

Review Article

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Intergenerational attrition: direct or reverse language transmission?

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Abstract

It has been suggested that the parents of heritage speakers (2nd generation immigrants), who are the main source of input to them, may exhibit first-language (L1) attrition in their language, thereby directly transmitting different structural properties or “errors” to the heritage speakers. Given the state of current knowledge of inconsistent input in L1 acquisition, age of acquisition effects in bilingualism, and how long it takes children to master different properties of their native language, it is highly unlikely that immigrant parents are directly transmitting patterns of language attrition to their heritage language children. The argument advanced in this article is that if the patterns evident in heritage speakers and first-generation immigrants are related, reverse transmission may be at play instead, when the heritage speakers might be influencing the language of the parents rather than the other way around. Theoretical and empirical evidence for this proposal may explain the emergence of the variety of Spanish spoken in the United States.

Highlights

- It has been suggested that the parents of heritage speakers (2nd generation immigrants), who are the main source of input to them, may exhibit first-language (L1) attrition in their language, thereby directly transmitting different structural properties or “errors” to the heritage speakers.
- This is unlikely: Language attrition in adults is rare, while structural changes in heritage speakers are very common.
- Like L1 children, heritage speakers do not directly replicate the input from the parents.
- Structural divergence between child and adult grammars are not necessarily related; they arise independently.
- If the patterns evident in heritage speakers and first-generation immigrants are related, reverse transmission may be at play instead, when the heritage speakers might be influencing the language of the parents rather than the other way around.

1. Introduction

Heritage speakers are native bilingual individuals who acquired their native language naturally at home since birth in a societal context where their native language is a minority language. Some heritage speakers acquired the heritage language together with the majority language (simultaneous bilinguals) while others enjoyed a period of monolingualism; the majority language was learned after the heritage language (sequential bilinguals), most likely upon (pre)school entry by age 4 or 5 (Carreira & Kagan, 2011; Montrul, 2016a; Polinsky, 2018; Rothman, 2009). Although many multilingual situations give rise to heritage language acquisition, in this article, I exclusively discuss heritage languages in the context of immigration, as spoken in the diaspora. If heritage speakers were born into the majority language environment, or arrived very early in childhood, they are typically referred to as second-generation immigrants (Silva-Corvalán, 1994). The parents of heritage speakers are first-generation immigrants, native speakers of standard and nonstandard languages who grew up in their homeland (in monolingual or multilingual environments) and immigrated in adulthood.

Heritage languages typically develop in a language-contact situation together with the majority language. This bilingual setting renders conditions of reduced exposure and use of the heritage language during late childhood and adolescence, which directly impact the development and ultimate attainment of the heritage language. Many heritage speakers are dominant in the heritage language in early childhood, but as they socialize more in the majority language as they get older, the heritage language progressively weakens (Carreira & Kagan, 2011). Research in the last three decades has shown that young adult heritage speakers display variable levels of proficiency in the heritage language, ranging from receptive bilinguals (*overhearers*, Au et al., 2002, *receptive bilinguals*, Sherkina-Lieber et al., 2011) to fully fluent (Kupisch et al., 2014; Rao, 2015). Most heritage speakers, however, display low to advanced proficiency in their productive

abilities, along with structural changes (also “divergences”, “errors” or “innovations” depending on theoretical stance) in morphology, syntax, semantics, discourse pragmatics and less so in phonetics/phonology, compared to age-matched monolingual individuals in the homeland and to their own parents (first-generation immigrants) residing in the same sociolinguistic environment (Cuza & Pérez-Tattam, 2016; Montrul, 2016a; Polinsky, 2018; Aalberse et al., 2019; Montrul & Polinsky, 2021; Rao, 2015).

