УДК 81'282.4

HERITAGE RUSSIAN VARIATION AND CHANGE IN TORONTO

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Much research in the language acquisition literature reports different linguistic behaviour for Heritage Language speakers than monolingual speakers of the same languages. These effects are often attributed to contact with the dominant language, either at the individual or the community level. In contrast, sociolinguistic studies in the variationist paradigm often do not find differences either between heritage and monolingual varieties nor between speakers with greater or lesser contact with the dominant language of the community. This paper focuses on Heritage Russian, as spoken in Toronto, comparing outcomes of several studies of different aspects of its grammar, and making comparisons to other varieties spoken in the same city and to homeland Russian. The four variables considered are overt vs. null subjects in finite clauses, case-marking in non-nominative contexts, voice onset time in voiceless word-initial consonants, and vocabulary size. We find little effect on Heritage Russian of contact with English: there is no effect of generation for the null subject variable, case-marking or vocabulary size, in spite of the range of linguistic and cultural attitudes exhibited by the speakers. While there is a generational effect for voice onset time, showing increasing drift away from the homeland norm, the lack of effect in three of four variables contradicts the popular belief that contact with English necessarily influences heritage languages.

Key words: null subject; case-marking; voice onset time; vocabulary size; Heritage Russian; language contact; phonetics; morphosyntax; variationist sociolinguistics; Heritage Cantonese; Heritage Italian; Heritage Ukrainian.

1. Introduction

While many studies report on contact-induced language change, little progress in our theories of how languages vary and evolve can be made when they use disparate methods[1]. Inconsistencies among collection and analysis methods, and differences in contact situations and languages compared, limit our ability to generalize judiciously. The **Heritage Language Variation and Change Project** (=HLVC) [Nagy 2009, 2011] represents an innovation in applying consistent methodology across multiple language-contact contexts to advance our understanding of contact-induced change. The project examines a range of sociolinguistic variables in three generations of speakers from a range of heritage languages. A heritage language (HL) is defined (in Canada) as a mother tongue which is not one of the two official languages of Canada. Here we primarily analyze the effects of a constellation of factors on a single linguistic variable: (null-subject), the presence or absence of an overt pronoun as the subject of a finite verb. Our data come from sociolinguistic interviews conducted in Toronto with speakers of three HLs: Russian, Cantonese and Italian. Some details of their communities are shown in Table 1, as is the place of origin targeted for each[2]. We analyze linguistic factors that allow for comparison with previous studies, and with Toronto English and Homeland Russian. We also briefly present recent findings for three other linguistic variables: Voice Onset Time in voiceless stops, vocabulary size, and case-marking in Heritage Russian.

For three of the four variables, we report a lack of effect of contact with English: the rate of null subjects does not differ significantly between generations of speakers born in the Toronto area and those born in the homeland, nor do any constraint rankings suggest a move toward the English grammar. A more nuanced search for contact effects related to quantity and quality of contact with English and speakers' attitudes toward their languages and their communities likewise does not reveal any patterns or effects suggesting contact-induced change.

Table 1

Demographic summary of Heritage Languages examined (see [Nagy 2011] for sources)

Language	MT speakers[3]	Ethnic Origin	Established	Place of origin
Russian	65 210	58 505	1916	St. Petersburg or Moscow
Cantonese	166 650	537 000	1951	Hong Kong
Italian	185 765	466 155	1908	Calabria
English	2 849 285	1 331 485	~1793	British Isles

The lack of evidence of contact effects may relate to how we define "heritage language." There are three non-overlapping categories of languages in Canada: indigenous, official (French and English) and heritage languages, spoken by immigrant groups more recent than the original French and British colonisers. Anyone who is a mother-tongue speaker of a language identified with their heritage, other than French or British, is thus a HL speaker. We do *not* use the term "heritage language" with any implication of linguistic deficit. Thus, generalizations about impoverished systems often made about HLs are not relevant here [Nagy 2014]. Future comparison to additional homeland varieties and the ethnic varieties of English developing in Toronto will enhance our understanding of whether there has been change that is not observable within the present sample.

2. Null subjects

In languages such as Russian, many contexts allow for either the presence of an overt subject pronoun or no subject pronoun, without changing the meaning. (1) and (2) provide examples of such contexts, extracted from the interview transcript of the same speaker. This variability in subject pronoun realization is also known as the null subject variable or "pro-drop."

(1) Overt pronoun

когда-то	я	вери-л-а	но	(R1F82A)[4]
once	1.SG	believe-PAST-F.SG	but	

I once believed it, but …

(2) Null pronoun

но	да	когда-то	Ø	вери-л-а	(R1F82A)
but	yes	once	Ø	believe-PAST-F.SG	

But, yes, once Ø-[I] believed.

2.1. Null subjects and contact-induced change

We apply a consistent methodology cross-linguistically and cross-generationally to investigate this variable that has been claimed, in the language acquisition literature, to exhibit contact-induced changes. Toronto HLs are an ideal place to look for the effects of contact, since speakers of many HLs are in contact with English speakers. Subject pronoun realization is an ideal first variable to examine for effects of language contact in the HLs chosen for our study, since these languages are all (variably) null subject languages, and English is a non-null subject language. We can thus investigate the effect of contact between null subject languages and a dominant non-null subject language.

Such an effect has been reported in the language acquisition literature. R. Otheguy, A.C. Zentella, D. Livert [2007] found that Spanish speakers who had arrived in New York City after the age of 16 and had been living in the city for less than six years had a significantly lower rate of overt subject pronouns than those who were born and raised in NYC (or who had arrived before age three) [Otheguy, Zentella, Livert 2007]. They concluded from this that contact with English resulted in a lower rate of null subjects. M. Polinsky also found evidence for a possible effect of contact with English on overt subject pronoun realization in six languages [Polinsky 1995]. Her study did not use variationist methods, and examined only a few speakers per language, but she found that the more attired a speaker's HL was, the more overt subject pronouns the speaker used. Other investigators also report effects of contact with English on null subject patterns in a range of languages. [Benmamoun, Montrul, Polinsky 2010; Montrul 2008; Polinsky 1997, 2006; Polinsky, Kagan 2007; Sorace 2004, 2011; Sorace, Serratrice 2009].

