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Heritage languages and their speakers: Opportunities and challenges for linguistics

Abstract: In this paper, we bring to the attention of the linguistic community recent research on heritage languages. Shifting linguistic attention from the model of a monolingual speaker to the model of a multilingual speaker is important for the advancement of our understanding of the language faculty. Native speaker competence is typically the result of normal first language acquisition in an environment where the native language is dominant in various contexts, and learners have extensive and continuous exposure to it and opportunities to use it. Heritage speakers present a different case: they are bilingual speakers of an ethnic or immigrant minority language, whose first language often does not reach native-like attainment in adulthood. We propose a set of connections between heritage language studies and theory construction, underscoring the potential that this population offers for linguistic research. We examine several important grammatical phenomena from the standpoint of their representation in heritage languages, including case, aspect, and other interface phenomena. We discuss how the questions raised by data from heritage speakers could fruitfully shed light on current debates about how language works and how it is acquired under different conditions. We end with a consideration of the potential competing factors that shape a heritage language system in adulthood.

Keywords: Agreement, aspect, Case, tense, interfaces, lexical categories, ultimate attainment, critical period, bilingualism, attrition

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1 Introduction

What do we know when we know a language? This question is at the heart of the debate about the language faculty. The usual answer is that we know a system of

sounds (or gestures/signs), as well as ways of putting these sounds together in a systematic fashion to make up meaningful linguistic units. These units, in turn, can be manipulated and combined to form more complex linguistic units, such as phrases, sentences, and extended discourse. Knowledge of all these aspects of a given language is part of the linguistic competence of *native* speakers. But what exactly is a native speaker?

Intuitively, the concept of a native speaker seems clear. A prototypical (educated) native speaker lives in a monolingual environment, or in a bilingual environment in which his/her original native language has not undergone attrition.[1] Such a prototypical speaker is expected to have "native" pronunciation and a sizable, comprehensive vocabulary (about 20,000 words) (Nation and Waring 1997). The speaker will speak in grammatical sentences (except for the occasional slip of the tongue), will not omit or misplace morphemes, will recognize ambiguity and/or multiple interpretations and pragmatic implications of words and sentences, and will be attuned to his or her sociolinguistic environment (social class, social context, gender, register, etc.). Native speakers are readily accepted and acknowledged as members of their speech community, which can be as wide as the language of the entire community left behind (if, for example, you are one of only a handful of immigrants in a foreign country), or as narrow as the jargon of a particular high school group.

There seems to be a consensus that native speakers differ from non-native speakers with regard to their fluency in and mastery of their linguistic system, with the degree of a speaker's linguistic proficiency varying according to the age of first exposure to the language, as well as other factors. Normally-developing native speakers seem to attain, for lack of a better term, relatively complete or full acquisition of their native language system. L2 speakers, on the other hand, typically exhibit persistent signs of non-targetlike acquisition in phonetics, phonology, inflectional morphology, semantics, syntax, and discourse/pragmatics.

1 It is, of course, debatable whether educational background should be taken into consideration in the definition of a native speaker. Although language is an oral phenomenon and writing is a cultural invention, in countries with high literacy rates, native speakers are educated, and the level of education plays a role in language knowledge and metalinguistic awareness (Rothman 2007; Pakulak and Neville 2010; Dąbrowska 1997, 2012). Literacy has also been evoked as a way of delaying or even sparing the process of language attrition in children (Zaretsky and Bar-Shalom 2010). The role of literacy, of course, raises a host of additional issues, particularly in situations where the literary standard is significantly different from the spoken varieties (as is the case with Arabic). In this paper, we choose to focus on the spoken varieties of heritage languages and will not comment on literacy except in a short paragraph in section 2.2.1 below – not because this is an unimportant concern, but simply because we need to begin the present conversation from a narrower base.

Despite the wide range of abilities covered by this brief discussion, native speakers and L2 learners represent just two extremes on a continuum of language attainment. In this paper, we discuss a different population, one that has been claimed to share properties with both native and L2 speakers: heritage speakers. The study of heritage speakers started out as part of contact linguistics and sociolinguistics, although the work was not always labeled this way. More recently, heritage speakers have become an important group in experimental linguistics, particularly in acquisition and psycholinguistics. The linguistic behavior of heritage speakers challenges long-held views and raises a host of critical issues; for instance, how long does it take for a native language to be acquired and solidified so that it does not regress with fluctuations in input? Generative linguistics assumes that once a speaker has reached ultimate attainment, his linguistic knowledge is set and stable, but what exactly is the role of input in the development and maintenance of a language during childhood and into adulthood? When language acquisition takes place under reduced input conditions or under pressure from another language in a bilingual environment, which areas of grammar are resilient and which ones are vulnerable? What underlies the common simplification patterns observed among different heritage languages?

While we welcome and embrace the rich interdisciplinary potential of heritage language studies, the purpose of this paper is to discuss these issues and highlight the relevance of this linguistic group for theoretical linguistics, a subfield that has given primacy to the "monolingual" native speaker as the most valuable source of data for linguistic inquiry. Such an emphasis on monolingual speakers was justified in the early stages of theory construction, when the main goal was to delimit the structural characteristics of the language faculty. Now that such foundational work is relatively well-established, it is important to apply and test theoretical premises on new populations. As is the case with any difficult and multidimensional problem, additional perspectives and sources of data can also provide new critical evidence for our understanding of language structure.

In the rest of the paper, we present pertinent characteristics of heritage languages and discuss how these characteristics relate to prominent issues that touch on the nature of linguistic knowledge and its cognitive underpinnings. Since the concept of a heritage language is relatively new in theoretical linguistics, we devote a considerable amount of space to the construction of a factual foundation concerning heritage linguistics.

The paper is structured as follows: Section 2 introduces the phenomenon of heritage speakers and their languages, with particular emphasis on the diagnostics that can be used to identify such speakers. Section 3, intended as a brief overview of heritage grammars, combines the description of certain design features

found in heritage languages with a preliminary exploration of their significance for linguistic theory. Section 4 develops the theme of how linguistic theory can benefit from heritage language study. Section 5 presents some considerations on the forces that shape heritage language grammar. We conclude by reiterating the interdisciplinary value of heritage languages as a point of convergence for several areas of linguistic study, and also discuss the potential of heritage language studies for advancing linguistic theory.

2 Heritage languages and their speakers

2.1 Introducing heritage speakers

The terms *heritage language* and *heritage speaker* are fairly new, and they are still poorly understood outside of North America, where similar concepts are denoted by the phrases *minority language/speaker*. Although the terms are new, the phenomenon has probably been with us as long as language contact situations have arisen through migration, and thus as old as human language itself. Immigrant languages in many countries are acquired as heritage languages. The term *heritage speaker* typically refers to second generation immigrants, the children of the original immigrants, who live in a bilingual/multilingual environment from an early age. Heritage speakers have as their dominant language the language of the host country, whereas first generation immigrants are dominant in the native language of their home country, although they may have undergone L1 attrition in specific aspects of their grammar. Language attrition is characterized by the gradually loss of aspects of a native language by a healthy native speaker (Schmid 2011); this attrition typically takes place at the individual level in contexts where the native language begins to be used less often. An eventual consequence of linguistic attrition is that a native speaker will become, in the judgment of his or her peers, a non-native speaker of his/her own language. This judgment is generally based on observed difficulties with lexical retrieval, the use of code-switching to fill lexical gaps, divergent pronunciation, morphological errors, avoidance of certain structures, and overuse of other structures due to transfer from the dominant language.

As this paper discusses different variants of language, it is important to introduce some distinctions we will use below. First language (L1) and second language (L2) are distinguished by the temporal order of acquisition. In the case of simultaneous bilinguals, we can speak of two L1s (Meisel 2011). Critically, over the lifetime of a bilingual, one of the two languages typically wins out; the other

language becomes somewhat weaker, depending on experience, context, and degree of language use (Grosjean 2008). A second distinction concerns primary versus secondary languages, which are differentiated from one another by prevalence of use. Thus, if an individual learns language A as his/her first language and speaks it predominantly throughout adulthood, that language is both first and primary. If an individual dramatically reduces the use of his/her first language, A, and a second language, B, becomes more dominant, then A is characterized as this person's first/secondary language, and B becomes the second/primary language.

The sociopolitical status of the languages is equally relevant. The majority language is often the language spoken by an ethno-linguistically dominant group and is typically supported and regulated through laws and institutions, such as language academies. It has a standard, prestige, written variety used in government and media, and it is the language used for literacy and education imparted at school. Minority languages typically have relatively lower prestige and lesser or no official status; they may not be used beyond restricted contexts; they are not typically taught in schools, and may even lack a standardized script, thus limiting their reach. Immigrant languages are also referred to as 'minority' languages, while the societally-dominant language in a particular region (e.g., English in the United States) is the 'majority' language.

The three dimensions discussed above are relevant to understanding the linguistic position of heritage speakers: a heritage speaker is an early bilingual who grew up hearing (and speaking) the heritage language (L1) and the majority language (L2) either *simultaneously* or *sequentially* in early childhood (that is, roughly up to age 5; see Schwartz 2004, Unsworth 2005), but for whom L2 became the primary language at some point during childhood (at, around, or after the onset of schooling). As a result of language shift, by early adulthood a heritage speaker can be *strongly* dominant in the majority language, while the heritage language will now be the weaker language.

The best-known and most widely used definition of heritage speakers is that of Valdés (2000): "individuals raised in homes where a language other than English is spoken and who are to some degree bilingual in English and the heritage language." Although the original definition is English-centered, any other dominant language can be substituted for English in this definition. The crucial criterion is that the heritage language was first in the order of acquisition but did not develop fully at age appropriate levels because of the individual's switch to the societally-dominant language. The other critical component of this definition is the identification of a continuum of proficiency, reflecting the tremendous variation in heritage language ability observed by several researchers (see Polinsky and Kagan 2007; Silva-Corvalán 1994).

2.2 Variability in the command of the heritage language

Heritage speakers vary widely in the degree of their receptive and productive command of the heritage language. This variation is significant both within particular linguistic groups and along the lifespan of each individual, a situation that adds to the complexity of heritage language research. Some heritage speakers have merely receptive knowledge of the language, while others may have near-native linguistic abilities in listening, speaking, reading and writing. It is typical of heritage speakers to have better-developed listening and speaking abilities than reading and writing abilities, a discrepancy that is mainly due to the lack of schooling in the heritage language. According to their self-reports, heritage speakers' most developed skill is listening (Carreira and Kagan 2011; Montrul et al. 2012). A challenge for researchers is determining how to evaluate the linguistic proficiency of speakers who fall at the lower end of the ability continuum. A variety of tests have been proposed, all of which fall into two general categories: biographical and linguistic.

2.2.1 Biographical reports

One way to estimate heritage language proficiency concerns the manner and length of exposure to the baseline language, which is defined as the language of input for heritage speakers.[2] These two characteristics, manner and length of exposure, seem interrelated in ways that are not yet fully understood. With respect to manner of exposure, it is natural to expect that speakers who grew up surrounded by the baseline language in the homeland[3] should differ in proficiency from those who grew up in an immigrant community in the U.S. or any other country where a different language is dominant. Exposure to a language in the homeland setting is inevitably richer than exposure in an immigrant community where bilingualism is prevalent; one would therefore expect, for example, a heritage Korean speaker who spent her first five years of life in Korea to have an advantage over an American-born Korean heritage speaker.