Although heritage speakers with the lowest proficiency in the heritage language display more widespread structural changes in their grammars than speakers with higher proficiency (Giancaspro et al., 2022; Pérez Cortés, 2022; Polinsky, 2006), this general finding does not imply that heritage speakers with lower proficiency have acquired a “rogue”, haphazard grammar, as Bayram et al. (2019) have suggested, but quite the contrary (Holmes & Putnam, 2020; Putnam et al., 2018). In fact, Sherkina-Lieber (2020) provides compelling evidence that receptive bilinguals maintain a (high) degree of representational complexity in their morphosyntax. Many of the structural patterns exhibited by heritage speakers, such as tendencies toward reduction, simplification and overgeneralization of vocabulary and morphology that affect syntax and long-distance dependencies, are systematic and arise from normal and natural processes of language acquisition and language change in a bilingual situation (Polinsky, 2018; Polinsky & Scontras, 2020). For example, Ivanova-Sullivan et al. (2022) show how overgeneralization of prosodic constraints by Bulgarian heritage speakers leads to a lack of discrimination in processing and equal acceptance of ungrammatical and grammatical clitic positions.

How these structural patterns arise in heritage language speakers has been an important question, and debate on the sources of grammatical changes in their grammars has been intense. My position is that the changes documented in heritage language speakers typically emerge during language development. Although the basic structure of language emerges early in childhood (ages 3–4), its further growth and consolidation must be supported with optimal input conditions. A child needs to be exposed to the language frequently, through multiple interlocutors, and in different environments during the entire language learning process, which goes beyond age 3 or 4 and lasts until adolescence, so that the richest possible experience is provided. Aspects of grammar acquired early (by age 5), like phonology, syntax and morphology, get entrenched and consolidated with sustained language exposure until at least puberty (Berman, 2004; Bylund, 2009).

Because heritage speakers are bilingual, the input they are exposed to in the diaspora is different in quantity and nature from the input monolingual children receive in the homeland. Monolingual children are exposed to 100% of the input in one language. The input to bilingual children, in contrast, must be split between the two languages (50–50%). Most often, however, the proportions are uneven for heritage speakers (40–60%, 30–70%, 20–80%, 90–10%), and the majority language receives more exposure than the minority language. According to some accounts (Montrul, 2008, 2016a; O’Grady et al., 2011; Polinsky, 2006; Silva-Corvalán, 2014, 2018), insufficient input in the heritage language during childhood and adolescence leads to partial or incomplete acquisition of the heritage language; that is, while heritage speakers acquire all the basic structural properties (e.g., word order, case, gender, agreement, tenses) they do not fully master morphology (Montrul, 2018a).

It has also been argued that the patterns characteristic of the grammatical development of heritage speakers, such as variable gender agreement, erosion of case distinction, stricter word order,

overuse of overt subject pronouns, confusion with aspectual forms and verbal tenses, to name just a few, can be directly linked to the language of their parents. That is, structural changes are also related to the nature of the input, which is already affected by contact-induced changes in the parental generation (first-generation immigrants) when heritage speakers receive it (Pascual y Cabo, 2020; Sorace, 2011, 2020). Direct transmission is how native language acquisition is believed to happen, a model also assumed in theories of diachronic language change (Kerswill, 1996; Sankoff, 2019), when continuity between the child and adult grammars is the norm. A myriad of complex factors are involved and interact in language change across generations over time. However, in this study, I will focus only on how the timing of acquisition of the heritage speakers and the length of residence (LOR) of adult immigrants may relate to each other to transmit or effect changes in their grammars.

Although direct transmission of contact-induced changes from the first to the second generation is a logical possibility, I argue that it is highly unlikely conceptually, when we consider the developmental schedules of heritage language acquisition from childhood to young adulthood and potential L1 attrition in adults. Furthermore, the direct parental transmission of structural changes would also go against theoretical accounts of diachronic language change that assume that changes are driven by disruptions in transmission (i.e., acquisition failure, as in Lightfoot, 1991, or parsing, as in Lightfoot, 2020). The direct intergenerational transmission possibility is also not generally supported empirically because reports of L1 attrition in adults at the level of morphosyntax, the grammar module where heritage speakers display most changes, are uncommon, and when found, not very extensive. I discuss empirical findings from studies of child heritage speakers and their parents on a variety of morphosyntactic phenomena that found no evidence of direct transmission of attrited output as input to heritage language grammars. However, in the few cases where the parental generation has been found to exhibit L1 attrition in morphosyntax, I suggest that similar patterns in the second generation may be an entirely independent development. However, if related, they may have been reinforced by *reverse transmission*, such that the patterns emerging in the first-generation adults result from the children (the adolescent/young adult heritage speakers) affecting the language of the parents. This theoretical proposal might explain the emergence of US Spanish as a distinct language variety of Spanish spoken in the United States (see also Shin & Otheguy, 2013). Granted, my argument at this stage rests on cases of potentially attrited immigrants who have children for which empirical evidence exists and leaves to be established by further research whether similar attrition effects would be detected in long-term immigrants with no children or infrequent interactions with heritage speakers.

