VOT DRIFT IN 3 GENERATIONS OF HERITAGE LANGUAGE SPEAKERS IN TORONTO

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1. INTRODUCTION

Voice onset time (VOT) – an interval between the stop burst and the onset of vocal fold vibration – is an important acoustic correlate of the voiceless/voiced contrast, and is known to vary considerably across languages (Lisker & Abramson, 1964). In languages like English, voiceless stops /p, t, k/ are realized with long-lag VOT (>30 ms). In other languages, including Italian, Russian and Ukrainian, these consonants exhibit short-lag VOT (0-30 ms). Recent studies show that speakers' native short-lag VOT can be affected by their exposure to non-native long-lag VOT, and vice versa (Flege, 1987; Fowler *et al.*, 2008). In contrast to previous studies of VOT based on experimental elicitations, we investigated VOT in conversation, from recordings of Torontonians speaking their Heritage Language (HL). Data, from the Heritage Language Variation and Change Project (HLVC), consists of sociolinguistic interviews with speakers in three generations of six HLs, stratified by age and sex (Nagy, 2009). In this paper we present results for onset /p, t, k/ produced by 34 individuals representing three generations of Russian, Ukrainian, and Italian. Comparing our data to published reports on monolingual patterns shows that HL speakers' VOT tends to drift from the homeland standard toward that of English in successive generations.

2. METHODS

HLVC defines generations as follows. G1: lived in the country of origin until age 18+ and in Toronto for 20+ years. G2: born in Toronto or arriving before age 6, with at least one G1 parent. G3: born in Canada, with at least one G2 parent.

VOT was examined in conversational speech of 3-4 speakers in each generation in each language, plus one fluent G5 Ukrainian. Time-aligned transcripts of the interviews were searched for the first 25 instances of word-initial /p/, /t/, and /k/ preceding stressed /a/ or /o/, beginning 15 minutes into the interview. A total of 2,515 words were selected and manually annotated in *Praat* (Boersma & Weenink, 2011). VOT was defined as the duration from the onset of the stop burst to the first zero-crossing of the first periodic wave of the following vowel. The following vowel duration was measured and used as a control for speech rate (it was expected that later generations may speak more slowly). Duration measurements were extracted by script.

Mean VOT values for each speaker were submitted to repeated measures ANOVAs, separately for each language. Within-subjects factors were Consonant (/p/, /t/, /k/) and Vowel (stressed /a/, /o/), while the between-subjects factor

was Generation (1-3; and 5 for Ukrainian). Additionally, we orally administered an Ethnic Orientation Questionnaire (EOQ, Keefe & Padilla, 1987) in the interview. Open-ended responses were quantified into scores to represent a speaker's self-identified ties to Canadian society vs. their country of origin, as well as past and current exposure and attitudes to English and their HL. EOQ influence was examined through correlations between individual speakers' deviation from the VOT mean for their language and their EOQ score. The expected trend is to see more English-like VOT from speakers with a more Canadian orientation.

3. RESULTS
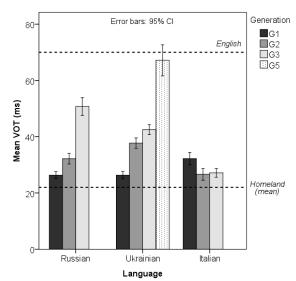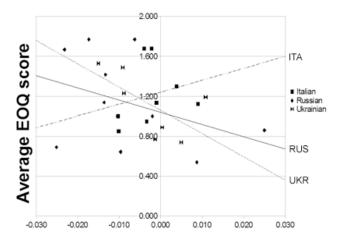
3.1. Overall VOT Trends

Figure 1. Mean VOT(in ms) for all languages, with English and mean homeland comparison values

