

Incomplete Neutralization in Russian Final Devoicing: Acoustic Evidence from Native Speakers and Second Language Learners

Olga Dmitrieva, Department of Linguistics, University of Kansas

149th Meeting of the Acoustical Society of America, 16-20 May 2005, Vancouver, Canada

INTRODUCTION

Final devoicing:
[+voice] → [-voice] / __ #

In Russian:	Underlying form	Surface form	Gloss
	/kod/	[kot]	code
	/kot/	[kot]	cat

Previous Studies:

In the past 20 years a number of instrumental studies of final devoicing in German, Dutch, Afrikaans, Catalan, and Polish have shown evidence of incomplete neutralization.

Revealed: greater preceding vowel duration
shorter closure/frication duration
less voicing into closure/frication
shorter burst

for underlying voiced
final obstruents

Small, but systematic and statistically significant differences!

In Russian: **Pye (1986)** found: difference in vowel duration - 5-20 ms
difference in consonant duration - 6-30 ms

No statistical analysis

No control of second language (English) experience of the participants

Research questions

- Neutralization complete or incomplete? Which parameters contribute?
- L2 effects? English does not have final devoicing!

EXPERIMENT

Participants

11 Russian (L2 English, varied proficiency)
9 English (L2 Russian, varied proficiency)
Second language exposure questionnaire

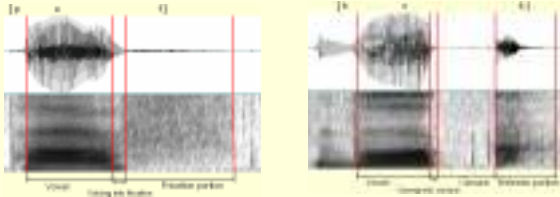
Stimuli

34 minimal and near minimal pairs (17 with final labiodental, alveolar, and post-alveolar fricatives, 17 with final bilabial, dental, and velar stops)
All real Russian words

Procedure

Word-list reading
Filler items (92 in total)
Semantic and intonation (rhyming) connections between the words
2 readings

Measurements



ABSTRACT

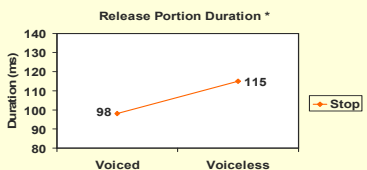
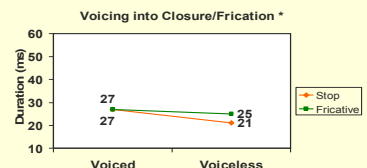
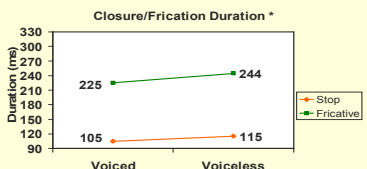
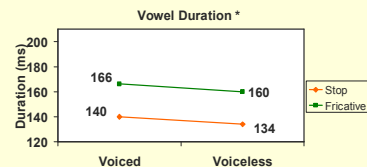
An acoustic study was conducted to investigate the neutralizing nature of final devoicing in Russian. Two groups of participants took part in the study: native speakers of Russian with a varied degree of proficiency in English, and native speakers of English with a varied degree of proficiency in Russian. Measurements were made for the acoustic correlates of voice. Analysis showed that final devoicing was incomplete in production of both native speakers of Russian and learners of Russian, but native speakers of English learning Russian preserved a greater durational difference between final obstruents contrasting in underlying voicing. Moreover, the amount of durational differences correlated with the degree of second language proficiency for both groups of speakers.

RESULTS

Two-way ANOVA with Underlying Voicing and Manner of Articulation as independent variables: vowel duration, closure/frication duration, voicing into closure/frication duration, release portion duration as dependent variables

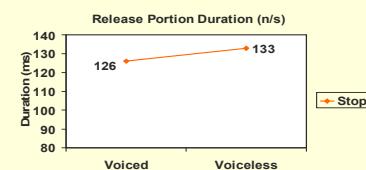
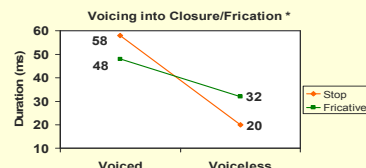
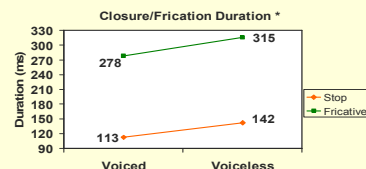
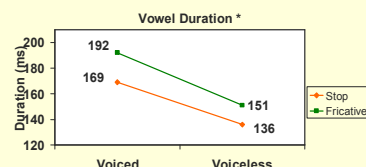
Native Speakers of Russian

Underlying Voicing *significantly* affects vowel duration, closure/frication duration, voicing into closure/frication duration, and release portion duration



Learners of Russian

Underlying Voicing *significantly* affects vowel duration, closure/frication duration, and voicing into closure/frication duration

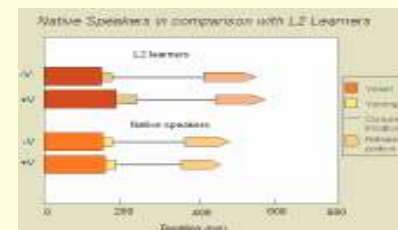


All speakers

Three-way ANOVA with Underlying Voicing, Manner of Articulation and Native Language as independent variables

Learners of Russian produces tokens overall significantly greater in duration than native speakers

Learners of Russian produced significantly greater difference between underlying voiced and underlying voiceless final obstruents

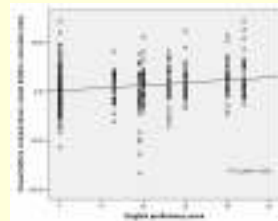


Correlation with second language proficiency

Native Speakers of Russian

Significant positive correlation between English proficiency and durational differences for vowels (shown below) and voicing into closure

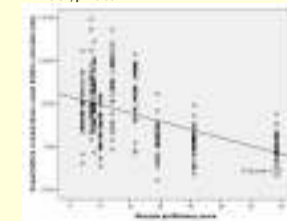
$r = 0.205, p = 0.00$



Learners of Russian

Significant negative correlation between Russian proficiency and durational differences for vowels (shown below) closure/frication duration, and voicing into closure

$R = -0.51, p = 0.00$



CONCLUSIONS

- Final devoicing is incomplete for both groups of speakers, stronger effect for L2 learners (native English speakers!)
- L2 proficiency affects L2 production of final devoicing (for native speakers of English: as Russian proficiency increased, amount of durational differences *decreased*)
- L2 proficiency affects L1 production (for native speakers of Russian: as English proficiency increased, durational differences *increased*)

ACKNOWLEDGMENT

I would like to thank Prof. Allard Jongman, Prof. Joan Sereno, Prof. Jie Zhang, and members of Empirical Research Methods seminar at KU for their helpful comments and suggestions.