In contrast, R. Torres Cacoullos and C.E. Travis found that a putative contact effect was in fact due to priming [Torres Cacoullos, Travis 2010]. They examined variable *yo* (1st sg. pronoun) realization in New Mexican Spanish-English bilingual speakers, and found the same factors conditioning the realization of *yo* in these speakers as in varieties of Spanish with no English contact. Use of an overt subject pronoun was found to be conditioned by a "structural prime": the use of an overt subject pronoun in the previous discourse favoured overt pronoun realization, whether that discourse was in English or Spanish. They concluded that this variable showed no evidence of contact-induced change. Similarly, a lack of contact effects is reported in most studies of this variable conducted in the variationist sociolinguistic paradigm [Bayley, Pease-Alvarez 1997; Flores-Ferrán 2004; Paredes Silva 1993; Raña Risso 2010; Silva-Corvalán, 1994].

2.2. Null subjects in generative grammar

We next present an overview of null subject realization from a theoretical perspective. A null subject language is a language where a clause may have a grammatical subject that is not realized overtly. Originally a binary parameter was proposed: languages were either +Null Subject or –Null Subject [Rizzi 1982, Perlmutter 1971]. This approach has been refined to account for more typological variation [Biberauer et al. 2010]: different kinds of null subject languages have different contexts where it is acceptable to "drop" the grammatical subject. I. Roberts and A. Holmberg present a typology of null subject languages, with four categories: consistent null-subject languages, expletive null-subject languages, radical pro-drop languages (or 'discourse pro-drop languages'), and partial null subject languages [Roberts, Holmberg 2010]. These typologically different groups display different properties in the distribution of null subjects.

For instance, consistent null-subject languages, like Italian, permit null subjects in all tenses and in all grammatical persons/number. Expletive null-subject languages (e.g., German) allow null expletive subjects but not referential ones. Radical pro-drop languages, like Cantonese, allow other nominal arguments, (e.g., objects) to be null, in addition to null subjects. (These languages also typically do not have person-agreement marking on the verb. Consistent null subject languages, on the other hand, typically have rich verbal inflection.) Partial null-subject languages, like Russian, limit null subjects to the 1st and 2nd person in finite clauses, and 3rd person pronouns "bound by a higher argument," (a context that A. Holmberg admits is "rather poorly understood" [Holmberg 2005: 539]). Generic pronouns are not realized overtly. Finally, non-null-subject languages, like English, bar null subjects in all finite clauses, except in specific discourse contexts (e.g., "diary drop"; see [Haegeman 2000]). English is used as our non-null subject comparison language.

These generalized distributions for the occurrence of null subjects are exactly that: generalizations, and, in some cases, idealizations. For instance, I. Roberts and A. Holmberg note that there is considerable variation among the discourse pro-drop languages [Roberts, Holmberg 2010: 13, fn. 10]. Chinese is apparently more restricted in this respect, making more use of overt pronouns, than, for example Japanese, and possibly more than many consistent null-subject languages.

We provide evidence of null subjects in English below. Various approaches have been put forward to account for variation across null-subject languages. I. Roberts and A. Holmberg [Ibid.] argue that an approach using a combination of micro- and macro-

parameters can account for a wide range of differences between types of null-subject languages, with variation (within a Minimalist framework) being located primarily in features in the lexicon. M.D. Cole has suggested that "the syntactic licensing of thematic null subjects [but not expletive null subjects] is redundant," and that recoverability of null subjects is heavily context-dependent, achieved through a combination of rich agreement morphology and the availability of a contextual antecedent [Cole 2009]. In this approach, an overt pronoun used in a null subject language is a kind of 'last resort' strategy where recoverability of the subject is not possible through either agreement morphology or a topic antecedent. V. Samek-Lodovici also found that the presence of a topic antecedent was crucial to the non-realization of an overt pronoun in Italian [Samek-Lodovici 1996].

2.3. Null subjects in variationist sociolinguistics

Variationist studies investigate the social and linguistic factors that account for the variation that remains even within a particular language, both intra- and inter-speaker [Bayley, Pease-Alvarez 1997; Otheguy, Zentella, Livert 2007; Paredes Silva 1993; Heap, Nagy 1998]. First, a "subject continuity" effect is consistently reported for many languages including Spanish [Torres Cacoullos, Travis 2010; i.a.], Portuguese [Parades Silva 1993], and Polish [Chociej 2010]: tokens with the same referent as the subject of the previous clause favour null subjects, and tokens with a different referent from the subject of the previous clause disfavour them. This echoes Cole's finding that a contextual antecedent is crucial for licensing null subjects [Cole 2009].

Some studies report evidence for the "functional hypothesis" [Labov 1994: 557–560], suggesting that that overt pronouns are introduced in null subject languages to clarify the discourse referent when information is unavailable in the morphology. In cases where ambiguity in the verbal paradigm makes the referent indeterminable from the verbal morphology if the subject is null, an overt pronoun will be used. R. Torres Cacoullos and C. Travis note that the evidence for this hypothesis is inconclusive [Torres Cacoullos, Travis 2010: 13]. Their study found that morphological ambiguity was a significant factor, but it had the weakest effect of all significant linguistic factor groups. They also report that some studies have found morphological ambiguity to have a significant effect on subject pronoun realization (e.g. [Bayley, Pease Alvarez 1997; Paredes Silva 1993]), but other studies have reported no such effect (e.g. [Ranson 1991; Bentivoglio 1987]).

Other linguistic factors that have been reported are emphasis ([Paredes Silva 1993] for Brazilian Portuguese), "discourse connectedness" [Ibid.; Bayley, Pease Alvarez 1997] for Spanish), the position of the subject pronoun in the clause [Harvie 1998 for English], and grammatical person and number in Spanish [Bayley, Pease Alvarez 1997; Otheguy, Zentella, Livert 2007] and Brazilian Portuguese [Paredes Silva 1993]. These factors are not cross-linguistically relevant but specific to certain null subject languages. We focus on the grammatical person and number effects.

