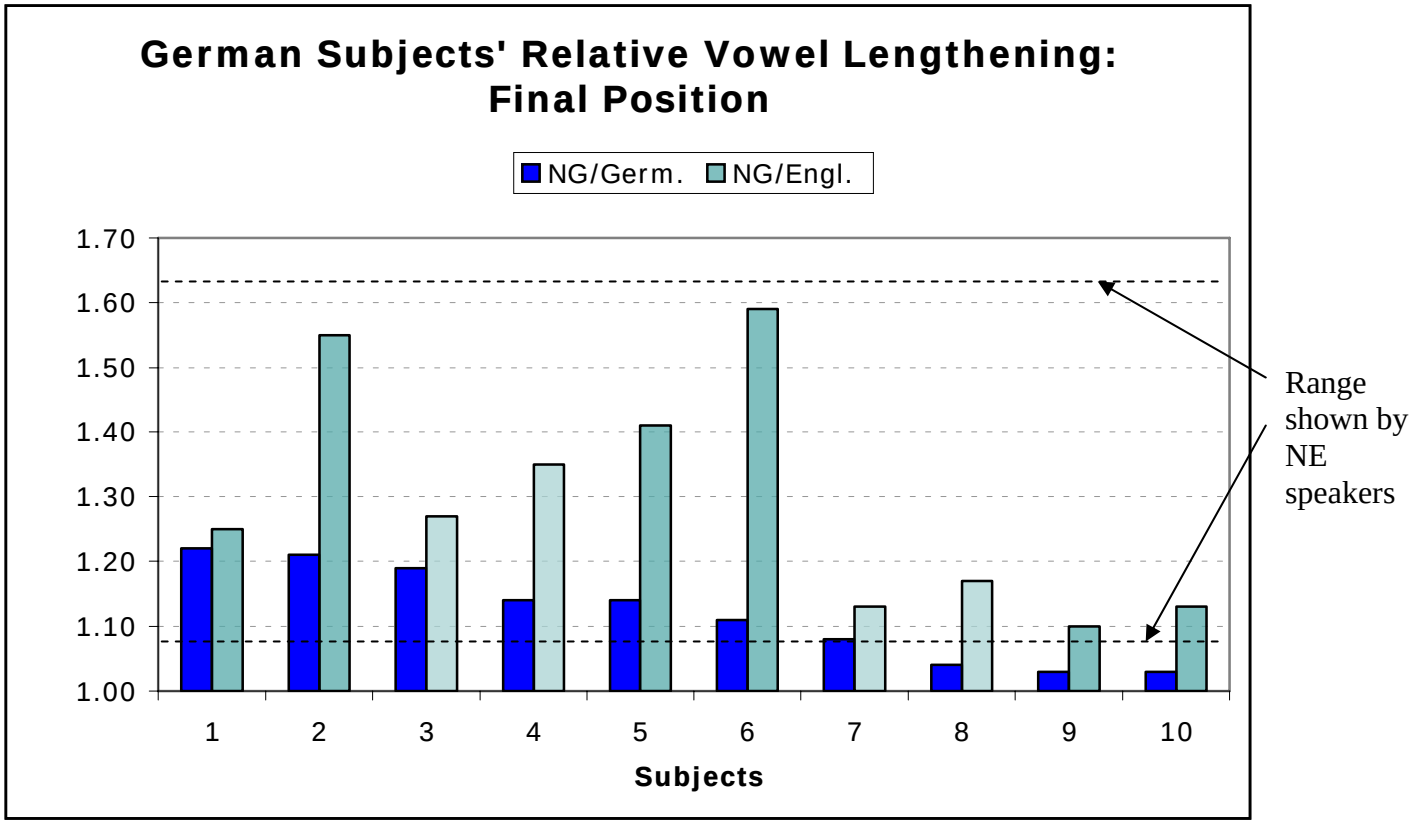
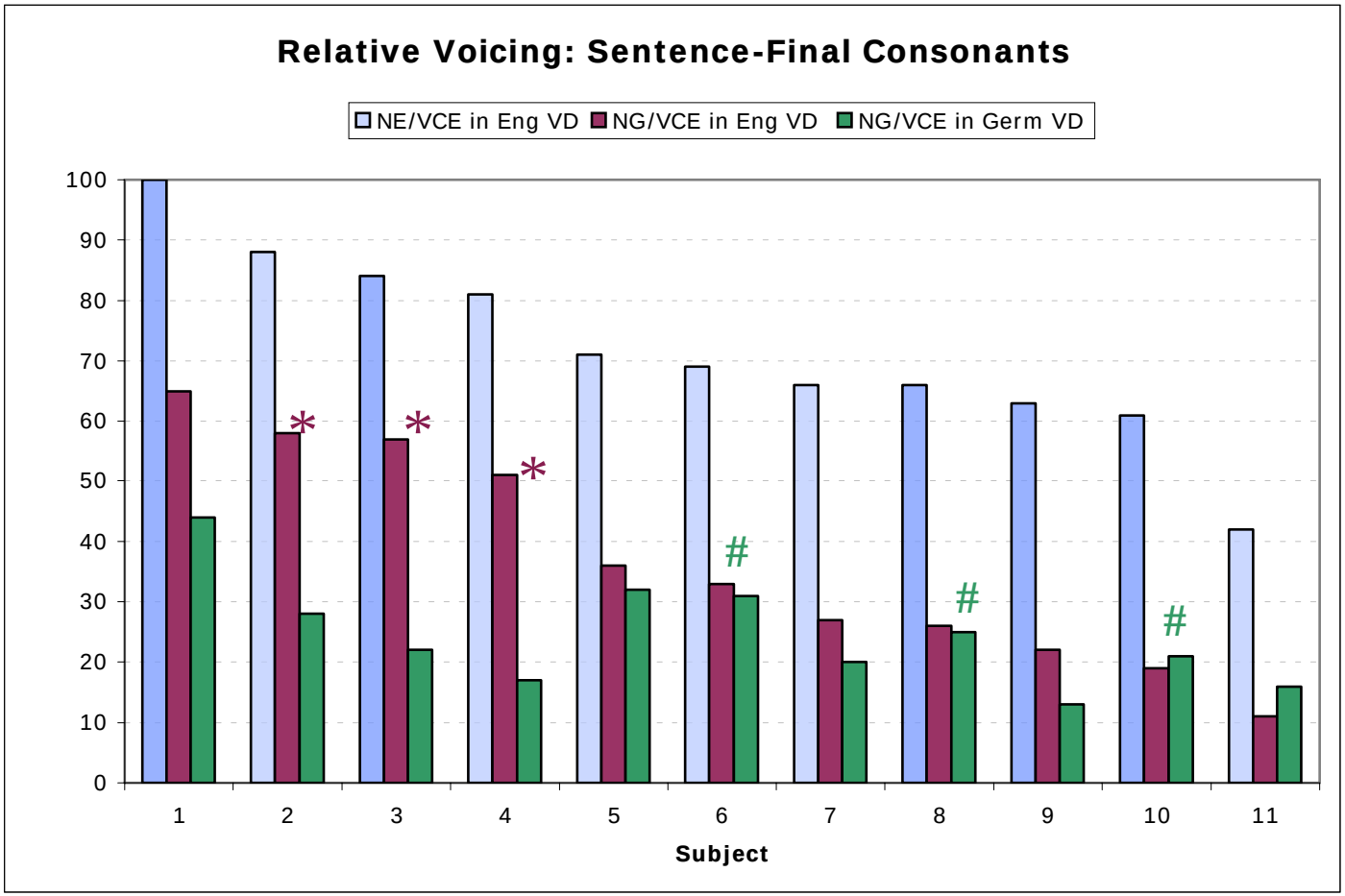