Au et al. (2002), Oh et al. (2003) and Au et al. (2008) show that speaking the majority language before age five puts heritage speakers at a small but measurable risk for poorer heritage language skills during adolescence. Conversely, we

2 Crucially, the baseline language is not the monolingual variety of that language but the language spoken by first-generation immigrants.

3 Here and below we refer to the location where the immigrant language is spoken by the majority as its *homeland*.

should expect that longer exposure to the baseline (heritage) language in its various contexts and registers should enrich the speaker's heritage language skills later in life. For example, Montrul (2002) showed that simultaneous bilingual heritage speakers were less accurate at judging the meaning of the preterite/imperfect contrast in Spanish than sequential bilingual heritage speakers were.

2.2.2 Language-based measures

Recent research on heritage languages has also focused on identifying linguistic measures, such as a heritage speaker's knowledge of their home language and the similarity of the speaker's heritage grammar to the baseline grammar of the home language. Although the progress made in this area has been quite modest, several promising diagnostics have emerged. S*peech rate* is a good example (Polinsky 2008b, 2011).

Speech rate can be measured as the word-per-minute output in spontaneous production. A speaker might, for example, be asked to describe one set of pictures in their heritage language and another set in their ~~and~~ dominant language; the resulting measure provides a standard of comparison for assessing individual variation in speech rate. Results show that a heritage speaker's speech rate may be as low as 30% of the speech rate of full speakers of the same language (baseline).

The relevance of speech rate is attested by a study of gender restructuring in heritage Russian (Polinsky 2008b), which showed that heritage speakers fall into two distinct groups: those who maintain the baseline three-gender system and those who radically reanalyze the baseline grammar as a two-gender system. Reanalysis of the baseline three-gender system as a two-gender system was strongly correlated with a lower speech rate, thus supporting the use of speech rate as a reliable diagnostic for measuring the fluency of heritage speakers and tracking the variation in the population. The source of the correlation between speech rate and degree of grammatical knowledge is straightforward: lower-proficiency speakers have more difficulty in accessing lexical items, which slows down their speech. In addition, speech rate is connected to utterance planning, and lower-proficiency speakers have more problems in that domain as well. Spontaneous speech is thus punctuated by pauses, repetitions, false starts, and code-switching. As we will show below, knowledge of lexical items and grammatical knowledge are correlated.

While speech rate may be a promising method of identifying and classifying heritage speakers, this rate can be difficult to calculate in the lowest-proficiency heritage speakers, who are often reluctant to produce connected discourse.

Another useful diagnostic is *lexical proficiency*. Polinsky (1997, 2000, 2006) and O'Grady et al. (2009) observed a strong correlation between a speaker's comprehension via oral translation of lexical items, measured in terms of a basic word list (about two hundred items), and the speaker's control of grammatical phenomena such as agreement, case marking, aspectual and temporal marking, pro-drop, co-reference, and embedding. Grammatical knowledge was measured by deviations from the baseline in spontaneous speech (Polinsky 1997) and, in later studies, by answers to forced-choice judgments (Polinsky 2005, 2008b, 2011). The correlation between grammatical and lexical knowledge was supported by results from several heritage languages, including Arabic, Russian, Polish, Armenian, Korean, and Lithuanian (see also Godson 2003, Albirini and Benmamoun, in press). This relationship between grammatical and lexical knowledge is not exclusive to heritage language competence; it has also been proposed as a measure for early child language (Fenson et al. 1994; Thal et al. 1996, 1997). If structural attrition and lexical proficiency are correlated, lexical proficiency scores, which are relatively easy to obtain, can serve as a basis for the characterization and ranking of speakers with incomplete development of their heritage language.

We have discussed only two approaches to identifying heritage speakers' proficiency here. Others can be employed as well, depending on the level of productivity of the speakers. With more proficient speakers who can read and write, other standardized and non-standardized written tasks have been used (Montrul 2002). Although these tools are not comprehensive, they are still useful and necessary, especially when conducting rigorous experiments to understand the degree of linguistic variability exhibited by heritage speakers. It is particularly interesting to investigate how this variability correlates with the linguistic patterns exhibited by the grammatical systems of heritage speakers. In the next section we discuss recent findings on phonology and pronunciation, morphology, syntax and semantics in a variety of languages.

3 Aspects of the grammatical system of heritage languages

3.1 Sound systems

3.1.1 Existing studies in phonetic and phonological skills

Phonological competence seems to be the best-preserved aspect of linguistic knowledge in heritage speakers, although even this is not entirely nativelike.

With respect to production, Au et al. (2002), Oh et al. (2003), and Knightly et al. (2003) show that low-proficiency Spanish and Korean heritage speakers who have receptive command of their heritage languages (overhearers) have more non-native accents than native speakers in general, suggesting that pronunciation is affected in heritage speakers to some extent. The differential effects depend on the particular phonemes; for instance, Au et al. (2002) demonstrate that low-proficiency Spanish heritage speakers show no differences in their productions of the VOTs of voiceless stops compared with native speakers.

Godson (2004) documents phonetic changes in vowel production in Western Armenian heritage speakers living in the United States. Godson found that the heritage speakers retained the 5-vowel system of Western Armenian in production, but the two front vowels /i/ and /ɛ/ and the central vowel /a/ differed in quality from those produced by native speakers. Unsurprisingly, the quality of these vowels was similar to their counterparts in English. Therefore, while heritage speakers may retain their native phonology, the phonetic values of both vowels and consonants are affected, thus contributing to a non-native accent. With respect to comprehension, the main findings show that phoneme differentiation is generally quite strong in heritage speakers. For example, Oh et al. (2003) show that even low-proficiency Korean speakers have unimpeded phoneme perception.

A few studies compare heritage speakers to second language learners in terms of their perception of consonants and production of vowels. In every case, these studies show that heritage speakers significantly outperform L2 learners in phonological abilities, and in some cases do not differ from native speakers in perception (Chang et al. 2008; Lukyanchenko and Gor 2011; Saadah 2011). Even though phonological retention is relatively high among heritage speakers when compared with various other aspects of their grammar, their phonological abilities remain an understudied area to date. We believe that phonological discrimination is an important area where studies of low-proficiency heritage speakers can inform our hypotheses concerning critical or sensitive periods (Newport 1990).[4]

3.1.2 Heritage language phonology and critical period effects

It is relatively uncontroversial that young children's tuning toward their L1 sound system is in place by around 12 months of age (Werker and Tees 1984). The

4 The literature on critical periods is enormous and it is beyond our goals to represent it here, so we will limit ourselves to just a subset of relevant references.

acquisition of phonology and word-learning is interdependent; the acquisition of lexical items is dependent on sufficient acquisition of phonology, and the phonology is honed by the patterns discerned in the words learned (Werker and Tees 2005). Such interdependence underlies the model of optimal periods, in which the acquisition of a certain domain serves as part of the foundation for the acquisition of the next domain, and so on. The process begins with the honing of acoustic and then phonetic sensitivity, triggering a cascade of openings and closures of optimal periods. Taken together, the collection of optimal periods constitutes the critical or sensitive period, which begins with the onset of the first optimal period (acoustic sensitivity) and ends with the completion of the final optimal period (presumably a higher-level domain such as syntax). However, since neither the onset nor the end-point of any optimal period is invariant (Werker and Tees 2005), this window of sensitivity is not absolute, and it should allow for some flexibility regarding age of onset of acquisition.

Complementary to the system of optimal periods determining the specific and concrete trajectory of L1-acquisition is the Native Language Neural Commitment (henceforth NLNC) hypothesis developed by Kuhl et al. (2005). According to this hypothesis, early experience in the native language promotes its own acquisition by making sensitivity increasingly more specific to the native language and simultaneousy inhibiting language learning that is unrelated to the L1. The hypothesis postulates that cognitive resources are limited, and that as the child is increasingly exposed to a language, establishing that language as the native language, these cognitive resources are progressively committed to this L1 to the exclusion of other linguistic input. Kuhl et al. (2005) show a negative correlation between an infant's ability to discriminate native phonemes and her ability to discriminate non-native phonemes at 7 months of age, indicating that as native language ability increases, ability in non-native languages simultaneously decreases. Children with higher perceptual skills in the native language at 7 months also showed stronger performance in word production, sentence complexity, and other higher domains of language at 18 and 24 months, while children with greater perceptual ability in non-native languages showed lesser ability in the higher domains of the native language at these older ages. According to the NLNC hypothesis, this correlation reflects a difference in the amount of commitment to the native language by these children: worse performance on non-native contrasts reflects a more complete monopolization of cognitive resources by L1, which also explains the more advanced ability in higher-level domains of L1. After 24 months, the differences in higher-level L1 ability were reduced (Kuhl et al. 2005: 248); by this point, the L1-commitment of the children who had performed better on non-native contrasts had presumably caught up to that of the children who performed better on native contrasts.

The NLNC hypothesis posits that once commitment is complete, the fundamental, underlying rules of the language are solidified in the mind so that learning is no longer needed, and the sensitive period closes for phonological perception. Once an underlying understanding of the rules of a language is sufficiently established, this flexibility is no longer necessary, and the window of sensitivity can close. However, only when all of the domains have been acquired, and thus all the optimal periods have closed, does the sensitive period as a whole come to an end.

Assuming the framework of optimal periods and the NLNC, what process underlies linguistic acquisition in sequential bilinguals? For such speakers, the commitment to L1 will have already been made when the second language is introduced. The ability to learn a new native language after initial strong exposure to L1 might require a reorganization of the cognitive resources at the expense of the original native language, prolonging (or renewing) access to the optimal periods that normally close once the relevant commitment is complete. Two possibilities present themselves. Under one hypothesis, the commitment effects of the NLNC are irreversible: once commitment has taken place in each optimal period, the resources dedicated to the original language cannot be reassigned, and the knowledge persists throughout life. Under the alternative hypothesis, the persistence of learning is contingent upon continued exposure to the language; if this input ceases, reorganization of the resources can occur, optimizing the neural system to another language. This reorganization is more likely early in life, before commitment is stabilized with the closing of the sensitive period. These two competing possibilities can be formalized as follows:

(1) *Permanence hypothesis*: once commitment has taken place in each optimal period, the resources dedicated to the original language cannot be reassigned, and the relevant knowledge persists throughout life
(2) *Contingency hypothesis*: the persistence of learning is contingent upon continued exposure to the language; if this input ceases, reorganization of the resources can occur, optimizing the neural system to another language (Brenner 2010: 9–13)

It is clear that the study of heritage languages offers an unprecedented opportunity to test these two hypotheses; the case of early receptive bilinguals whose exposure to their L1 was limited in childhood will be particularly helpful for examining these possibilities.

Bowers et al. (2009) recruited native English speakers who had substantial exposure to Hindi or Zulu as children to test their ability to discriminate phonemic contrasts that are natural in these heritage languages but opaque to native

English speakers. Both groups performed as poorly as an English-speaking control group on a vocabulary test in either Hindi or Zulu, indicating that they had no remaining knowledge of these languages.