The variety of null subject languages noted above and the array of factors that can contribute, across and within languages, to the realization of overt/null subject pronouns, create a rich opportunity to investigate the kinds of factors that hold cross-linguistically, using comparable and consistent methods across a variety of languages and generations. We code and categorize our tokens to examine predictions made by the theories outlined here. Space limitations prohibit extended discussion of their support in our data, given our focus on evidence of contact effects in different parts of the grammar.

3. Other variables examined

3.1. Case-marking

Effects of contact with English on case systems have been shown for many languages (see [Groot de 2005; Leisiö 2006; Polinsky 2008; Sick 2004], references in [Polinsky 2011]). Homeland Russian has a six-case system, according to which nouns, pronouns, adjectives and numerals are inflected. English lacks case-marking except on pronouns. V. Mordvinova conducted a pilot study of the case system in Heritage Russian [Mordvinova 2014]. She hypothesized that the case system of Heritage Russian would gradually undergo simplification towards a single-case system, eventually retaining only the nominative case, and using it in contexts where homeland speakers use other (indirect) cases.

3.2. Voice Onset Time

Voice Onset Time (VOT) is defined as the duration of the interval between the release of a stop and the onset of vocal fold vibration. VOT has frequently been shown to be influenced by language contact (cf. [Fowler et al. 2008]). Voiceless stops in Russian are realized with a short lag VOT, defined as less than 30 msec., while English has long lag VOT (>30 msec) on Russian [Ringen, Kulikov 2012], on English [Lisker, Abramson 1964]. Consonants with long lag VOT are often referred to as aspirated. The contrast between Russian and English makes VOT an excellent domain in which to explore sociolinguistic variation induced by language contact.

To compare contact effects on this phonetic variable vs. the morphosyntactic variables, we examine word-initial voiceless stops /p, t, k/ in stressed sylla-

bles before /a/ and /o/, produced by 18 individuals representing three generations of speakers. We expect that first generation speakers will exhibit VOT patterns more similar to those of monolingual speakers of their L1, while second generation speakers and, to a greater extent, third generation speakers will have patterns more like monolingual English speakers. (See definitions of generation since immigration in 4.1.) Details of this study are available in [Nagy, Kochetov 2013], from which this discussion is excerpted.

3.3. Vocabulary size

M. Polinsky [2006] and M. Hulsen [2000] report correlations between lexical knowledge and extent of morphosyntactic attrition in heritage speakers of Russian. As a step toward replicating that trend, V. Mordvinova [2014] estimated Heritage Russian speakers' vocabulary size. Further work, following methods established by this pilot study, will look directly at the relationship between this variable, morphosyntactic variables (lacking generational difference) and VOT (exhibiting generational difference).

4. Methods

4.1. Data Collection

While the focus of this paper is on Heritage Russian, the HLVC project examines variation and change in a range of Heritage Languages spoken in Toronto. The languages included, to date, are Cantonese, Faetar, Korean, Italian, Russian and Ukrainian. For each language, our corpus will soon have recordings of 40 native speakers, distributed across three generations. *First generation speakers* lived in the homeland until the age of 18, and have been in Toronto for >20 years. *Second generation speakers* have at least one parent who is a first generation speaker, and *third generation speakers* are those with at least one second generation parent. Each generation is represented by four age groups: 12-18, 19-38, 39-59, and 60+[5]. Two male and two female speakers represent each age/generation cell. For comparison with English, we include eight speakers of comparable ages from the Toronto English Archive [Tagliamonte 2006] whose British Isles-origin families have been in Canada for several generations.

Fieldworkers who are fluent speakers of a HL recruit participants, starting in their own social networks. They engage participants in three tasks to elicit naturally occurring speech in the HL. The first is a sociolinguistic interview containing questions adapted from W. Labov querying the speaker's background, their family's immigration history, and their observations on language, as well as other topics of interest to each speaker [Labov 1984]. This serves to collect demographic information and to elicit and record natural speech. The second is the Ethnic Orientation Questionnaire (EOQ), parallel to M. 's survey, used to investigate speakers' perceived degree of orientation toward the relevant ethnic group [Hoffman, Walker 2010]. The full EOQ and sociolinguistic interview questionnaires are on the project website (http://projects.chass.utoronto.ca/ngn/pdf/HLVC/short_questionnaire_English.pdf; http://projects.chass.utoronto.ca/ngn/pdf/HLVC/long_questionnaire_Englis h.pdf). Data from the third task, a Picture Elicitation task, is not discussed in this paper.

4.2. Transcription

Conventions for transcription have been developed for each language and are posted on the project's website [Nagy 2009]. Fluent speakers of each language are trained to produce time-aligned orthographic transcriptions of the interviews using ELAN [Wittenburg et al. 2006]. We exploit ELAN's capabilities by adding mark-up tiers to code each variable, all of which are time-aligned to the original recording. ELAN thus keeps all context intact. During any stage of analysis, the researcher can recover the broader context of a token, as all tiers are searchable. ELAN calculates basic statistics and produces transcriptions and coding easily exported to various analysis programs.

4.3. Ethnic Orientation Data

From the transcribed interviews, two kinds of data are collected and coded. One is self-reports in the EOQ, which are used to develop an EOQ index (score) for each speaker. Answers to a subset of the questions, regarding language choice broadly, language choice for reading and writing, use of language with family, ethnic self-identification, and attitudes about ethnic discrimination, are coded on a scale of 0 to 2. Answers that indicate a strong identification with the speaker's ethnic identity and the HL are coded as 2. Answers showing a strong pull towards "Canadian" identity or English are coded as 0. Mixed responses are coded as 1. While these responses correlate to generation, we have not found strong effects of EOQ scores on linguistic variation patterns. Figure 1 (from [Martin 2014]) illustrates the generational effect on several subsections of the questionnaire.