Fig. 1 shows the mean VOT (all contexts) for each generation of HL speakers. Horizontal lines indicate the comparator English (Fowler, *et al.* 2008) and homeland varieties' average duration (Ringen & Kulikov, 2010, Sorianello, 1996). Note that homeland and English values are from sentence reading data, while HL data is from conversation. Mean VOT for Russian and Ukrainian increases as generations progress, as predicted. However, Italian exhibits stability across generations. (Speech rate, estimated by vowel duration, does not account for this surprising outcome.) The largest increase in VOT occurs between G2 and G3 for Russian, and between G3 and G5 for Ukrainian. Note that the VOT of the latter speaker is very close to English. The observed differences were confirmed statistically, with results showing a main effect of Generation for Russian (F(2,7)=6.10, p<.05) and Ukrainian

(F(2,7)=12.01, p<.01), but not Italian (F(2,7)=1.299, p=.33). Bonferroni post-hoc tests revealed that VOT was significantly higher for G3 compared to G1 in Russian (p<.05; adjusted for multiple comparisons), and higher for G5 compared to the other generations in Ukrainian (p<.01-.05). For the latter group, there was also a non-significant tendency towards higher VOT for G3 than G1 (p=.094). All languages showed a significant effect of Consonant. Based on Bonferroni post-hoc tests, VOT was significantly longer for /k/ than for /p/ and /t/ (p<.001-.05). VOT was significantly longer before /o/ than before /a/ for Russian and Ukrainian (Vowel: F(2,15)=11.52, p<.01; F(2,15)=34.73, p<.001)

3.2. Ethnic Orientation Influence on VOT

EOQ measures speakers' self-identified ethnicity and exposure to their HL, and attitudes toward the heritage language and culture. Higher EOQ score indicates closer association with the country of origin (on the y-axis in Fig. 2). Mean value refers to VOT mean of the speaker sample for a particular language. Positive deviation from the mean indicates longer, more English-like VOT (on the x-axis). Russian and Ukrainian show the predicted shorter VOT correlating with higher EOQ, while Italian has the opposite trend. However, in all cases the correlations are weak (r^2 = 0.06 for Italian, 0.15 for Russian and 0.41 for Ukrainian).

Figure 2. Individuals' deviation from language's VOT mean (ms) *vs*. Overall Ethnic Orientation score

One more outcome illustrates that Russian and Ukrainian speakers are more influenced by English than Italians are. /t/ in all three HLs is dental, but alveolar in English. G2 and G3 Russian and Ukrainian speakers show less drift toward English values for /t/ than for /p/ and /k/, sounds which are more similar across the languages. This illustrates Flege's (1987) claim that bilinguals undergo more influence on segments that are more similar in both languages: Russian and Ukrainian /t/ is not drawn toward the English long-lag value as much as /p/ and /k/ because dental and alveolar are different categories. Again, Italian is an anomaly.

4. DISCUSSION AND CONCLUSIONS

Russian VOT exhibited the expected pattern of drift from short-lag to long-lag VOT, with the biggest increase occurring between G2 and G3. This is likely because G3 speakers in Toronto do not form a cohesive Russian community and therefore have little opportunity to talk casually in Russian outside the home. In contrast, an active Ukrainian community creates ample opportunity for casual speech with other generations. Thus the VOT of G2 speakers is more rapidly pulled towards the community norms. Italian, a considerably larger community in Toronto, shows no such drift. Possibly, negative attitudes toward Calabrese Italian in Italy cause G1 to place more value on integrating into English-speaking society. However G2 and G3 Italians continue to value their language and heritage more than the Russians and Ukrainians, illustrated by the Italian's small cross-generational drop in EOQ scores: Average EOQ of G1 – G3 is 0.3 for Italian *vs*. 0.7 for each of the other two groups.

The lack of significant differences between consecutive generations can be attributed to inter-speaker variability. Some Russian G2 and G3 speakers had VOT values considerably lower than typical for their groups. The VOT of one G2 Ukrainian was similar to the average for G1, while the VOT of another was higher than the average for G3. These differences, reflecting individual and family lifestyle differences, might be eliminated by increasing the sample size. Future work will accomplish this, examine VOT in the other languages in the corpus, and compare VOT to other linguistic variables, in the hopes of better understanding contact-induced language change.

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