The subjects were then given the AX task, in which participants hear two sounds and are asked to determine whether they are the same or different (whether X is like A). After 30 trials of 112 AX tests divided between Hindi and Zulu, all three of the subjects under 40 years of age had achieved near-native performance on the contrasts of their respective forgotten languages; at the same time, they showed no improvement in the other language (the one with which they had had no prior experience). The subjects older than 40, however, showed no more improvement than the control group. The authors suggest that these results indicate that the longer a speaker is isolated from a forgotten language, the more their latent ability in that language atrophies. It is also possible that older subjects simply show a much greater decline in re-learning.

The subjects who did improve only improved in distinguishing sounds of the language with which they had had experience; thus, Hindi-oriented subjects improved on Hindi but not on Zulu sounds. This suggests that the improvement was not simply a case of across-the-board learning, but rather reflects an activation of a latent, previously inaccessible ability in the forgotten language. The dental/retroflex contrast in Hindi and the plosive/implosive contrast in Zulu are both non-phonemic in English. The successful participants show evidence of ability to discriminate a phonemic contrast that should have been overwritten by an allophonic contrast, had their phonological mapping been completely reorganized in favor of English. The results of this study thus support the *permanence hypothesis* (1). Another recent study supporting this hypothesis is Oh et al.'s (2010) study of discrimination of lenis-tense-aspirated phonemic contrast in Korean adoptees.

Both studies that showed evidence of latent ability incorporated a form of re-exposure into their methodology: Bowers et al. (2009) repeated sessions of 112 trials 30 times with their subjects, and Oh et al. (2010) recruited participants from a beginning Korean class. Although re-exposure was minimal in the Oh et al. (2010) study, it might still have served as a triggering experience for accessing latent knowledge. Although more work in this area remains to be done, it is tempting to offer a simile here: the language that was not accessed for a while is like an abandoned road, which is covered with some debris but not lost. The re-exposure does not build a new road but cleans the old one, opening up the forgotten pathway.

Phonology is, of course, a vast component that includes systems of sounds and their alternations, prosodic units such as syllables and intonational groupings, and processes such as stress assignment, tone mapping, phoneme deletion and insertion, and locality (phonological domains). Acquisition of a phonologi-

cal system entails mastery of all those components and, as is evident from the above literature review, heritage language research in this area has barely scratched the surface. While many phonological aspects of language develop quite early and seem to be resilient under conditions of reduced exposure to the language in later childhood, others are vulnerable to restructuring and change under pressure from the dominant language. Clearly more research is warranted to understand the resilience and vulnerability of the phonological systems of heritage speakers with different degrees of proficiency in the heritage language.

3.2 Morphology and morphosyntax

3.2.1 Non-isolating languages

Inflectional morphology in languages that exhibit robust morphological systems, including regular and irregular paradigms, is particularly vulnerable in heritage languages. In languages such as Arabic with root and pattern morphology (McCarthy 1979), other issues can also arise concerning speakers' knowledge of the notion of a root and the mapping mechanisms for linking the root and the vocal melody to the template. Benmamoun et al. (in press) report that heritage speakers have incomplete knowledge of the notion of the root (particularly roots that contain glides and geminate consonants), which is critical in establishing lexical relations in Arabic and other Semitic languages. Unlike native speakers, heritage Arabic speakers struggle with word formation processes that require access to sub-word prosodic categories such as syllables and feet. They perform better on concatenative processes that affix morphemes to stems than on non-concatenative processes that require decomposing the stem into smaller prosodic units. This implies that non-concatenative derivational processes are more difficult to acquire and perhaps more vulnerable to attrition than concatenative processes are, a finding that is consistent with research on ~~the~~ first language acquisition of Arabic morphology (Omar 1973; Ravid and Farah 1999).

In languages that exhibit both concatenative and nonconcatenative morphology, different types of inflectional morphology are affected by attrition. In the nominal domain, heritage speakers exhibit errors with gender agreement in Russian, Spanish and Swedish (Håkansson 1995; Montrul et al. 2008a; Polinsky 2008b), with definiteness agreement in Swedish and Hungarian (Håkansson 1995; Bolonyai 2007), with case marking in Russian and Korean (Polinsky 1997, 2006, 2008a, 2008b; Song et al. 1997), and with concord in Arabic (Albirini et al. 2013). Similar patterns of erosion are attested in the verbal domain, including agreement in Russian (Polinsky 1997, 2006), lexical aspect in Russian (Pereltsvaig

2005; Polinsky 1997, 2006, 2011), grammatical aspect in Spanish and Hungarian (Montrul 2002; Fenyvesi 2000; de Groot 2005), mood in Spanish, Russian, and Hungarian (Lynch 1999; Montrul 2009; Silva-Corvalán 1994; Polinsky 1997, 2006; Fenyvesi 2000), and inflected infinitives in Brazilian Portuguese (Rothman 2007).

Morphological deficits in heritage languages are asymmetric; they seem to be more pronounced and pervasive in nominal morphology than in verbal morphology (see Bolonyai 2007 for the same observation), and within verbal morphology, deficits typically target subsets of categories. One example of such a nominal-verbal morphological asymmetry comes from Hindi heritage speakers, who make case-marking errors in the range of 23–27%, while their verbal agreement errors are under 7% (Montrul et al. 2012). Low-proficiency heritage speakers of Russian have an error rate of about 40% in the nominal morphology, but less than 20% in their verbal agreement morphology (Polinsky 2006). Observations on production in heritage Hungarian (Fenyvesi 2000; de Groot 2005), including the Hungarian of English-dominant bilingual children (Bolonyai 2007), also point to significant attrition of nominal morphology (omission of case affixes and the possessive suffix; overextension of definite forms), despite well-preserved verbal morphology, including agreement marking on verbs. Within verbal agreement, the forms which are affected the most are those with object agreement (Bolonyai 2007; Fenyvesi 2000).

Albirini et al. (2013) report that Egyptian and Palestinian heritage speakers display better command of subject-verb agreement (82.78% accuracy) than of noun-adjective agreement or concord (63.92% accuracy). This finding is intriguing, particularly since the verbal agreement paradigms are significantly larger than the adjectival paradigms and hence possibly more costly to acquire. It seems that the centrality of verbs to sentential syntax may outweigh the relative morphological simplicity of adjectives, and thus facilitate the upkeep of these verbal paradigms in the heritage grammar.

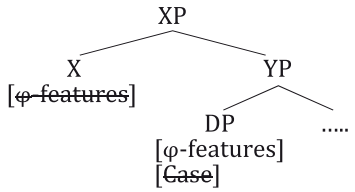
Within the verbal morphological complex, a further asymmetry exists regarding categorial features. Tense marking is unaffected and there are no reports of tense errors in heritage grammars (Fenyvesi 2000). However, in addition to agreement marking, which is generally affected, heritage speakers commonly make errors in aspectual morphology (Montrul 2002, 2009; Polinsky 2006, 2008c; de Groot 2005), as well as the morphology associated with mood and polarity.

The encoding of morphological categories on the verb seems to follow a cline according to which tense is the most robust category, aspect marking and mood marking are less so, and agreement is most vulnerable. Finally, verbal agreement is particularly vulnerable in heritage languages. While most of the data on such errors come from production and may be attributed to timing problems, scarce

comprehension work offers evidence in favor of the same cline. In a comprehension study of heritage speakers of Labrador Inuttitut, an agglutinative language, Sherkina-Lieber found that her subjects were particularly sensitive to the violations of tense marking, which they often rated as unacceptable (Sherkina-Lieber 2011; Sherkina-Lieber et al. 2011). Mismatches in verbal agreement were rated as significantly more acceptable, and finally, case marking violations were most acceptable. These results conform to the generalizations outlined in this section: nominal morphology is more vulnerable than verbal morphology, and within verbal morphology, agreement is the most vulnerable. These asymmetries are intriguing, and in what follows, we would like to offer some preliminary observations.

The first consideration has to do with unifying heritage language vulnerabilities on case and agreement. On the minimalist view, case licensing and agreement are tightly connected as (uninterpretable) features that get "checked" when a noun phrase enters into an agreement relation with a syntactic head (Chomsky 1995). ~~Thus (strikethrough indicates uninterpretable features):~~

(3)



Assuming such an account, the licensing of case and agreement depends on establishing a relationship between probe and goal, and this connection between two elements can be easily severed. Categories whose licensing does not require Agree are expected to be less vulnerable. On this account, verbal agreement and case marking are treated as very similar.

A possible alternative account of the asymmetry in the maintenance of nominal and verbal morphology capitalizes on certain differences in the nature of these two morphologies. Some researchers have argued that nominal morphology is post- or extra-syntactic, whereas verbal morphology is directly reflexive of syntactic structure (cf. Bobaljik and Branigan 2006; Bobaljik 2008). If so, it is possible that heritage speakers retain the syntactic ability to form predication relations and mechanisms to generate syntactic structures that realize thematic and semantic dependencies (such as head-complement, head-specifier, and adjunction relations, all of which are essential properties of narrow syntax), but have a reduced capacity to perform post-syntactic operations that require mapping the output of one component onto another. Although this explanation would account

for the noun-verb asymmetry in inflectional morphology, it would not explain why various verbal categories are affected differentially.

Leaving case and agreement vulnerabilities aside, we would now like to comment on the relatively robust status of tense as opposed to other verbal categories. We have already mentioned that tense is more resilient to attrition than aspect. Negation in heritage languages has not received as much attention as other grammatical categories, but at least two studies show that it is also vulnerable. According to Sherkina-Lieber et al. (2011), the sequencing of negation, which, like other grammatical categories, must follow a strict ordering pattern within the word, is more vulnerable to attrition than is the sequencing of tense. In work in progress on heritage Egyptian Arabic by Albirini and Benmamoun, preliminary findings indicate that heritage speakers prefer not to deploy verb movement in the context of sentential negation, even when movement is the preferred option in the baseline version of the heritage language. The question is why tense fares better than other aspects of verbal morphology (aspect, negation) in the context of heritage language attrition. One possibility is that tense is critical to sentential syntax because it licenses the subject through its Case and EPP properties; it is selected by a complementizer, and it usually interacts with the verb and the complementizer (as in auxiliary inversion in English and under V2 in Germanic languages). All this makes tense unique compared to other functional categories, which usually interact with one or two elements and may not be critical to word order and selection. It is possible that the richness of the Tense head, both with regard to its feature composition and its related syntactic behavior, may be a factor in its resilience compared with negation and aspect.

3.2.2 Languages with isolating morphology

So far we have discussed morphological deficits in heritage languages whose baseline has considerable, often rich, inflectional morphology. Since morphology is the "weakest link" in heritage grammars, one may wonder what happens in languages without inflectional morphology, such as heritage Cantonese, Mandarin, or Vietnamese. Are the respective heritage speakers closer to the baseline because they have "less to lose"?