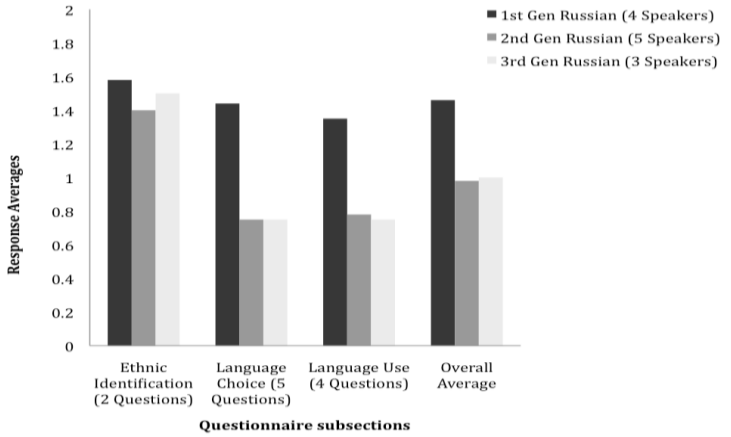

Figure 1. Generational trends in the Ethnic Orientation Questionnaire [Martin 2014]

4.3.1. Pro-drop coding

Potential null subject contexts are examined in the transcripts of speakers of Heritage Russian, Italian and Cantonese, to allow for cross-linguist and cross-community generalizations. For each speaker, we examine 50-100 main finite clauses with subjects consisting of overt pronouns (as in 1) or Ø forms (as in 2). Each of these examples is referred to as a token. Selection was made beginning ~15 minutes into each recording. Verbs that occur in subordinate clauses, have nouns as subjects, or are part of discourse markers are excluded. Each token is coded for properties of the verb: person, number and tense. Other internal factor groups coded are subject continuity of reference, clause type (main or conjoined), and ambiguity of the subject referent. Tokens are coded as ambiguous if the verb form used is homophonous with another form. For example, in Russian, сказал 'said' is ambiguous, as it occurs with 1st, 2nd, and 3rd sg. persons, while говорит 'says' is unambiguous, as it is marked for 3rd sg. For subject continuity, we code every token for whether its referent was the same as the referent of the subject of the previous clause, as in (3a), or different from the previous clause, as in (3b)[6].

Following Harvie [1998] we code for whether the token appeared as the subject of a main clause or as the subject of the second (or later) conjunct of two or more conjoined sentences. Tokens coded as belonging to the main clause include the first subject in (4). Tokens coded as being in conjoined clauses include the second subject of that example (*Ø*).

(3) a. Same referent

то что	я	дела-ю	я	восполня-ю	дет-ям
what	1.SG	do-1.SG.PRES	1.SG	fill.in-1.SG.PRES	children-DAT

что	у	них	школа	забра-л-а	(R1M62A)
what	at	3.PL.GEN	school	take.away-PST-SG.F	

What I'm doing, I'm filling in for the children what the school took away.

b. Conjoined clause with overt subject

значит	три	оттуда	приеха-л-и			
so	three	from.there	come-PST-PL			
и	мы	посла-л-и	трёх	туда	(R2F79A)	
and	1.PL	sent-PAST.PL	three	there		

So, three came from there and we sent three there.

(4) Main clause + conjoined clause

он	быстро	вскочи-л-ø	вот	на	коня
3.SG.M	quickly	leap-PAST-SG.M	there	on	horse-ACC

и	Ø	убежа-л-ø	в	другой	город	(R1M62A)
and	3.SG.M	flee-PAST-SG.M	to	another	city	

He quickly leapt up onto the horse and Ø-[he] fled to another city.

We assume here that conjoined clauses are full sentences complete with subjects (whether null or

overt) and not conjoined verb phrases. A sentence with an overt conjunct subject is shown in (3b)[7]. Additionally, in Italian, tokens are coded for presence of a preverbal object (e.g., *lo, me, te*).

4.3.2. Case-marking coding

One male and one female speaker of Heritage Russian from each generation were selected for this pilot study. A random excerpt of each recording was selected. To target contexts where variation is likely, the first 100 non-subject nouns were marked, omitting any in opposition to the subject (these are in the nominative case in Homeland Russian), indeclinable nouns (mostly borrowings from other languages) and second and third declension direct objects (where the nominative and accusative forms are identical, making it impossible to determine which case is used). Each noun was coded for the form of case marking used, i.e., whether the noun was produced with an indirect case as prescribed, produced in the nominative form, or produced with another indirect case. The ratio of these categories was also calculated by generation.

4.3.3. VOT analysis

We investigate VOT in conversational speech using data from 11 sociolinguistic interviews. In the time-aligned transcript, beginning 15 minutes into the conversations, the first 25 instances of each word-initial /p,t,k/ in a stressed syllable with an /a/ or /o/ nucleus are marked. Using the transcript, plus audio and visual cues from spectrograms produced by Praat [Boersma, Weenink 2011], the tokens are segmented to mark the beginning and end of the preceding segment, the closure and the release of the voiceless stop, and the following vowel. VOT is 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's duration is measured to control for speech-rate variation. A Praat script extracts the duration of each of these segments. We conduct repeated measures ANOVAs to check for significant differences among consonants, between following vowels, and across generations.

4.3.4. Vocabulary size coding

V. Mordvinova [2014] estimated Heritage Russian speakers' vocabulary size by dividing the total number of words uttered by each speaker (tokens) by the number of different words produced (types). This ratio indicates the average number of repetitions of each word. A lower ratio indicate more diverse (larger) vocabulary. The average ratio for each generation was calculated. She hypothesized that earlier generations of heritage speakers would have larger Russian vocabularies than later generations. The transcript of their entire sociolinguistic interview was examined. The same male and female speaker from each generation were selected for this pilot study as for the analysis of case-marking.

5. Analysis and Results

5.1. Null subject results

First, the overall frequencies of null subjects (Ø-subjects) in the four languages are compared across generations. We then examine the factors constraining variable null subjects in each language. We employ mixed-effects logistic regression modeling using Rbrul [Johnson 2009]. Table 2 summarizes our sample.