2. Direct language transmission?

To what extent can many of the divergent structural patterns observed in heritage speakers be related to similar patterns in the first-generation immigrants who are the parental generation? The idea seems to be that many first-generation immigrant adults who are living in a language contact situation show native language attrition and interact with other bilinguals in their communities, including their children. To give a concrete example, the distribution of null and overt subjects has been extensively discussed in L1 attrition studies (Domínguez & Hicks, 2016; Gürel, 2004; Tsimpli et al., 2003), and the main finding has been that speakers of null subject languages overextend overt subjects in pragmatic contexts

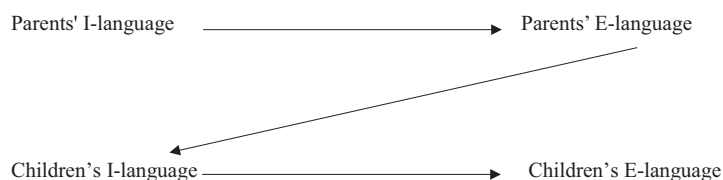


Figure 1. The dynamics of language acquisition and change (Yang, 2000, p. 232).

where null subjects are more felicitous, such as in topic continuity or same reference contexts (Sorace, 2011). If adult immigrants who speak a null subject language (Spanish, Greek, Italian) show, say, 5% overproduction of overt pronominal subjects in same reference contexts due to attrition, heritage speakers are likely to show twice or thrice that rate, to give an estimate, of the same divergent pattern (see Montrul, 2018b for an example with null and overt subjects in Spanish; see also Labov, 2007 for a similar explanation for sound changes). The generalized interpretation has been that first-generation immigrants' attrition patterns are *transmitted directly* to the second-generation speakers (the heritage speakers), who in turn amplify the extent and magnitude of the changes.

For a language to be transmitted across generations, an obvious relationship must exist between the language of the parents (or adult caregivers) and the language of the children. For instance, sociolinguistic studies have linked the speech of adults and children, as with the pronunciation of /ou/ in southern British English, where young children model the pronunciation of one or both parents (Kerswill, 1996). In Lightfoot's (1991) and Yang's (2000) accounts of language acquisition and language change, there is a direct link between the language produced by the parents (E-language) and the internalized grammar (I-language) of the children to account for language transmission, as in Figure 1. E-language has no internal structure; structure is assigned to it through parsing by the child's I-language (Lightfoot, 2020).

A well-known proposal in diachronic change is that when young children somehow fail to parse the parental input, a process of reanalysis and restructuring that gives rise to a different, divergent grammar ensues (Lightfoot, 1991, 2020; Pires & Thomason, 2008). In essence, change occurs because there is a break in transmission, and the language of the parents and the language of the children diverge with respect to a particular property (e.g., case marking, V2, null subjects). "When E-language shifts, children may parse differently, and thus a new I-language emerges" (Lightfoot, 2020, p. 29).¹

However, child monolingual (L1) learners have been shown to be very conservative during early development and make very few errors (Aitchison, 2003; Snyder, 2017). So, they are unlikely to experience the amount of parsing failure leading to language change. For this reason, both Meisel et al. (2013) and Westergaard (2021) have raised credible objections on the purported link between monolingual acquisition and diachronic language change, maintaining instead that language contact through second (L2) acquisition or bilingualism in the parental generation brings about changes in the E-language that is the input to the I-language of their children. Their position bodes well with the consensus in sociolinguistics (Bentz & Winter, 2014; McWhorter, 2007; Meisel et al., 2013; Trudgill, 2001): that adult L2 learners are the main

agents of language change because L2 acquisition generally results in non-native attainment after puberty (Johnson & Newport, 1989; Hartshorne et al., 2018).