The data required to answer this question are still very preliminary and come mainly from production, but they attest to the same trends as those observed in morphologically-robust languages. In the nominal domain, Mandarin, Cantonese, and Vietnamese require the use of classifiers with nouns in the presence of numerals and demonstratives. Different nouns can be paired with different classifiers. Heritage speakers of Mandarin tend either to omit classifiers completely or

to use the wrong classifier. Compare the sentences in (4), produced by a heritage speaker of Mandarin: (4a) shows an unacceptable classifier omission and (4b) illustrates the wrong classifier (general classifier *ge* instead of *ke*):

(4) a. women cong yi*(-ge) guojia dao bie de guojia jiu
we from one-CLF country to other ADN country then
zuo huoche
sit train
'We take the train from one country to another.' (Ming and Tao 2008: 173)

b. Xiangzhang dui-mian you yi-ge si de shu
XZ opposite-face have one-CLF die ADN tree
'There is a dead tree opposite Xiaozhang.' (Ming and Tao 2008: 173)

Assuming that the use of classifiers requires feature-matching, the omission or misuse of classifiers represents a failure to match two constituents. The symptoms of failure get worse if the noun and the relevant classifier are separated by intervening lexical material. ~~We conducted an auditory pilot study~~ on Mandarin where the classifier phrase (underlined below) and the associated noun (boldfaced) were separated by one content word and the adnominal marker *de*:

(5) Laozhang ba <u>na-yi-liang</u> hen-kuan-chang de **qiche** songgei
Mr.Zhang BA that-one-CLF very big ADN car give
le Laowang
PERF Mr.Wang
'Mr. Zhang gave the big car to Mr. Wang.'

Subjects' ratings were elicited on two conditions: matching (as in (5), where *liang* is the appropriate classifier to use with 'car') and non-matching (as in (6), where the classifier referring to schools is used inappropriately):

(6) *Laozhang ba <u>na-yi-suo</u> hen-kuan-chang de **qiche** songgei
Mr.Zhang BA that-one-CLF very big ADN car give
le Laowang
PERF Mr.Wang
('Mr. Zhang gave the big car to Mr. Wang.')

Native controls give low ratings to inappropriate classifier-noun combinations in reading tasks (Xiang et al. 2009). In the auditory pilot, the controls rated sentences containing classifier mismatches significantly lower than those with the matching conditions ($p = 0.006$); heritage speakers' ratings, on the other hand,

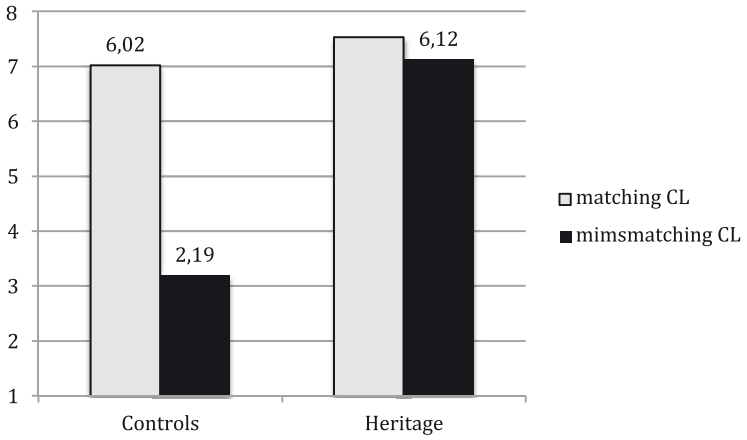


Fig. 1: Mandarin classifier match/mismatch, comprehension (17 native speaker controls, 19 heritage speakers; age matched, avg. age 18.5; 1–7 scale)

were indistinguishably high, which suggests that they overlook the classifier-noun mismatch. This is shown in Figure 1.

Also in the nominal domain, heritage speakers frequently either fail to use a preposition at all, as in (7), or choose an inappropriate one, as in (8): *zai* 'at' instead of *cong* 'behind'.

(7) wo zai Taiwan liou le liang-ge duo yue *(cong)
I at Taiwan stay PERF two-CLF many month from
shu-jia kaishi dao shu-jia guo le
summer-vacation start to summer-vacation pass PERF
'I stayed in Taiwan for two months, from the start to the end of the summer vacation.' (Ming and Tao 2008: 173)

(8) shengyin zai shu de hou-mian lai
sound at tree ADN back-face come
'The sound came from the back of the tree . . .' (Ming and Tao 2008: 173)

In the verbal domain, the main error observed in heritage Mandarin production has to do with the inappropriate use, omission, or overgeneralization of the perfective marker *le* (Ming and Tao 2008; Jia and Bailey 2008). For example in (9), the marker *le* is omitted in a context where it is obligatory:

(9) Xiaozhang xiang ta de xiao dongwu keyi pa-shang
XZ think 3SG POSS little animal can climb-up

na-ke	shu,	suoyi	ta	pao-shang-qu	kan	*(le)	yi	kan.
that-CLF	tree	so	3SG	run-up-go	see	PERF	one	see

'Xiaozhang thinks that his little animal can climb up that tree, so he goes up and takes a look.' (Ming and Tao 2008: 172)

In (10), the aspectual marker is used in a context where it cannot appear in the baseline:

(10)

wo	zhidao	ruguo	wo	qu	mai	zhe-ben	shu,	ni	hui	xue
I	know	if	I	go	buy	this-CLF	book	you	will	learn
(*le)	hen-duo	dongxi . . .								
PERF	very-many	thing								

'I know that if I buy this book you will have learned many things.'
(Ming and Tao 2008: 172)

Although available data on isolating languages is preliminary, the trends seem to match what is found in languages with richer morphology. Thus, the functional domain, which arguably plays a critical role in syntax, seems to be more vulnerable regardless of whether it is realized by affixes on lexical hosts or through phonologically independent markers. It seems, therefore, that functional categories are relatively more vulnerable than lexical categories, although there is significant variation among the latter as well.

3.3 Lexical categories

Every so often, linguists encounter examples of languages that seem to lack a noun-verb distinction (see Broschart 1997, Gil 2005 for some recent examples). Other linguists regularly refute such conjectures, however, claiming that the noun-verb distinction always exists, although it may be less evident in certain languages (cf. Lander and Testelets 2006; Arkadiev et al. 2009). The noun-verb distinction seems to be one of the tenets of Universal Grammar, granting the child the innate ability to posit paradigmatic differences between nouns and verbs whenever presented with linguistic data. The importance of the noun-verb distinction may derive from its connection to the independent cognitive processes of (i) referring and labeling (nouns), and (ii) predicating, i.e., attributing properties to things (verbs) (Williams 1980; Bowers 1993; Baker 2003; Hornstein 2009; a.o.). Examining heritage speakers' knowledge of these basic lexical categories is important because it can either provide additional evidence in support of the

noun-verb distinction or help refute its universality by suggesting that it is less fundamental than many researchers think.

Simple lexical decision studies involving heritage speakers seem to give credence to the universality of the noun-verb distinction. Polinsky (2005) and Lee et al. (2012) show that heritage speakers of Russian and Korean exhibit higher accuracy with verbs than with nouns. Subjects in these studies were presented with a lexical decision task which featured real and nonce nouns, verbs, and adjectives with different endings (thus ensuring that the participants did not rely on identifying inflection). With items controlled for frequency, the participants recognized verbal items more accurately and more quickly than nouns and adjectives. These studies show that the basic noun-verb distinction seems to be retained even by speakers whose knowledge of a given language is not fully developed.

This is just one of many instances where an investigation of heritage grammars may yield results that are of value to the field in general, specifically with regard to theory construction. While these studies offer new support for the universality of the noun-verb distinction, they leave open the question of why heritage speakers respond more readily to verbs over nouns. An obvious possibility is that verbs are a smaller class, whereas nouns are more numerous. For instance, in Russian, nouns comprise about 28.5% of the lexicon, and verbs about 17%;[5] in Korean, the percentages are about 38% and 16%, respectively (Seo 1998). Since we only have data for two heritage languages, it may be reasonable to delay the search for an explanation until this result is further tested in more empirical settings.

3.4 Aspects of syntactic structure

Syntactic knowledge, particularly the knowledge of phrase structure and word order, appears to be more resilient to incomplete acquisition under reduced input conditions than inflectional morphology is. There is a tendency for heritage language speakers to retain the basic, perhaps universal, core structural properties of their language. Aspects of syntax that pertain to the higher projections of the CP layer (i.e., *complex syntax*) appear to be much less productive and developed in these speakers (see Laleko 2010 for a detailed discussion). In the *word order* domain, Håkansson (1995) showed that Swedish heritage speakers have native-speaker control of the V2 phenomenon in Swedish, including native command of

5 Statistics from the Russian National Corpus: http://ruscorpora.ru/en/corpora-stat.html

structural (or stylistic) variability with verb placement. We do not know, however, whether heritage speakers of Swedish have mastered the full pragmatics of embedded V2. Montrul (2005) shows that even low-proficiency Spanish heritage speakers know the syntactic constraints on *unaccusativity* in their language. However, they show reduced sensitivity to the subtle lexical-semantic constraints that determine the categorical or gradient compatibility of individual verbs, particularly in unaccusative/unergative configurations.

Null pronominals, however, seem to be significantly affected in heritage grammars: languages whose baseline is pro-drop are reported to lose this feature or employ it in a more limited manner in heritage grammar – such a pattern has been illustrated for Hungarian (de Groot 2005), Hindi (Mahajan 2009), Tamil and Kabardian (Polinsky 1997), Spanish (Silva-Corvalán 1994; Montrul 2004), Polish (Polinsky 1997), and Arabic (Albirini et al. 2011). Sorace (2000, 2004), who also finds a more restricted use of null pronominals in émigré languages,[6] attributes the loss to the attrition of those aspects of grammar that lie at the syntax-discourse interface. If this explanation is on the right track, it is important to further explore what types of interface phenomena are prone to change under contact. It is crucial to determine whether other interfaces are also affected – below, we will address both the morphology/phonology interface and the syntax/pragmatics interface (Montrul 2011; Montrul and Polinsky 2011).

An alternative explanation for the loss of pro-drop stems from the general difficulty that heritage speakers exhibit in establishing and processing syntactic dependencies, especially when the dependency is at a distance. A null pronominal is always an element that has to be licensed and identified (Rizzi 1986). To pursue an explanation in terms of processing, we would first need to disentangle licensing conditions on null pronominals from the conditions on identification. In particular, co-indexation of a null pronominal with a DP at a distance or the binding of a null pronominal may cause significant difficulty in heritage grammars.

Maintenance of long-distance dependencies is also relevant in the domain of binding, which may account for observed difficulties in the interpretation of anaphors by heritage speakers. Difficulty with anaphor interpretation may vary across heritage languages, across proficiency levels, or across both. Kim et al. (2009, 2010) show that Korean heritage speakers retain control of the syntactic properties that license local and long distance anaphors in their language.

6 *Émigré language* refers to the version of a native language spoken by first generation immigrants; these speakers will subsequently provide the input language for heritage speakers in the next generation.

However, Polinsky (2006) finds that heritage speakers of Russian often produce the correct anaphors but have significant problems interpreting binding domains. Note that Korean *caki* has distinct logophoric properties (Sells 1987; Yoon 1989) that may aid in its interpretation, whereas Russian *sebja* is clause-bound – this parametric divergence may cause the difference in performance observed between heritage speakers of these languages.

Little is known about the ability of heritage speakers to deal with A-movement and A-bar phenomena. With respect to A-movement, Polinsky (2009) compared English-dominant heritage speakers of Russian to age-matched monolingual Russian controls in a sentence-picture matching task. Subjects matched pictures to active/passive constructions with verb-initial and verb-medial orders in Russian:

(11) a. morjak spas pirat-a (Active SVO)
sailor.NOM saved pirate-ACC
b. spas pirat-a morjak (Active VOS)
c. spas morjak pirat-a (Active VSO)
'The sailor saved the pirate.'