Table 2

Token count, by language and generation, for 57 speakers

Generation	Russian	Cantonese	Italian	English
First Generation	1 337	800	377	n/a
Second and Third Generation	1 834	800	670	n/a
Total	3 171	1 600	1 147	400

5.2. Distributional and multivariate analysis

Figure 2 displays the frequency distribution of Ø-subjects in English and the three HLs. Error bars indicate 95% confidence intervals for these frequencies. For the HLs, data are divided by generation, with first generation to the left of second/third generation. There is a clear pattern for rate of Ø-subjects: English (a non-null subject language) < Russian (a partial null subject language) < Cantonese (a radical null subject language) < Italian (a consistent null subject language). For our purposes, the generational comparisons are more relevant. In Italian and Russian, the error bars representing the 95% confidence limits indicate that there is no significant difference with respect to the rate of Ø-subjects between the speech of Italian- and Russian-Canadians who were born in Italy and Russia and those born in Canada. Although Cantonese shows a slight difference across generations, we will see that generation is not significant when included in a variable rule analysis. Crucially, none of the languages in either generation are close to the 2% rate of Ø-subjects in English. This is the first indication that contact with English is not causing a change in Toronto HLs, with respect to null subject variation.

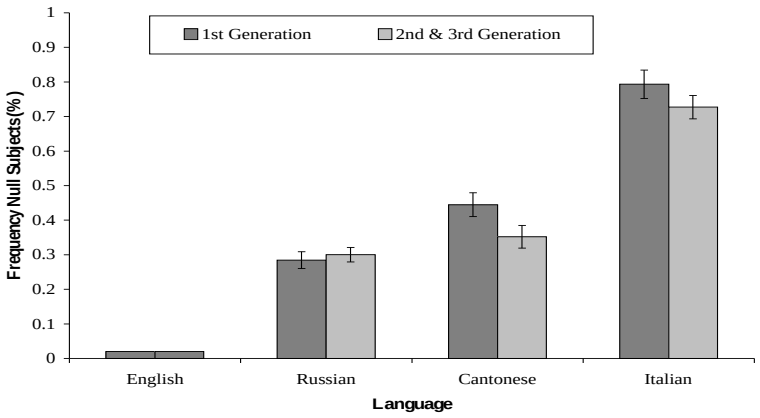

Figure 2. Frequency of tokens with Ø-subjects across languages and generations (N = 6,216)

Despite similar cross-generational frequencies, the underlying grammar constraining the variation could still be undergoing change. If the HLs are changing through contact with English, then the variable grammar of our English speakers represents the model toward which the languages will change across generations. We thus begin our discussion of linguistic constraints by considering English. Table 3 presents a Ø-subject variable grammar for English, which we then compare to the grammars of the HLs. In Tables 3 and 4, the probability of a null subject in each context is provided in the *Factor weight* column. Higher values indicate greater likelihood of null subjects. The number of tokens in each context is given in the "*n*" column.

Table 3

Mixed-effects logistic regression analysis of English Ø-subjects

English		N = 400	
Fixed Effects:		Factor weight	*n*
Subject Continuity × Conjunction	Same Referent × Conjoined	.86	120
	Same Referent × Main	.53	130
	Different Referent × Main	.34	123
	Different Referent × Conjoined	.21	27
	Range	*65*	
Random Effects: Individual	standard deviation = 0 (no speaker effect)		
Non-significant factor groups: tense, grammatical person/number			

For English, only subject continuity and conjunction are selected as significant. As there is a significant interaction between these two factors, only the results of this interaction effect are reported[8]. Tokens in which the referent of the previous clause is the same as the referent of the token and that are the second element of a conjunction, as in (4), highly favour null subject realization. Tokens in main clauses with the same referent as the previous clause slightly favour null realizations. All tokens with different referents disfavour Ø-subjects. For English, no other fixed effect is significant and there is no effect of individual speaker (as indicated by a standard deviation of 0 for the random intercept for individual).

Next, for each HL, we run one analysis for speakers from all generations. To test for changes across generations, a fixed effect of generation is included in the model. This indicates whether the overall likelihood of null subject realization in the language has changed across generations. Additionally, we include interaction terms that cross the main effect of generation with each linguistic main effect. If these interaction terms significantly contribute to the model, then we can infer that some change has occurred across generations with respect to the linguistic effect in question. We cautiously interpret a model in which these terms are not significant as indicating that no such change has taken place.

Table 4 presents the results of the mixed-effects logistic regression model of each of the HLs. For each language, the input value (the overall likelihood of a null subject in a finite clause in that language) is provided as well as the number of tokens. For each fixed effect, or factor, the range is provided – a larger range indicates a factor with a greater effect on the choice between an overt or null subject. As above, individual is included as a random intercept. For Cantonese, subject continuity is significant: same referents favour Ø-subjects and different referents disfavour Ø-subjects. Grammatical person

is also significant: 1st and 3rd person favour and 2nd person disfavours Ø-subjects[9]. Conjunction is significant: main clauses favour Ø-subjects while, unlike English, conjoined clauses disfavour Ø-subjects[10].

For Cantonese, the critical result for us is that neither generation, nor any of the interaction terms we included that cross generation with a linguistic main effect, were selected by the model, suggesting that there is no difference between the first generation and second generation speakers with respect to the frequency of Ø-subjects and with respect to the constraint grammar. In other words, we see no indication that Ø-subject realization in Heritage Cantonese has moved toward an English model, or indeed has changed at all.

Table 4 shows a methodologically identical analysis for the Italian data. Broadly, the results resemble those of Cantonese: the effect of generation is not significant and neither are any of the interaction terms that cross generation with the linguistic main effects. With the exception of the effect of subject continuity, the variable grammar is constrained differently in the two languages. Italian Ø-subjects are constrained by grammatical number, tense and the presence of preverbal direct objects. However, it is what has not been selected as significant by the model that is important. As in Cantonese, there is no indication that Heritage Italian has changed toward an English-like Ø-subject model at all.