Leaving aside for now the issue of diachronic language change, I want to bring attention to the idea of successful transmission (Figure 1); that is, when the output of the parents' grammars feeds the developing system of the children's grammars, and the children and the parents end up sharing approximately the same I-grammars across generations. A child exposed to English acquires English; a child exposed to Mandarin acquires Mandarin. This is what happens in typical language acquisition in general, when new, different patterns do not emerge in the younger generation. While heritage speakers exposed to Spanish, or Russian, or Korean acquire Spanish, Russian or Korean, respectively, it has been repeatedly claimed that the heritage speakers who show errors, divergent attainment, innovations, or changes in their heritage language do so because of direct transmission (and supposedly exact "replication", as in Sankoff, 2019) of structural patterns from the parental generation, as in Figure 1. For example, responding to Montrul and Polinsky's (2011) commentary on the extension of the Interface Hypothesis to study heritage speakers, Sorace (2012, pp. 213–214) writes:

individual speakers removed from their original community ... provide input affected by attrition to second generation speakers (i.e., heritage speakers), who may acquire a different grammar from that of their parents: this is a different stage of the attrition process and does not present the same characteristics as those identified by the IH (see also Sorace, 2004; Rothman 2007, Rothman, 2009). My claim that heritage speakers are exposed to qualitatively different input (Sorace, 2005) is now beginning to be supported by a number of studies (e.g. Pires & Rothman, 2009; Place & Hoff, 2011; Unsworth et al., 2011).²

And in a commentary on Hicks and Domínguez' (2020) model of L1 attrition, Sorace (2020), pp. 203–204) amplifies the same claim:

individual attrition involves no 'erosion' or 'permanent loss' but rather fluctuations and increasing optionality: this is because attrition in this sense crucially does not affect the grammar itself but rather how the grammar is accessed (Sorace, 2011, 2016). *Parental input affected by attrition is then transmitted to the next generation of heritage speakers* (emphasis mine), who regularize variable input as part of their grammar. The degree of parental attrition has generally not been studied as a variable in heritage language development, but it is crucial for an understanding of the diachronic dimension of language change.

That heritage speakers may be exposed to qualitatively different input compared to monolingual children is possible and true, but Sorace's claim that such qualitatively different input "is transmitted" and becomes intake to heritage speakers' developing systems (i.e., my interpretation of *direct* transmission) is an entirely different possibility. The studies cited by Sorace (2011)—Pires and Rothman (2009), Place and Hoff (2011) and Unsworth et al. (2011)—provide evidence that heritage speakers may be generally exposed to qualitatively

¹In my reading of Lightfoot (1991), I do not see explicitly mention of bilingualism. Lightfoot (2020) suggests that the changes in the E-language of monolingual three-year-old children were coming from bilingual adults but, again, he do not explain this in any detail, nor does he explicitly state it or connect it to the main reason why the child parses the input differently.

²Unsworth et al. (2011) is in fact Unsworth et al. (2011) as cited in the references of Sorace' (2012) response.

different input, but nothing else: They are not about how the language of the parents affects the heritage language of their children.

Still, theoretically, direct transmission of grammatical changes is in principle possible, but how common is it, and has it been attested? After many years of living in the United States, some first-generation immigrants can also exhibit signs of language attrition in some aspects of their grammars. Although most studies of attrition have found optionality due to lexical access and processing effects, as the quote from Sorace (2020) above suggests, in my work with Spanish speakers in the United States, I have found evidence of attrition at the level of linguistic representations, not just processing, with differential object marking (DOM) and related syntactic structures, as measured by a variety of comprehension, production and judgment tasks (Montrul, 2019, 2022). I assume that attrition in heritage speakers and in the first generation of immigrants leads to structural changes and different endstate grammars. DOM is the phenomenon by which animate, specific direct objects are overtly marked with the preposition “*a*” in Spanish. Several studies have found that heritage speakers of Spanish largely omit this marker (Arechabaleta Regulez, 2019; Cuza et al., 2019; Montrul, 2004; Montrul & Bowles, 2009; Thane, 2024). Montrul and Sánchez-Walker (2013) compared child heritage speakers to age-matched monolingual children in Mexico, and adult heritage speakers to age-matched monolingual native speakers in Mexico and first-generation immigrants in the United States. There was a significant omission of DOM (35%) by the bilingual children, whereas the monolingual children and adults tested in Mexico were at ceiling (above 98%). The adult heritage speakers omitted more DOM (20%) than age-matched native speakers in Mexico. As for the bilingual immigrant adults, about half of them omitted DOM like the heritage speakers (ranging from 10% to 70% omission). It is easy to conclude from these findings that many adult heritage speakers may be receiving attrited input from the adult immigrants because the same phenomenon was found in the two groups. In fact, this is the conclusion reached by Grosjean and Py’s (1991) studies of first and second-generation Spanish-speaking immigrants in French Switzerland, who also found incorrect acceptance of omission of DOM and other structures in a grammaticality judgment task and suggested that morphosyntactic changes in the first generation pass over to the second generation.