(12) a. pirat spas-en morjak-om (Passive SVO)
pirate.NOM save-PASS sailor-INSTR
b. spasen morjak-om pirat (Passive VOS)
c. spasen pirat morjak-om (Passive VSO)
'The pirate is saved by the sailor.'

The results show that, regardless of voice, heritage speakers have serious problems when the word order departs from SVO; they also have problems with the passive. At first glance, these results seem parallel to the results obtained for child language (see Orfitelli 2012, Crawford 2012 for overviews) and aphasics (see Caramazza et al. 2001, Drai et al. 2001 for a full range of debate concerning the representation of passives in aphasia). Children's difficulties with passive and scrambled constructions are often thought to result from their inability to form and maintain syntactic chains (cf. the A-chain maturation hypothesis by Borer and Wexler 1987) or to transmit theta-roles (Fox and Grodzinsky 1998). Underlying such accounts is the assumption that, once a syntactic mechanism is internalized, it should be accessible. Other analyses put the burden of children's errors on processing difficulties: failure to pay attention to the relevant inflectional morphology (cf. Murasugi and Kawamura 2005) and subsequent shallow processing that relies on some kind of a canonical sentence strategy (e.g., 'Interpret the first NP as agent and the second NP as patient'; cf. Hayashibe 1975, O'Grady 1997 for L1).

When tested in their dominant language, heritage speakers do not show any problems with passives, which means that they certainly are able to form A-chains (assuming a movement or chain-based analysis of passives). That heritage speakers command A-chains in their dominant language casts doubt on a purely syntactic explanation for their problems with the passive. Given that heritage speakers have access to the relevant functional projection, their poor performance on passives is more likely to stem from the sort of simplified processing strategies that have been identified in child language speakers.

Let us now turn to A-bar phenomena. Montrul et al. (2008b) investigated knowledge of *wh*-movement, subject-verb inversion, and *that*-trace phenomenon in Spanish heritage speakers. They found that heritage speakers were quite accurate with subject-verb inversion and complementizers (*that*-trace effect), even though Spanish and English differ in this regard. However, there were significant differences between native and heritage speakers on subject and object wh-questions, with heritage speakers performing below the baseline. Heritage speakers of Russian and Korean show difficulties in the comprehension of relative clauses (see O'Grady et al. 2001 for Korean, Polinsky 2011 for Russian), especially object relatives. Again, it is possible to account for this deficit without relying on the hard-to-maintain notion that heritage speakers lack relevant syntactic operations; instead, problems with relative clauses may follow from poor command of morphology, specifically case morphology. In this regard, it may be significant that Spanish heritage speakers who are dominant in English do not show deficits in the comprehension of relative clauses (Sánchez-Walker 2012):[7] both languages rely on the order of meaningful elements in the clause, not on case marking.

Case marking seems to be a particularly vulnerable domain in heritage grammars; however, it is unclear whether the problem lies with the syntactic mechanism of case licensing or with morphological, arguably post-syntactic case marking. We return to this issue in section 4.

3.5 Semantics

While most of the existing work on heritage language grammars has centered on the areas of morphology and syntax, there is an emerging indication that certain aspects of semantics are also highly affected in these grammars. One such area

7 Importantly, Sànchez-Walker used the same methodology as was employed in the Korean and Russian studies (sentence-picture matching), so there is no issue of possible differences due to different experimental tools.

is semantically-based (or inherent) case. Polinsky (1997, 2006) discusses the erosion of the Russian genitive of negation, which is learned late in L1 acquisition and is generally quite infrequent. Similar erosion has been documented in Spanish (Montrul 2004; Montrul and Bowles 2009, 2010). Spanish does not have a genitive of negation, but it does have differential object marking (DOM) with animate, specific direct objects, as well as differential subject marking (DSM) with dative subjects of psychological predicates. Spanish heritage speakers tend to omit these case markers, which happen to both surface as the preposition *a*. Interestingly, *a*, which is also the dative marker in prototypical dative constructions, is not omitted as often by heritage speakers with indirect objects. This suggests that inherent case marking may be more affected than structural case marking. DOM and ergative case marking are also vulnerable in Hindi heritage speakers (Montrul et al. 2012; see the discussion in section 4.1 below).

Another problematic area of emerging interest is the semantics of articles. Montrul and Ionin (2010, 2012) have found that Spanish heritage speakers have a strong tendency to use bare nouns with generic reference in subject position (these are ungrammatical in Spanish but grammatical in English), and a similar tendency was found in the Italian of Italian-English bilingual children growing up in the UK (Serratrice et al. 2009). Heritage speakers of Spanish also tend to interpret definite articles in Spanish as specific in generic contexts. Although both Spanish and English have definite and indefinite articles, the languages vary in their semantic interpretations of these features. For example, genericity in English is expressed through bare plural noun phrases, as in (13a). With the definite article, (13b), the sentence refers to a specific group of tigers. In Spanish, bare plurals in subject position are typically ungrammatical, as in (14a), but the definite article can be used to express both a generic statement and a specific statement. Therefore, sentence (14b) may be a generic statement about tigers, or it may express a property of a specific group of tigers.

(13) a. Tigers eat meat. GENERIC
b. The tigers eat meat. SPECIFIC
(14) a. *Tigres comen carne.
b. Los tigres comen carne. GENERIC, SPECIFIC

Montrul and Ionin asked whether Spanish heritage speakers would tend to interpret definite plural determiners as generic, as native speakers do, or as specific due to transfer from English. Results of an acceptability judgment task and a truth value judgment task in English showed that the heritage speakers of Spanish accepted bare plurals with generic reference and definite articles with specific reference in English and were indistinguishable from a native English speaker

group. When given the same tests in Spanish, however, there were significant differences between the Spanish native speakers and the heritage speakers. In fact, the heritage speakers were indistinguishable from L2 Spanish learners in their performance on these tasks, and, unlike the native speakers, who preferred a generic interpretation for plural definites, heritage speakers showed a preference for specific readings instead. Thus, both L2 learners and heritage speakers exhibited influence from English in the interpretation of definite articles in Spanish.

In this section, we have shown that heritage speakers of different languages show similar patterns of erosion in different areas of grammar. Phonology, in general, seems to be the best-preserved area of heritage grammar, followed by syntax, while inflectional morphology, semantics, and the syntax-discourse interface are the most vulnerable. In the next section we examine some theoretical implications of these facts.

4 Theoretical implications

First language acquisition is valuable to theoretical linguists of all persuasions for at least two reasons: first, it contributes critical information to the debate about the roles of nature versus nurture in language development; second, child language has less irregularity than adult language; it is less encumbered by external linguistic experience and, therefore, it allows researchers to see more clearly how the rules and constraints operating in natural language emerge and develop. When a child over-generalizes, the mistakes are not arbitrary: s/he draws on fundamental principles of natural language design. The same applies to child errors of all types, which is why utterances like (15) never occur in child language (Crain and Nakayama 1987; Legate and Yang 2002):

(15) *Is the woman who singing is happy?

Clearly, much can be learned about the structure of language by studying how linguistic development unfolds in young children. At the same time, we see tremendous value in studying what happens when language development regresses or does not reach its fullest potential, as a result of differential input conditions or pressures from the dominant host language in an immigrant context. In what follows, we will sample just a few areas in which data from heritage languages has a bearing on linguistic theory.

Much of the work in applied and experimental paradigms relies on theoretical predictions to generate and test hypotheses; it is common for experimental

work to establish certain generalizations in support of a particular finding in the theoretical literature. The emerging experimental work on heritage languages is no exception, but we would like to underscore that the interaction between theory and experimentation does not have to be a one-way street. It is also desirable to use experimental results as a way of feeding back into theory and challenging it on various grounds. Heritage languages are a natural linguistic phenomenon and provide exciting new data. These data can then feed back into linguistic theory and help to promote its progress. Here, we present just a small set of examples illustrating how the data obtained from heritage speakers can provide new empirical fodder for linguistic theory. The examples we chose to illustrate are drawn from case and interface phenomena.

4.1 Structural vs. inherent case

Case assignment theories have long distinguished at least two types of cases: structural case and inherent case.[8] As its name implies, a structural case is one that is assigned in a certain structural configuration and is not dependent on the semantics of the case-assigning head. With respect to verbal case assignment, this means that the particular theta-roles in the verb's argument structure do not affect the case of the noun phrases that express the arguments. A two-place verb may take as its internal argument a theme, a location, or a stimulus, but these arguments are all encoded in the accusative, as in Russian:

(16) a. razbit′ vaz-u
break.INF vase-ACC [Theme]
b. svjazat′ koft-u
knit.INF jacket-ACC [Theme]
c. videt′ ulic-u
see.INF street-ACC [Stimulus]
d. zapolnit′ derevnj-u
fill.INF village-ACC [Location]

At the opposite extreme, we find inherent cases, whose assignment is dependent on theta-marking by the verb. These cases reflect the argument structure of the verb more directly; their licensing is linked to a particular verbal head – for

8 The third option, so called lexical case, idiosyncratically assigned by individual lexical items, will not concern us here.

example, the light verb.[9] Usually genitive, dative, and partitive are considered inherent cases. In a number of languages, experiencers in subject position are encoded in the dative rather than the nominative, reflecting theta-marking. Compare in Spanish:

(17) a. Juan practica la guitarra
Juan.NOM practices the guitar
'Juan practices playing the guitar.'

b. A Juan le gusta la guitarra
DAT Juan DAT.CLITIC likes the guitar
'Juan likes the guitar.'

There are a number of strong syntactic arguments for this distinction between structural and inherent case, many of them based on English. Inherent case is considered the "stronger" case, in that it is more tightly connected to its licensing expression. By implication, a case assigned in such a manner cannot be altered under displacement or nominalization. One of the best-known instances of such case preservation is the maintenance of the dative under raising, as in Icelandic. In (18), the dative experiencer, which is the syntactic subject, undergoes raising:

(18) Dómurunum$_i$ virtist t$_i$ kona hafa skrifað bókina.
judges.DET.DAT seemed woman.NOM have.INF written book.DET.ACC
'It seemed to the judges that a woman had written the book.'
(Preminger 2011: 174)

As we move away from more familiar languages, our understanding of case becomes less clear, and the distinction between structural and inherent case less reliable. Some researchers tend to impose the structural/inherent distinction top-down, by analogy with more familiar languages, and then form expectations based on those familiar languages. This is not always a successful strategy for dealing with less-studied languages. Frequently, we simply lack the familiar tools typically used to identify case types: many languages lack the sort of raising we find in Icelandic, or do not have nominalizations of the English type, leaving us without tried-and-true diagnostics. Such difficulties have led some researchers to question the entire concept of a binary system of case types (Alsina 2001).

9 We do not intend to suggest that inherent case is completely dependent on semantics; for an explicit model showing how to combine semantic and syntactic principles in inherent case assignment, see Anttila and Fong (2000), Butt (2006) and further references in the latter book.

Is there any evidence from heritage languages for or against the distinction between structural and inherent case assignment? To answer this question, we will start with two better-known languages: Russian and Spanish.