We reanalyze M. Hollett's data for consistency in method, but our Heritage Russian results are consistent with her findings [Hollet 2011]. There is a significant interaction between generation and negation, and between generation and grammatical person. Negated sentences favour Ø-subjects for second generation speakers, while affirmative sentences disfavour them. In the first generation, no such effect is found. In the case of person, the hierarchy of constraints is reordered such that in the first generation, third person > second > first, while in the second generation, the relative order of favouring Ø-subjects is second person > first > third. As with the other languages, the subject continuity effect is significant such that tokens with the same referent as the previous subject favour Ø-subjects. Also, tokens that are the second subject of a conjunction favour Ø-subjects.

Although we observe some cross-generational changes in the Russian data, these changes are not in the direction of the English model reported in Table 3. However, M. Hollett [Ibid.] suggests that the favouring effect of Ø-subjects in negated sentences in the second generation could be an effect of English contact. D. Harvie hypothesized that English Ø-subjects are becoming more prevalent in negated constructions such as *don't know* and *can't say* [Harvie 1998]. However, negation was not a significant factor in Harvie's data. Thus, the hypothesized change toward an English model in Heritage Russian, as with Heritage Cantonese and Heritage Italian, remains unconfirmed. Correlations of the speakers' EOQ scores with Ø-subject rates are discussed in [Nagy, Chociej, Hoffman 2013]. The principle finding is that speakers' linguistic practices and cultural attitudes do not correlate with their linguistic behaviour with respect to this phonetic variable, except insofar as they are distinguished by generation.

We turn next to a comparison with data from monolingual homeland (Moscow) speakers, work reported in [Pustovalova 2011] and [Nagy 2014]. Using identical methods to those reported here, A. Pustovalova examined variation in 1 400 null subject tokens from 14 speakers in the Russian National Corpus (http://www.ruscorpora.ru). She uncovered a pattern of variation by age, suggestive of a change in progress in homeland Russian. That trend is also evident in our Heritage Russian data. Figure 3 compares the rate of null subject usage by age group to illustrate this effect. Such a pattern underscores the need to avoid assumptions of stability or homogeneity in homeland/baseline/comparator varieties. The lower rate of null subjects in the Heritage varieties, vs. the Homeland, suggests that there is a difference between rate of null subject use in the Homeland vs. the Heritage varieties. However, this may be due to heritage speakers carrying on a homeland change in progress, rather than necessarily due to contact with English. See [Kang, Nagy 2013] for a similar example of parallel development of VOT changes in the homeland and the heritage varieties of Korean.

5.3. Case-marking results

Table 5 shows each speaker's usage of different types of case markers. Across the generations since immigration, we see a decrease in the percentage of non-subject nouns produced with indirect case and an increase in the percentage of nouns produced with the nominative case or a non-standard indirect case. However, the third generation male demonstrated the same case usage pattern as the first generation male. The third generation female, on the other hand, used the nominative case for non-subject nouns extensively, accounting for much of the generational trend. The four first and second generation speakers marked case in much the same way. Second generation speakers marked slightly fewer non-subject nouns with the homeland indirect case, somewhat more with nominative and insignificantly more in another indirect case than first generation speakers. Therefore, while the average data shows a

Table 4

Mixed-effects logistic regression analyses of Ø-subjects in 3 HLs

Russian	Input = .31 N = 2 507		
Fixed Effects:		Factor weight	*n*
Subject Continuity	Same Referent	.59	1 014
	Different Referent	.41	1 493
	Range	*18*	
Conjunction	Main	.63	2 223
	Conjoined	.37	284
	Range	*26*	
Generation × Negation	Gen. 2 × Negative	.77	220
	Gen. 2 × Affirmative	.45	1 205
	Gen. 1 × Negative	.38	122
	Gen. 1 × Affirmative	.38	960
	Range	*39*	
Generation × Person	Gen. 2 × Third	.57	428
	Gen. 2 × Second	.67	166
	Gen. 2 × First	.64	831
	Gen. 1 × Third	.54	381
	Gen. 1 × Second	.47	109
	Gen. 1 × First	.38	592
	Range	*29*	
Random Effects: Individual	standard deviation = 0.740		
Non-significant factor groups for Russian: generation × subject continuity, generation × conjunction, tense, subject continuity × conjunction, generation × subject continuity × conjunction			
Cantonese	Input = .199 N = 1 581		
Fixed Effects:		Factor weight	*n*
Subject Continuity	Same Referent	.64	966
	Different Referent	.36	615
	Range	*28*	
Grammatical Person	First	.64	1 017
	Third	.58	434
	Second	.29	130
	Range	*26*	
Conjunction	Main	.60	1 500
	Conjoined	.40	81
	Range		*20*
Random Effects: Individual	standard deviation = 0.627		
Non-significant factor groups for Cantonese: generation, generation × subject continuity, generation × person, generation × conjunction, tense			
Italian	Input = .895 N = 1 047		
Fixed Effects:		Factor weight	*n*
Subject Continuity	Same Referent	.63	519
	Different Referent	.37	528
	Range	*26*	
Grammatical Number	Plural	.63	351
	Singular	.37	696
	Range	*26*	
Preverbal Direct Object	Direct Object	.65	43
	None	.35	1 004
	Range	*30*	
Tense	Past perfect	.60	261
	Present	.46	547
	Past imperfect	.43	239
	Range	*17*	
Random Effects: Individual	standard deviation = 0.728		
Non-significant factor groups for Italian: conjunction, generation, generation × conjunction, generation × subject continuity, generation × number, generation × direct object, generation × tense			

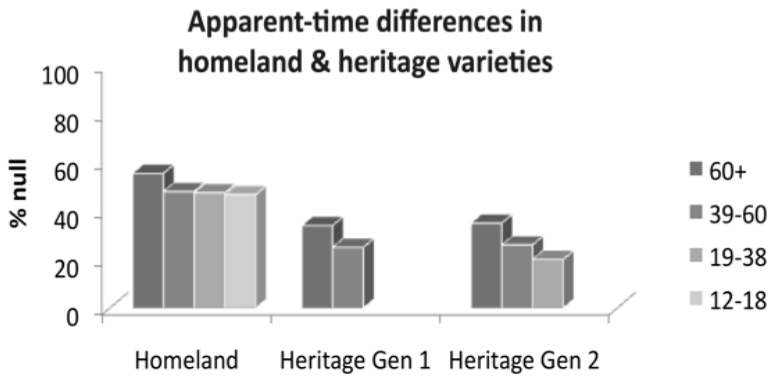

Figure 3. Null subjects rates by age in Homeland and Heritage Russian (data from [Pustovalova 2011; Hollett 2011])