Montrul (2016b) is another study of the same adult participants in Montrul and Sánchez-Walker (2013), about the preposition “*a*” as an obligatory dative marking with dative experiencer verbs like *gustar* “like” (*A Juan le gusta cantar* “Juan likes to sing”). Spanish heritage speakers have been found to omit the dative case marking with these verbs, producing and preferring nominative experiencers as in English (**Juan (le) gusta cantar*) (Montrul, 2014; de Prada Pérez & Pascual y Cabo, 2011; Toribio & Nye, 2006). Montrul (2016b) used an acceptability judgment task and a written production task. Ungrammatical sentences without the preposition “*a*” were judged as statistically more acceptable than other ungrammatical sentences. In the written production task, some participants omitted the “*a*” with *gustar*-type verbs between 15% (the adult immigrants) and 20% (the heritage speakers), whereas the native speakers from Mexico did not omit *a*-marking with the psych verbs in written production. Montrul (2016b) concluded that because the first-generation immigrants are the main source of input to the heritage speakers, the structural properties of the output of the first generation may *reinforce*, not necessarily feed directly, the mental representations of the individual grammars of the second generation, which may also be affected by majority language transfer.

Pascual y Cabo (2013, 2020) also argued that linguistic innovations in heritage speaker grammars with *gustar*-type verbs can be traced back to subtle changes in the input received from first-generation immigrants, especially when production data are considered. The hypothesis investigated was that heritage speakers have reanalyzed dative experiencer verbs as nominative experiencer verbs, which would lead them to accept passive structures with *gustar*-type verbs. Pascual y Cabo found that only the heritage speakers accepted ungrammatical passives with *gustar*-like verbs in the grammaticality judgment task. In the production task, some omission of “*a*” was produced by monolingual adult (13.31%), bilingual adults (23.17%), advanced proficiency heritage speakers (29.21%) and intermediate proficiency heritage speakers (48.37%). Because all groups omitted “*a*” to some extent, Pascual y Cabo concluded that heritage language acquisition outcomes could result from differences in the input heritage speakers receive, following Pires and Rothman (2009). However, Pascual y Cabo also considered that passivization of *gustar*-verbs can come from direct transfer from English, which affects the heritage speaker groups more than the first-generation bilingual adults.

Despite these assertions, direct transmission of attrited patterns from the parents to the children is highly unlikely, for the following reasons:

- 1) Language attrition in adults at the level of linguistic representations, especially at the morphosyntactic level, has been very hard to find (Schmid, 2013). There are some reported cases (Kasparian et al., 2017; Kasparian & Steinhauer, 2017; Montrul et al., 2015, 2016b), but they are very few. Most studies have found L1 attrition in lexical access, phonetics/phonology, and some syntactic preferences (Schmid, 2019). In general, language attrition is a highly individual phenomenon and quite rare (Hicks & Domínguez, 2020, cf. Schmid & Köpke, 2017). By contrast, grammatical changes in heritage speakers are very extensive and remarkably common.
- 2) Related to (1), most studies of intergenerational transmission comparing heritage speakers and first-generation immigrants show a break in transmission. First-generation speakers are at ceiling and do not differ from speakers in the homeland; heritage speakers are statistically different from first-generation immigrants, showing changes in lexical access in Dutch (Hulsen, 2000), evidentiality markers in Turkish (Karayayla, 2020), VOTs in Russian and Ukrainian (Nagy & Kochetov, 2013), verb tenses, copulas, null and overt pronouns in Spanish (Silva-Corvalán, 1994), DOM and dative clitics in Spanish (Irizarri van Suchtelen, 2016); accusative clitics in European Portuguese (Flores & Rinke, 2020; Rinke & Flores, 2014); case in Polish, Russian and Ukrainian (Łyskawa & Nagy, 2020), to name just a few.
- 3) Some of the patterns found in heritage language speakers are also found in second language (L2) learners, even those L2 learners exposed to native input. For example, L2 learners of Spanish omit DOM in obligatory contexts as much as heritage speakers of Spanish (Arechabaleta Regulez, 2019; Guijarro-Fuentes & Marinis, 2007; Guijarro-Fuentes, 2012). Case marking in general is difficult for heritage speakers of Hindi, Korean and Samoan; it is also difficult for L2 learners of Hindi (Montrul, 2019), Korean (Chung, 2020) and Samoan (Muāgututi’a, 2018). This suggests internally driven developments in different bilingual grammars converging on a common result, independently of input quality.