In Russian, as in English, the nominative and accusative are identified as structural cases, independent of theta-marking. Russian is not a pro-drop language, so the nominative is very common.[10]

(19) a. žil-byl krokodil
lived-was crocodile.NOM
'There lived a crocodile.'
b. Vanja zastrelil krokodil-a
Vanya.NOM shot crocodile-ACC
'Vanya shot the crocodile.'

The accusative is the case of the direct object; it has a distinct form for animates, as shown in (19b). With inanimates, however, the accusative and the nominative have the same form (see the word for 'gift' in (21)). This is important for some of our discussion below.

The dative is considered an inherent case, and it occurs on the subject in experiencer constructions, (20), or on goal/recipient objects, (21). For a syntactic analysis of Russian datives, see Moore and Perlmutter (2000), Sigurðsson (2002) and references therein.

(20) Krokodil-u bylo grustno
crocodile-DAT was.PST.N sad.N
'The crocodile was sad.'
(21) papa prines Van-e podarok
Dad.NOM brought Vanya-DAT gift.ACC
'Dad brought Vanya a gift.'

The genitive is an inherent case assigned under negation (Pesetsky 1982) and in possessive constructions, as in (22).

(22) sobaka žen-y general-a
dog wife-GEN general-GEN
'the general's wife's dog'

10 For a comprehensive overview of the Russian case system, see Bailyn (2012: 123–172).

Russian also has a rich system of prepositions, all of which assign inherent cases (Bailyn 2012 and references therein); we will not review these here.

Several clear asymmetries emerge in the production of Russian case forms by heritage speakers. These speakers often omit case markers, and are particularly likely to leave out the accusative, the dative of the subject, and the genitive. The nominative replaces those cases which are selected by a prepositional head (dative, instrumental, locative, prepositional). It is probably more accurate to treat this phenomenon as an extended use of the unmarked case rather than an overgeneralization of the nominative per se; recall that this same 'unmarked' case accounts for the bulk of object forms (since the case contrast between nominative and accusative is neutralized for inanimates; recall (21), above). A similar simplification, from differential object marking with *a* to an unmarked object case, is observed in Heritage Spanish (Montrul 2004; Montrul and Bowles 2009).

The accusative case is also overgeneralized in heritage Russian. This overgeneralization is systematic; the accusative regularly replaces the dative case marking on indirect (goal/recipient) objects (see also Polinsky 2000, 2006). More proficient speakers retain the recipient/goal dative, while speakers with lower proficiency use the accusative, as shown below:

(23) papa prines Van-ju podarok
Dad.UNMARKED brought Vanya-"ACC" gift.UNMARKED
'Dad brought Vanya a gift.'

While morphological encoding varies, the grammar retains the special status of the indirect object case. This preservation may be due to the nature of the case encoding indirect object (recipient) as an inherent case. Given such an explanation, however, it is unclear why the dative experiencer subject is so much more prone to loss than its indirect-object counterpart. We suggest that the replacement of the dative experiencer by the nominative is strengthened by analogy with other nominative subjects. A similar change is observed in Heritage Spanish: the inherent subject dative is regularly replaced by the nominative, while the dative goal/recipient is retained (Montrul and Bowles 2009, 2010).

The genitive of negation is on the wane even in baseline Russian (Comrie et al. 1996), so its presence in Heritage Russian is negligible; the bulk of genitive omissions comes from nominal expressions such as (24) which have an unmarked prenominal possessor:

(24) [[general [žena]] [sobaka]]
general wife dog
Intended: 'the general's wife's dog'

The inherent cases assigned by non-verbal heads (prepositions) are replaced by the general unmarked case (which corresponds to the nominative in the baseline); however, the prepositional heads themselves are well-preserved (see Polinsky 2000, 2006 for details).

Table 1 summarizes the numerical data on the changes in heritage Russian.

Table 1: Mean percentages of incorrect case use in Heritage Russian production data (82 subjects, all English-dominant, avg. age 21.5)

	Suppliance	Omission	Overgeneralization
NOM	94.6	0	63
ACC	46.3	35.2	18.8
DAT exp	43.7	32.6	0
DAT goal	58.7	18.3	8.3
GEN	53.6	30.7	2

The data indicate the following trends: subjects receive a uniform unmarked case; the accusative is lost; the inherent case assigned by a verbal head (dative) is retained, while inherent cases assigned by non-verbal heads are lost.

At this juncture, we can try to explain these changes in two ways. The first approach distinguishes unique cases from those cases that occur in alternation. Case forms which occur in alternation with some other case form undergo frequent replacement, typically by the unmarked form: in Russian, this accounts for the replacement of the dative subject by the nominative (both cases mark subjects, but use of the nominative in this context is much more common) and for the replacement of the accusative by the nominative (facilitated by the syncretism of nominative and accusative with inanimates). By contrast, the dative of the indirect object, which does not appear in alternation with any other forms, is retained, either with the baseline marking preserved, or marked as the baseline accusative. This approach fails, however, to account for the loss of the genitive of possession and for the loss of prepositional cases (which all have unique marking).

An alternative account connects the loss or retention of case with theta-roles. Those case forms that have a clear connection to a particular theta-role are expressed and recognized. This analysis accounts for the maintenance of the indirect object case, and can also explain the loss of prepositional case marking: these case forms are, in a sense, marked by the preposition itself, which makes the use of a morphological case marker redundant. However, this account fails to

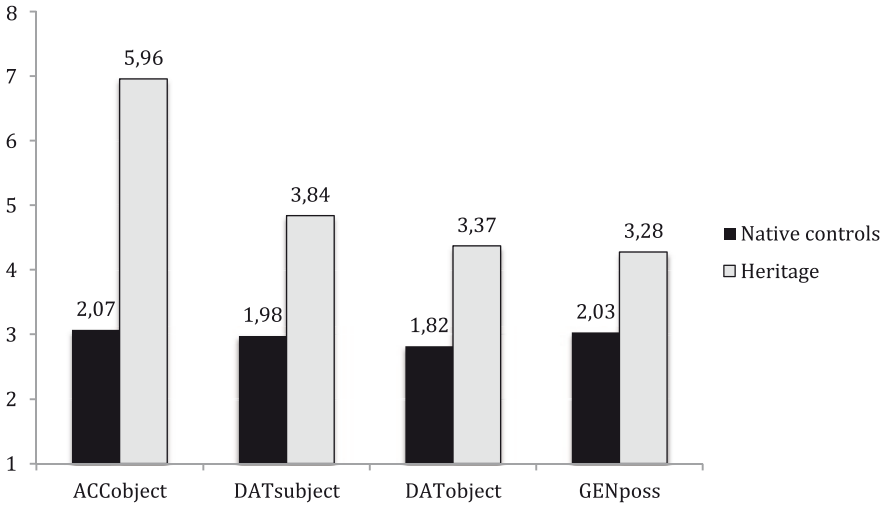


Fig. 2: Russian case mismatches, comprehension (20 native speaker controls, 23 heritage speakers (HS); age matched, avg. age 26; 1–7 scale)

explain the loss of the dative subject, which is reanalyzed by analogy with the nominative subject.

Whichever account we pursue, it is important to keep in mind that patterns observed in production data may be affected by performance limitations. ~~We therefore checked these results~~ against comprehension data. Figure 2 shows the ratings given by Russian heritage speakers for phrases omitting the accusative, dative (experiencer and goal/recipient), and genitive of possession. The listeners heard an unmarked case and had to rate the acceptability of the sentence containing it using a 1–7 scale (1 = lowest, 7 = highest).[11]

These results show, in a much clearer way than the production data, that the heritage group makes a clear distinction between the accusative case, on the one hand, and all the other cases, on the other. This distinction in comprehension is actually much crisper and supports the categorical distinction between the accusative as a structural case and the other cases as inherent. This distinction also supports an approach which frames case changes in terms of inherent/structural case rather than in terms of case alternations. The tentative generalization we can draw on the basis of these data is as follows:

11 Due to the nominative's status as an unmarked case, there is no comparable way of assessing its mismatch.

(25) In a heritage language, STRUCTURAL CASE of the baseline is replaced by an unmarked case, whereas INHERENT CASE is maintained (although its morphological exponent may change compared to the baseline).

Now that we have established this generalization, let us apply it to instances where the primary data have not been conclusive in establishing the status of a particular case as structural or inherent. The case we will consider is ergative: this case marks transitive subjects, and stands in opposition to the absolutive case, which encodes the intransitive subject and the object of a transitive verb.

The status of the ergative case has been the subject of much debate. A number of researchers identify it as an inherent case, assigned by the highest transitive *v* head in the structure (cf. Butt and King 2004, Woolford 2006 and references therein, Legate 2008, and Aldridge 2008, a.o.). The main arguments for treating ergative as an inherent case are twofold: it is assigned by a verb, not by a higher functional projection, and it is often, though not always, associated with the thematic Agent role, which suggests a close association with theta-marking. Scholars that treat the ergative as a structural case make precisely the opposite arguments: they claim that the ergative is not tightly linked to a particular theta role, can be shown to be licensed by a functional projection (e.g., VoiceP) above the VP, and does not get preserved under raising (Ura 2000). In particular, Davison (1999, 2000, 2001) argues that the Hindi ergative is a structural case, and shows that it is licensed in counterfactual constructions regardless of the thematic role or argument structure of the licensing verb.

We would expect that either the ergative would be replaced by the absolutive or vice versa (since both cases encode subjects, the direction of change may be hard to predict). If the ergative is an inherent case, we would predict it to be well preserved in the resulting heritage language (compare (25)). If, however, it is a structural case, it should meet the fate of the Russian and Spanish accusative and be erased, replaced by some (unmarked) case.

Let us now consider data from Hindi. In Hindi, a split ergative language, the ergative is marked with a postposition –*ne*, and the accusative and dative are marked by the homophonous postposition –*ko*. Compare:

(26) a. Mira-ne ramesh-ko dekh-aa
Mira-ERG Ramesh.M.SG-ACC saw-PERF.M.SG
'Mira saw Ramesh.'

b. Mira-ko ajmal yaad aa-yaa
Mira-DAT Ajmal.M.SG memory.F.SG come-PERF.M.SG
'Mira remembered Ajmal.'

Production data show that heritage speakers of Hindi omit –*ne* marking with ergative subjects at a rate of 36%, whereas their omission of –*ko* with dative objects is about 15% (Montrul et al. 2012). Omissions of the dative for indirect objects were not attested in production (0%), and for dative subjects, omissions were only 7%.

The differential acceptance of case marker omission was also evident in a bimodal acceptability judgment task, with stimuli presented in auditory and visual modalities. The same group of Hindi heritage speakers rated sentences with –*ne* and -*ko* omission as significantly more acceptable than the baseline of fully fluent speakers of Hindi. Within the heritage group, the mean acceptability ratings of case omission were as follows (where 1 = unacceptable and 4 = perfectly acceptable): 2.12 for ergatives, 2.35 for dative subjects, 2.5 for specific direct objects, but only 1.56 for indirect objects. All these differences were significant (Montrul et al. 2012). Thus, we see a big discrepancy between the tolerance shown by heritage speakers for the omission of the ergative, accusative, and dative subject marker and their relative sensitivity to the omission of dative indirect object marking.