Table 5

Percentage of non-subject nouns marked with the homeland indirect case, the nominative case, or another indirect case (data from [Mordvinova 2014])

Generation	Speaker	Homeland indirect case	Nominative case	Other indirect case
1	R1F47A	99	0	1
	R1M47A	98	1	1
2	R2F50A	94	4	2
	R2M50A	94	5	1
3	R3F25A	58	29	13
	R3M56A	98	1	1

predicted trend of indirect cases merging into the nominative, the individual speaker data does not fully support this trend due to the homeland-like behaviour of the third generation male.

5.4. Case-marking results

Table 5 shows each speaker's usage of different types of case markers. Across the generations since immigration, we see a decrease in the percentage of non-subject nouns produced with indirect case and an increase in the percentage of nouns produced with the nominative case or a non-standard indirect case. However, the third generation male demonstrated the same case usage pattern as the first generation male. The third generation female, on the other hand, used the nominative case for non-subject nouns extensively, accounting for much of the generational trend. The four first and second generation speakers marked case in much the same way. Second generation speakers marked slightly fewer non-subject nouns with the homeland indirect case, somewhat more with nominative and insignificantly more in another indirect case than first generation speakers. Therefore, while the average data shows a predicted trend of indirect cases merging into the nominative, the individual speaker data does not fully support this trend due to the homeland-like behaviour of the third generation male

5.5. VOT results

Comparison of the HL patterns to C. Ringen and V. Kulikov's study of VOT of monolingual St. Petersburg speakers [Ringen, Kulikov 2012] and to monolingual speakers of Canadian English [Fowler et al. 2008] illustrates contact-induced influence: across the generations, the VOT of these speakers drifts away from the monolinguals' short lag toward the long lag of English (see Figure 4). There is a significant difference between the mean measurements for the third generation vs. the second, while the difference between the first and second generations is not significant (determined by ANOVA post-hoc tests). The third generation's VOTs approach those reported for monolingual English speakers (in Montreal) by C. Fowler et al.: /p/ 0.057 sec., /t/ 0.074 sec., /k/ 0.078 sec. [Fowler et al. 2008]. The first and second generation VOTs, in contrast, are both within the range reported for Russian monolinguals in St. Petersburg by C. Ringen and V. Kulikov: /p/ 0.018 sec., /t/ 0.020 sec., /k/ 0.038 sec. [Ringen, Kulikov 2012]. The English and Russian monolingual data come from a reading task, which may show somewhat higher VOT values (cf. [Lisker, Abramson 1964; Kessinger, Blumstein 1997].

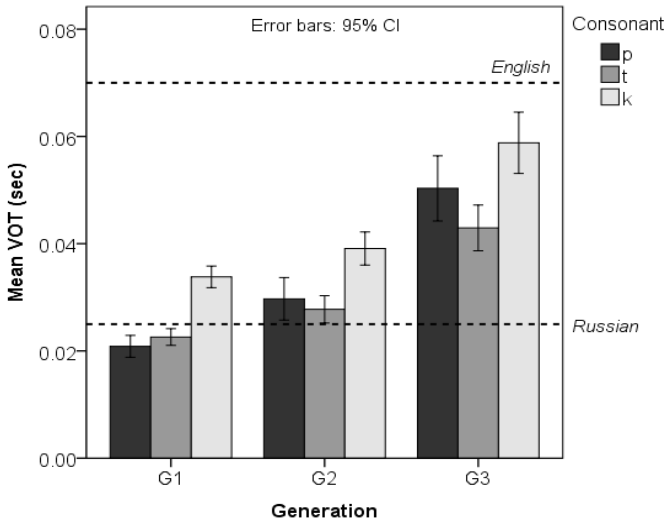

Figure 4. Russian VOT means for /p, t, k/ by generation (G1, G2, G3), compared to the Canadian English and homeland standards, by place of articulation (from [Nagy, Kochetov 2013])

Table 6

Vocabulary size calculation by individual [Mordvinova 2014]

Speaker	Total # of words	# of word types	Total words /different words
R1F47A	10,216	3,029	3.4
R1M47A	8,189	2,259	3.6
R2F50A	7,031	1,685	4.2
R2M50A	4,635	1,469	3.2
R3F25A	4,195	1,945	2.2
R3M56A	7,849	2,027	3.9

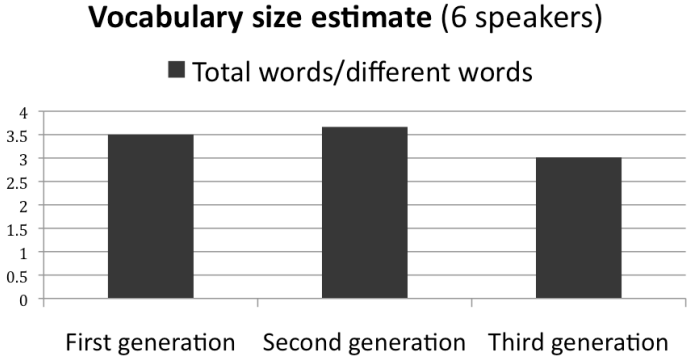

Figure 5. Average vocabulary size by generation (data from [Mordvinova 2014])

5.1. Vocabulary size results

First generation speakers generally used a larger number of word types than second and third generation speakers, but the difference is not significant. See Table 6 for individual calculations and Figure 5 for averages by generation.