- 4) During early stages of language development, children make errors (overgeneralizations of morphology, case omissions, under or overproduction of null/overt subjects, determiners or other pronouns, for instance) that are internally motivated by the current state of the children's developing grammars and other cognitive resources (working memory, parsing routines, etc.) because their caregivers do not produce such errors (Crain, 1991; Guasti, 2002; Lidz & Gagliardi, 2015; Pinker, 1989). If heritage speakers are native speakers and learn their heritage language like L1-acquiring children (Montrul, 2013, 2022; Rothman & Treffers-Daller, 2014), why would they be different?

Rather than parental transmission of structural patterns, I argue instead for a break in transmission, as in diachronic language change: In essence, structural changes in heritage grammars arise mostly (but not exclusively) from internal reanalysis of the heritage language grammar due to insufficient input (Montrul, 2016a, 2022; Polinsky, 2018). Under Lightfoot's (2020) proposal that parsing and acquisition are the same construct, the changes arise because the I-language of the heritage speakers may not fully parse the E-language from the parents with all its finer morphosyntactic details, not necessarily because the E-language provided by the parents may have changed, but because the quantity of input is insufficient to internally trigger certain parsing routines. Insufficient input during a critical age in language development leads to psycholinguistic effects such as fuzzy linguistic representations and difficulty accessing the linguistic representations of the heritage language for production and comprehension (Putnam & Sánchez, 2013; Montrul, 2021). In recent studies of school-age heritage speakers, we have found that when the heritage language is the medium of instruction at school, such exposure enhances cue integration during processing and acquisition (Armstrong, 2024; Montrul & Armstrong, 2024).

As for the very few instances where we see incipient morpho-syntactic changes in the first generation that are amplified in the heritage speakers (Montrul & Sánchez-Walker, 2013; Montrul, 2016a, 2022; Pascual y Cabo, 2020), these changes most likely develop *independently* in the two groups (see also Putnam et al. 2018), because the age of acquisition and the flexibility of the linguistic competence after a certain age play a critical role in language change (Kerswill, 1996; Montrul, 2022; Sankoff, 2019). If one generation affects the other, I suggest it is the adult heritage speakers who may contribute to changes in the language of the parents. For parents to directly transmit L1 attrition patterns to their children, the age of the children is critical to parse the input, as I discuss next.

3. Interrupted transmission

Both generative approaches to language acquisition and the variationist sociolinguistic concept of generational change share the assumption that the linguistic knowledge of the individual stabilizes and becomes firmly established and consolidated after childhood (Labov, 2001, pp. 448–552). Before puberty, the linguistic knowledge of children is nimble. After puberty, linguistic patterns become entrenched. For this reason, if linguistic innovations occur in the parental generation during the heritage speakers' childhood years (pre-adolescence), language change is more likely because children's linguistic ability is malleable and flexible (see Mayberry & Kluender, 2018 and Birdsong, 2018 for the relationship between language development, age and brain plasticity). For instance,

Lightfoot (2020) claims that changes in reduced verb morphology in the primary linguistic data (adult E-language) led 3-year-old children in the Middle English period to parse English verbs into different categories. Meisel et al. (2013) also contend that the age of the language learner and the psycholinguistic mechanisms that mediate between the I-language and the E-language is what links L2 acquisition and language change.