The significant erosion of the Hindi ergative suggests that it is a structural case; it patterns the same way as the accusative in Russian and Spanish. Note, however, that the dative is well preserved, particularly in indirect object marking. As in Spanish, dative subjects seem more affected than indirect objects. This suggests that changes in the case system are also sensitive to the grammatical function of the relevant DP, and subjects may have their own trajectory, equally influenced by case licensing and their prominent role in the predication relation.

4.2 Interface phenomena

The model of language representation in heritage speakers we support builds on the following assumption: heritage speakers control the rules of particular modules (e.g., narrow syntax, phonology) but experience difficulty at the interfaces between modules. The Interface Hypothesis (Sorace 2011~~, 2012;~~ Sorace and Serratrice 2009) claims that difficulty with interface areas accounts for the attrition of null pronominalization in near-native speakers of a second language. To further test this hypothesis, it is necessary to apply it to new populations, including heritage speakers (see Montrul and Polinsky 2011). In this section, we present and analyze heritage speakers' treatment of two interface phenomena: aspectual computation and the syntax-phonology/morphology interface. Our conclusions

suggest that heritage speakers indeed experience additional problems when they have to compute interface properties.

4.2.1 Aspect

Laleko (2008, 2010) advances the proposal that grammatical aspect is an area that is likely to exhibit interface effects. She investigates Slavic aspect, which is notoriously difficult for L1 and L2 learners. On the lexico-syntactic level, Russian aspectual distinctions are ostensibly tied to lexical aspect, i.e., telicity of the verbal predicate. For verbs that are inherently specified as telic or atelic, the default aspectual value at this level is calculated based on the semantic properties of the verb. In the absence of such a specification on the verbal root itself, compositional telicity of the verb phrase, including the nominal argument, has the potential to contribute to the resulting aspectual value of the VP (Laleko 2008 and references therein). On the sentential level, the contribution of telicity may be overridden by aspectual operators, such as habitual and progressive imperfectivizers, which license imperfective aspectual marking with telic eventualities. Telicity may also be overridden by delimiting perfectivizing prefixes such as *po-* and *za-*, which supply an external boundary to lexically unbounded eventualities. In the absence of sentential aspectual triggers, the default lexical aspect projects directly onto the sentential level. Finally, operating at the highest level of syntactic structure, which interfaces with discourse-pragmatics, are pragmatically-conditioned aspectual triggers. These triggers are sensitive to external contextual factors in mediating aspectual meanings. Here, aspectual contrasts reflect such notions as the thematicity of the predicate and the illocutionary force of the utterance. Thus, even in the absence of atelic interpretations of the verbal phrase at the lexical level or imperfective operators at the sentential level, Russian verbs may receive imperfective marking for pragmatic reasons. For example, imperfective marking may be used to indicate that the speaker is merely reporting some fact about a particular event, without regard to its completion, or to imply that the result of the action denoted by the predicate has been canceled. Availability of such pragmatically-conditioned functions of the imperfective in Russian produces aspectual competition, a situation in which both aspectual forms are grammatically possible. The competition is successfully resolved in favor of the imperfective aspect when the relevant contextual triggers are present.

Data from monolingual speakers of Russian (Laleko 2010) are fully consistent with the model outlined above. Laleko's data from advanced heritage speakers of Russian, however, reveal a significant reduction in the use of the pragmatically-

conditioned functions of the imperfective aspect. When compared with baseline controls, heritage speakers exhibit lower acceptability rates for imperfective forms with completed events, even in the presence of contextual discourse-pragmatic triggers of imperfectivity. Further, heritage speakers are significantly less accurate than native speakers in their interpretations of the annulled result implicature. Laleko (2010) argues that the three levels of aspectual structure – lexical, sentential, and discourse-pragmatic – are affected selectively in heritage language acquisition. The restructuring of aspect in advanced heritage grammars affects the highest level of sentential structure, a domain in which syntactic information is mapped onto discourse-pragmatic knowledge. As a result, the privative (single-valued) aspectual opposition present in baseline Russian, in which the imperfective aspect is unmarked, undergoes a shift to a binary opposition. This shift results in a representation of the contrast between perfective and imperfective in terms of plus or minus feature values. As a result, the distribution of aspectual forms is determined solely by the grammar, without any recourse to features of the discourse-pragmatic interface.

Laleko's (2010) model of aspect in Russian makes further predictions with respect to the directionality of aspectual restructuring across the heritage continuum. While advanced heritage speakers may exhibit sensitivity to phenomena mediated in the C-domain,[12] lower-proficiency heritage speakers are predicted to diverge from the baseline norm not only on the discourse-pragmatics level, but also on the intermediate level of sentential aspect, where grammatical aspectual triggers operate. Thus, we expect that lower-proficiency heritage speakers will not be consistently sensitive to sentential aspectual operators, but instead will pay more attention to the default lexical aspect of the predicate. Consistent with these predictions, existing production data from low-proficiency heritage speakers of Russian, such as the naturally-occurring examples provided in Polinsky (2006, 2008c), reveal multiple instances of perfective aspectual forms occurring in the presence of imperfectivizing sentential triggers, such as habitual adverbs, when predicates are lexically or compositionally telic.

4.2.2 Syntax-morphology interface

It certainly makes sense to expect vulnerabilities in a heritage language to be found in the mapping between components, as opposed to the deployment

12 Besides aspect, other difficulties in this category include apparent optionality with null and overt subjects and infelicitous use of overt determiners.

of specific rules or principles within a particular component. For the Interface Hypothesis to be successful, however, it is important to seek supporting evidence outside the particular discourse-syntax interface where it has been tested. In this section, we will explore one such potential case: a morphological deficit related to difficulties with interface mapping. The case in point has to do with the reanalysis of the construct state in several varieties of heritage Arabic.

In Afro-Asiatic languages, the construct state is used to form a genitive construction with a semantically definite head noun (Ritter 1988; Borer 1996; Benmamoun 2000; Siloni 2001). The head noun is placed in the construct state, which lacks any overt definite marking, and is often phonetically shortened. The modifying dependent expression directly follows the head noun, and no other word can intervene between the two.

(27) a. [$_{DP}$ [$_{DP}$ [kitaab-u] [$_{DP}$ l-walad-i]] [$_{AP}$ l-žadii-u]]
book-NOM the-boy-GEN the-new-NOM
HEAD NOUN CONSTRUCT STATE DEPENDENT DP
'the boy's new book'
b. *l-kitaab-u l-walad-i l-žadii-u
the-book-NOM the-boy-GEN the-new-NOM

In (27), the head of the construct state (*kitaab*) cannot be overtly marked for definiteness, hence the ungrammaticality of (27b). However, forms equivalent to (27b) are found in heritage Arabic speech (Albirini and Benmamoun in press): Arabic heritage speakers tend to attach the definiteness markers to both members of the construct state.

(28) lamma Siħi mən n-noom, liʔi žarra . . .
when awoke.3SG.M from the-sleep found.3SG.M jar
l-žarra l-ʔazaaz
the-jar the-glass
'When he woke up, he found a jar . . . the jar of the glass.'
(Heritage Palestinian Arabic)

(29) huwwa raaħit **l-beit** **r-raʔiis**
he went the-house the-president
'He went to the house of the president [king]' (Heritage Egyptian Arabic)

In (28) and (29), the heads of the construct state, *žarra* and *beit*, carry the definiteness marker, although this construction is ungrammatical in the baseline. In standard speech, the members of the construct state form a single prosodic

unit, which may explain why the definiteness marker is generated only once (on the assumption that there should be one marker per prosodic unit). The data from heritage speech thus suggest that these speakers do not treat the construct state as a single prosodic unit, and this is what allows them to use double marking. This divergence from the baseline may have to do with a failure to compute the interface level between syntax and PF, where the formation of the construct state ostensibly takes place (Benmamoun 2000: 141–143).[13]

Generalizing from this result, we expect that heritage speakers would have difficulty with operations that involve computation across more than one grammatical component, for example, across syntax and morphology. Such interface operations require knowledge of the principles and constraints operating on both components, together with the ways in which they map onto each other.

Interface effects may also underlie the nonstandard behavior exhibited by heritage Arabic speakers in the context of agreement and coordination (Albirini et al. 2011).

(30) el-walad wi-l-kalb naayem ʕala es-sriir
the-boy and-the-dog sleep.3SG.M on the-bed
'The boy and the dog are sleeping on the bed.' (Heritage Egyptian Arabic)

The example in (30) displays closest conjunct agreement: the verb agrees with the DP 'dog' rather than with the entire coordinate DP 'the boy and the dog'. Though Arabic is well known for its closest conjunct agreement (cf. Aoun et al. 1994), this agreement pattern only arises in the VS order; thus, in the baseline language, (30) would be incorrect. Rather, full agreement with the predicate is expected when the predicate follows the conjoined subject, as in (31). Grammatical closest conjunct agreement in the baseline is shown in (32).

(31) el-walad wi-l-kalb naayem-en ʕala es-sriir
the-boy and-the-dog sleep-3PL on the-bed
'The boy and the dog are sleeping on the bed.'

(32) naayem el-walad wi-l-kalb ʕala es-sriir
sleep.3SG.M the-boy and-the-dog on the-bed
'The boy and the dog are sleeping on the bed.'

13 Alternatively, it is possible that the first member of the Construct State inherits the definiteness feature from the second member and that this feature inheritance mechanism is missing or has been lost in heritage Arabic.

Closest conjunct agreement has received a number of theoretical analyses which we will not discuss in great detail here (see Aoun et al. 1994, Benmamoun et al. 2009, Bošković 2009, Bhatt and Walkow in press, for details). For our purposes, the crucial generalization is that the computation of closest conjunct agreement relies on the interaction between syntax and the morpho-phonological component of the grammar. Heritage speakers may no longer control this interface in their grammars; as a result, they inappropriately display closest conjunct agreement in the SV order. This suggests that heritage speakers rely on adjacency to compute agreement with the coordinate noun phrase subject, forgoing the more complex interface constraints. If this hypothesis is correct, it may represent another instance of the difficulty associated with mapping from syntax to PF. So far, this conclusion is based on production alone; it is important to further test the erosion of interface agreement constraints in the comprehension of heritage speakers of Arabic and of other languages with closest conjunct agreement.

5 What determines the shape of heritage grammars?

In the previous two sections, we presented a series of phenomena that characterize heritage languages. We would now like to consider possible factors that play a role in shaping heritage grammars. We identify four factors that may be relevant: differences in attainment (also referred to as incomplete acquisition), attrition over the lifespan, transfer from the dominant language, and incipient changes in parental/community input that get amplified in the heritage variety. We will examine each of these factors in turn.

5.1 Divergent grammar

Heritage speakers are early bilinguals who learned their dominant language in childhood, either simultaneously with the heritage language, or sequentially, after a short period of predominant exposure to and use of the heritage language at home. A common pattern in simultaneous bilinguals is that, as the child begins socialization in the majority language, the amount of input from and use in the minority language is reduced. Consequently, the child's competence in the heritage language begins to lag, with the result that the heritage language becomes, structurally and functionally, the weaker language. Developmental delays that

start in childhood never catch up, and as the heritage child becomes an adult, the eventual adult grammar does not reach native-like development.[14]

A clear example of such incomplete attainment has been found in the acquisition of the subjunctive in Spanish. Blake (1983) tested monolingual children in Mexico between the ages of 4 and 12 on their use of the subjunctive in different clauses. He found that between the ages of 5 and 8, knowledge and use of the subjunctive in these children was in fluctuation; children did not show categorical knowledge of the Spanish subjunctive until after age 10. Heritage speakers, who receive less input at an earlier age and no schooling in the language, never fully acquire all the uses and semantic nuances of the subjunctive, as reported in many studies (Martínez Mira 2009; Montrul 2009; Potowski et al. 2009; Silva-Corvalán 1994; see also Silva-Corvalán 2003 for a longitudinal study documenting incomplete acquisition of the subjunctive and other verbal forms in bilingual children).