This outcome contradicts the prediction that later generations would have a smaller vocabulary size than earlier generations. However, the small sample size precludes definitive conclusions. V. Mordvinova noted limitations due to the technology used [Mordvinova 2014]. ELAN counts different declensions of the same noun as distinct, making these counts an inaccurate representation of lexical knowledge. For example, in this method, speakers who use a greater variety of case markers will be shown to have a bigger vocabulary. Further work will count lemmas (citation forms) rather than surface forms (inflected forms). As an interesting aside, Table 6 indicates that first generation speakers also produced more words in total than the later generations (they were more talkative).

6. Conclusions

The analyses reported here indicate little effect on Heritage Russian of contact with English: there is no correlation between either rate or constraint hierarchies and generation for the null subject variables. This is true in spite of the range of linguistic behavior and attitudes exhibited by the participants (see Figure 1). There is also no consistent generational effect for case-marking or vocabulary size, although there is a generational effect for VOT in Heritage Russian (although not in Heritage Italian, see [Nagy, Kochetov 2013]). The lack of effect in three of four variables contradicts the popular belief that contact with English influences HLs, which would be supported if the Canadian-born generations had HL grammars more like English than the homeland-born generation. Although we see that the generations are virtually identical to each other, and different from English, we are not yet equipped to say **how** different from English they are. Once parallel analyses of homeland varieties are complete for each variable, as has been illustrated for the null subject variable in Russian, we can see where the HLs fall between the homeland varieties and English. A. Pustovalova's analyses of null subjects in Homeland Russian provides a model for this next stage of the project [Pustovalova 2011]. It is also important to study variation in the Heritage communities' English in order to see if it differs from the old-line monolingual English assumed here to be the contact variety. It is conceivable that English used in these communities has adapted toward the HL grammars and thus its possible effect on the HLs would be reduced. N. Nagy and I. Marr [Nagy, Marr: submitted] showed that this was not the case for the Toronto Italian or Cantonese communities, but analysis of the English in Toronto's Russian community remains for future work.

Notes

[1] We express our gratitude to the speakers who generously provided their time and voices to the HLVC Project, the many HLVC research assistants [listed at http://projects.chass.utoronto.ca/ngn/HLVC] who collected and prepared data, students in LIN 1152 in Spring 2010 with whom we initiated this study, and the *CLAVIER 9*, *GALANA 4* and *NWAV 38 and 39* audiences who asked good questions. This paper is an extension of [Nagy et al. 2011], from which portions are excerpted.

[2] "MT speakers" is the number of mother tongue speakers in Toronto reported in [Statistics Canada 2007]. Ethnic origin data is from [Statistics Canada 2009], also for Toronto. The "Established" date is when the first known church operating in each language was established in Toronto, a readily-available indicator of the existence of a community of speakers. "Place of origin" delimits the homeland of our first generation speakers, restricted to control the amount of regional variation in the sample.

[3] This category is referred to as "Chinese," and thus includes a number of people who speak languages other than Cantonese, but is the most comparable statistic available.

[4] All translations and glosses are from [Hollett 2011].

[5] By definition, there are no first generation speakers younger than 38.

[6] Other speakers' utterances were included in the previous context as they contribute to discourse context.

[7] It is possible that sentences with a null subject in the second conjunct are underlyingly conjoined verb phrases. However, on the surface it is ambiguous whether they are conjoined VPs or full conjoined clauses, and thus they could be interpreted by a listener as containing a null subject (see fuller discussion in [Nagy 2014]).

[8] Factor weight estimates for interaction factor groups are calculated based on Rbrul output that returns log-odds for main effects and interaction terms. The estimates for interaction terms are not immediately interpretable and calculations are made based on the regression model to determine interpretable factor weights.

[9] In all the HLs, we checked for an effect of ambiguity in the verb paradigm in order to test the Functional Hypothesis. No effect was found, and this factor was then excluded from further analyses because it is non-orthogonal to the person, number and tense factor groups.

[10] We are not surprised by this result considering that conjunction in Cantonese is structurally very different from conjunction in English.

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ВАРИАТИВНОСТЬ И ИЗМЕНЕНИЯ В «УНАСЛЕДОВАННОМ» РУССКОМ ЯЗЫКЕ (HERITAGE RUSSIAN) г. ТОРОНТО

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Многие исследования, посвященные усвоению родного языка, приходят к выводу, что существуют различия в языковом поведении носителей языка – монолингвов и носителей этого же языка как «унаследованного» (heritage language – язык второго и далее поколений эмигрантов, который используется дома, в семье). Эти различия часто связывают с влиянием доминирующего языка на heritage language, как на индивидуальном уровне, так и на уровне языковой среды. В противоположность этому, социолингвистические исследования, проводимые в рамках школы вариационизма, как правило, не находили различий между языком монолингвов и heritage language; также не удавалось установить связь между различиями в языковом поведении и степенью контакта носителей heritage language с доминирующим языком среды. Данная статья посвящена русскому языку как heritage language, в частности языку потомков русских иммигрантов, проживающих в англоязычном городе Торонто (Канада). В статье делается обзор результатов исследований различных аспектов грамматики этого социолекта, а также проводится его сравнение с другими подобными языками Торонто и литературным русским языком. Рассматриваются четыре социолингвистические переменные: реализация или опускание подлежащего (null-subject) с личными формами глагола, маркировка падежей существительных, начало включения голоса после глухих согласных (VOT) и общий словарный запас. Результаты исследования показывают, что влияние английского языка на русский язык как heritage language незначительно. В частности, отсутствует эффект поколения, т.е. разница в реализации большинства указанных переменных в речи первого и последующих поколении иммигрантов, в том числе среди носителей, наиболее ассимилированных в языковом и культурном планах. И, хотя влияние английского языка прослеживается в фонетике русского языка Торонто, отсутствие эффекта в трех из четырех переменных ставит под сомнение распространенное мнение о том, что контакт с английским языком неизбежно влияет на «унаследованные» языки.

Ключевые слова: опускание подлежащего; маркировка падежей; начало включения голоса; словарный запас; «унаследованный» русский язык (Heritage Russian); языковой контакт; фонетика; морфосинтаксис; вариационизм; социолингвистика; «унаследованный язык» (Heritage language); кантонский диалект китайского языка; итальянский язык; украинский язык.