Figure 9: Some *NGs* showed substantially more voicing* during consonant closure in English vs. German V+ targets; others showed little difference# between the two languages. (*NEs* showed ca. 50-100% relative voicing.)



SUMMARY AND CONCLUSIONS

- As a group, the ***NGs*** tended to neutralize the final voicing distinction to a greater extent when producing German words versus phonologically-similar English words (e.g., *Figure 1*: on average, ***NGs'*** vowels before English V+ stops were longer than their vowels before German underlying V+ stops).

- As a group, the ***NGs*** did not completely neutralize the word-final, underlying voicing contrast when speaking German (e.g., *Figure 2* : vowels before German underlying V+ stops were 10-12% longer than before their V- stops).

- As a group, ***NGs*** typically did not produce as many potential cues to the word-final voicing contrast when speaking English as ***NE*** talkers did, which could potentially contribute to a speaker's accent (e.g., *Figure 1 versus Figures 3, 4 and 7*, i.e., although NGs produced a vowel duration contrast, consonant closure duration and voicing during closure remained more "German-like").

- Considerable inter-subject variability was observed among the ***NGs*** (*Figure 8*), suggesting that it is important to exercise caution when making <u>general</u> statements about whether or not "German speakers" neutralize the word-final voicing contrast in German and/or English.