Lack of attainment of a particular baseline phenomenon occurs primarily in childhood when input is insufficient for developing the full L1 system. However, as we discuss next, incomplete acquisition and attrition in childhood are not mutually exclusive. Both factors can come into play simultaneously for different structures, or the two factors may occur sequentially; structures that were acquired at a certain age can be lost later on.

5.2 Attrition

Under normal circumstances, L1 attrition refers to the loss of linguistic skills in a bilingual environment. It implies that a given grammatical structure reached full development and mastery and was stable for a while before suffering weakening or being subsequently lost after several years of reduced input or language disuse. Thus, attrition is "the temporary or permanent loss of language ability as reflected in a speaker's performance or in his or her inability to make grammaticality judgments that would be consistent with native speaker monolinguals of the same age and stage of language development." (Seliger 1996: 616).

14 The divergence of heritage grammatical systems is sometimes referred to as "incomplete acquisition". This term has often been used in reference to the incomplete version of the target language acquired under L2 learning (Schachter 1983, 1988, 1990; Bley-Vroman 1989; Ellis 1985; Meisel et al. 1981; a.o.). When applied to heritage language, the term is used in a different manner, implying that the learner has acquired a system of language but that that system may be different from the baseline.

According to de Bot (1991), attrition may occur during the first generation of immigration, when either language shift or a change in the relative use of the L1 may affect structural aspects of the speaker's native language.[15] Attrition can also occur much earlier in the life of a learner, in which case it has more dramatic effects on the integrity of the grammar. Recent research suggests that the extent of attrition is inversely related to the age of onset of bilingualism (Bylund 2009; Montrul 2008; Pallier 2007). Prepubescent children tend to lose their productive L1 skills more quickly and to a greater extent than speakers who moved as adults and whose L1 was fully developed before migration (Ammerlaan 1996; Hulsen 2000). In other words, the extent of attrition and severe language loss is more pronounced in children younger than 10 or 12 years old than it is in individuals who immigrated after puberty. Within childhood, language attrition, most typically referred to as incomplete L1 acquisition (Montrul 2008; Polinsky 1997, 2006), also tends to be more extensive in younger children than in older children (Montrul 2008). Research has also shown that severed or interrupted input in childhood, which occurs particularly with international adoptees, leads to severe attrition and the possibility of total language loss, whereas reduced input in childhood, as in the case of heritage speakers, leads to partial attrition and incomplete acquisition (Montrul 2011).

There are two ways to tease apart incomplete acquisition and attrition in later childhood. The first strategy consists of conducting longitudinal or semi-longitudinal studies of children. This has been done, for instance, by Anderson (1999), Merino (1983) and Silva-Corvalán (2003), who were able to document the incremental accumulation of errors in agreement, case, or gender marking, in their investigation of immigrant children who arrived in their new country around age 8;0 or older. The results of these studies generally show a significant accumulation of errors which eventually leads to the loss of the baseline pattern. The stage at which such error accumulation reaches the point of no return has yet to be determined.

The other means of teasing apart the effect of incomplete acquisition and attrition is to directly compare child and adult heritage speakers. A recent study by Polinsky (2011) on comprehension of relative clauses in Russian heritage speakers showed that prepubescent heritage speakers performed at ceiling, just like age-matched monolingual Russian children and adult Russian speakers in the baseline. Meanwhile, the adult heritage speakers had significant problems with

15 Until recently, the vast majority of studies on linguistic attrition were done on older adults (Levine 2001; Schmid 2011), who had obviously attained full linguistic competence before attrition began and who also show aging effects.

relative clauses as compared with the other three groups; in particular, they performed at chance on object relatives but were close to the other three groups in their comprehension of subject relatives. It seems clear that the children had adult-like grammatical knowledge of relative clauses, but the adult heritage speakers re-analyzed that grammatical knowledge into a new system in which extraction only targets subjects.

5.3 Dominant language transfer?

An important point of contact between heritage speakers and second language learners that does not arise in L1 acquisition is the interplay between the learner's first (heritage) language and the second (dominant) language. This type of interplay is referred to as language transfer, and understanding this phenomenon is a foundational issue in second language acquisition research: to what extent does the first language grammar play a role in shaping the developing second language grammar? The effects of a speaker's native language on the acquisition of a second language at different levels of linguistic analysis (phonology, morphology, syntax, semantics, lexicon) have been extensively documented in the second language acquisition literature over the years (Odlin 1989; White 1989; Gass and Selinker 1992; Schwartz and Sprouse 1996; Jarvis 1998). A similar issue arises in other language contact situations, including pidgin and creole genesis, where phenomena like lexical borrowings and so-called areal features are the well-known consequences of language contact. Research on bilingualism and language contact (both at the social and psycholinguistic levels) suggests that the second language can encroach on the structure of the native language in systematic ways (Cook 2003; Pavlenko and Jarvis 2002; Seliger 1996).

In examining the linguistic characteristics of heritage grammars, the first question that comes to mind is whether many of the "simplified" characteristics observed in the heritage languages could be due to transfer from the dominant language. For instance, the erosion of nominal and verbal inflectional morphology in Spanish and Russian heritage speakers may be linked to the fact that the contact language for most of the tested speakers is English, a language which lacks rich inflectional morphology on nouns and verbs. The same explanation may apply to the overuse of overt subjects and the loss of semantically based case in Spanish and Russian, as well as the preference for SVO over topicalization. The loss of the generic use of definite articles in Spanish could also follow from contact with English.

An obvious way to resolve this question over the source of simplified characteristics in heritage grammars is by testing heritage speakers whose majority

language is typologically close to their heritage language (Spanish heritage speakers in Italy or Brazil, for example) or by comparing the effects of different dominant languages on one and the same heritage language. This research remains to be done.

5.4 Incipient changes in the input

As we seek to understand the source of the seemingly non-native abilities of heritage language speakers, it is important to pay attention to the form of language spoken by the immigrant communities themselves. It is possible that these communities speak an altogether different variety of the heritage language than that spoken in the home country. By documenting patterns of maintenance or change in the language variety used by the immigrant community, we can determine whether the input that heritage speakers get from the older immigrant generation is already different from the baseline – that is, whether any of the properties attested in the heritage language spoken by the second generation may be derived from the first generation grammar itself. This approach is typical of sociolinguistic studies (Otheguy and Zentella 2012). If a property is not part of the register spoken to the heritage speakers, then it cannot be acquired. Rothman (2007) and Pires and Rothman (2009) illustrate this fact with data from heritage speakers of Brazilian and European Portuguese. European and Brazilian Portuguese have inflected infinitives, but these are only used in written registers in Brazilian Portuguese. Their research shows that European Portuguese heritage speakers in the United States, who still hear inflected infinitives in the input, have inflected infinitives in their grammars. Brazilian Portuguese heritage speakers in the United States, who would only be exposed to inflected infinitives in written registers with which they lack familiarity, do not have knowledge of inflected infinitives.

Montrul (2004) and Montrul and Bowles (2009) have found incomplete acquisition of differential object marking in Spanish heritage speakers (see also section 3.5 above). Most recently, Montrul and Sánchez-Walker (2013) tested this phenomenon in adult and child heritage speakers and first generation immigrants (whose language corresponds to the language spoken by the parents of the heritage speakers), as well as control groups of children, young adults and adults in Mexico. They found that the child and adult heritage speakers omitted differential object marking with animate and specific direct objects, but so did the first generation immigrants. In comparison, the native speakers tested in Mexico had very low rates of omission of this marker. This suggests that differential object marking underwent attrition in first generation immigrant adults. Since these immigrant adults are the main source of input to the second generation, non-target

use of differential object marking can only be amplified in the language of heritage speakers.

In the case of differential object marking, the erosion of personal *a* is already present in the input, but the greater loss of the marking in second generation speakers could also be due to transfer from English (English does not mark animate, specific direct objects overtly). Thus, we see a situation where the two factors, dominant-language transfer and incipient change in the input, work together. There is no a priori way to tell which of the factors we have considered in this section would outweigh the others: incomplete acquisition, attrition, transfer, or inherent properties of the input. Isolating each factor is crucial for a better understanding of language loss and change, and may be achieved by expanding the empirical grounding of heritage studies. Although the research methodologies applied to heritage speakers so far have followed traditions in sociolinguistics, first language acquisition, second language acquisition and field linguistics, the study of heritage speakers would benefit from other psycholinguistic methodologies such as neuroimaging and computational modeling to complement behavioral data.

6 Conclusions

Research on heritage languages brings together several related fields that have much to gain from working with and talking to each other: theoretical linguistics, with its emphasis on universal principles of language structure; experimental linguistics, especially the study of comprehension, which stands to gain a great deal from working with readily available populations; L1 acquisition, which can compare normal and arrested development; and L2 acquisition, which can compare heritage languages with both first and second languages.

Although we are only just beginning to understand how heritage languages are structured, the emerging patterns point to interesting structural differences between complete and incomplete first language acquisition. The defining characteristic of heritage speakers is exposure to the heritage language in childhood, typically in the home and heritage community context. From a language acquisition perspective, this means that heritage speakers are usually exposed to the language during the critical period, unlike late L2 learners who also display variability in ultimate attainment but are exposed to the second language after puberty. The standard assumption is that exposure to natural language during the critical period (before puberty) should allow one to develop native-like competence, but, as we have seen, heritage speakers do not develop uniform native-like competence in all grammatical domains. They seem to pattern with both native

speakers and L2 learners in different aspects of the grammar. The linguistic behavior of heritage speakers, and their intermediary status with respect to L1 and L2 speakers, can help us isolate those aspects of the grammar – in phonology, morphology, syntax, lexicon, and interface areas – which require significant input and use in order to be immune from attrition, and those areas of the grammar which are naturally resilient even without extensive input and use. It is clear from the discussion above that certain aspects of the grammar *do* fall into the former category. Thus, not only is early exposure to input necessary for successful language acquisition, but it is also crucial for maintenance of an acquired system during childhood, extending up until puberty (Bylund 2009; Montrul 2008).

On a number of occasions throughout this paper, we emphasized that heritage languages are still an uncharted territory for theoretical linguistics. Now, however, we would like to conclude on an optimistic note, underscoring how much these languages have to offer linguistic theory. A parallel that immediately comes to mind is the study of creoles. Some forty years ago, creoles were the domain of specific language study or sociolinguistics, and theoretical linguists were reluctant to go near them. However, as soon as linguists recognized that creole phenomena speak directly to Plato's problem in language, creoles gained visibility in linguistic theorizing. Heritage languages add yet another piece to the puzzle of how a grammar can be acquired under conditions of reduced input and use. They can tell us about the overall design of language and the necessary and sufficient conditions for its development.

Abbreviations

ADN adnominal marker
CLF classifier
All other abbreviations follow the Leipzig Glossing Rules.

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