As discussed earlier, the literature on diachronic linguistics has made the monolingual child the prototypical agent of language change (Lightfoot, 1991, 2020; Lightfoot & Westergaard, 2007). While children do acquire the language of their environment and do not stray very far from what they hear, they do not always reproduce what they hear in the input faithfully (Shin & Miller, 2022) because they are constrained by their cognitive and psycholinguistic capacities. Unlike their parents and adult interlocutors, children simplify phonological clusters, omit required morphology (Snyder, 2021), overgeneralize regular morphology to irregular forms, and overgeneralize other syntactic patterns with different verb placement (Westergaard, 2005) or *wh*-words (Thornton, 1995). For example, Hudson Kam and Newport (2005) taught children ages 5–7 an artificial language. They then presented the children with input for that language with either consistent use of the determiner (i.e., nouns occurring with the same determiner 100% of the time) or inconsistent use (i.e., nouns occurring with different determiners at different frequencies). Unlike the adults tested who reproduced the input veridically, many children regularized the language, imposing patterns that were not the same as what they had been exposed to in their input. These results suggest that children and adults do not learn from variable input in the same way and that children do not faithfully reproduce the input.

In situations where children could be exposed to inconsistent or variable input, such as when the parents are non-native speakers of the majority language, children do not always adapt toward the non-native patterns of their parents. Creolization studies have shown that children who receive only pidgin input develop a more complex and regularized grammar (Bickerton, 1984; Senghas, 1995), providing some of the strongest evidence that children go beyond their input in the process of acquiring a native language. Other compelling examples come from sign languages, where children surpass their parents' L2-accented input and become native signers (Singleton & Newport, 1994). At the same time, this empirical evidence does not deny altogether a potential link between child language and the caregiver model, including some changes that may be going on in the adult model; my claim is simply that not all changes or differences in the adult parental model are adopted by the children.

Heritage speakers also surpass the input from their parents in their command of the majority language. In most of the studies I have conducted on heritage speakers to date, my participants have had very advanced to native-like command of English, reflected both in proficiency measures and linguistic tasks on unaccusativity (Montrul, 2006) and the semantics of definite determiners in Spanish and English (Montrul & Ionin, 2012). In the studies reported in Montrul (2022), the Romanian heritage speakers and the Spanish heritage speakers had higher self-rated proficiency in English than the first-generation immigrants. Surpassing the adult non-native model is possible in these cases because heritage speakers are exposed to the majority language in childhood, they have access to the language in the community, which includes many other native speakers and are schooled in the majority language.

But let us consider the possible developmental scenarios of the minority, heritage language and the issue of timing of variable,

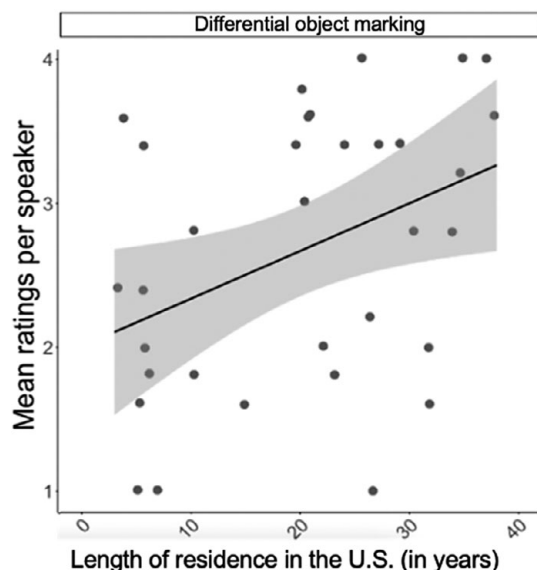


Figure 2. Relationship between length of residence in the U.S. and acceptability of ungrammatical animate specific direct objects without DOM by the adult Mexican immigrants (Montrul, 2022). A linear mixed-effects model revealed that this correlation was significant ($SE = .01$, $\beta = .03$, $p < .05$).

inconsistent input, if such inconsistent input were available to the heritage speakers and they replicated it veridically (which they typically do not). We will see that when we compare the language learning and forgetting trajectories of children and their parents, assuming families are having children within the first 10 years postmigration, the timing of attrition in adults and the timing when developing child grammars are malleable do not match in such a way that the parental generation could possibly directly influence the children in the manner that it has been suggested.³

L1 attrition in adult immigrants at the level of linguistic representations (Hicks & Domínguez, 2020; Schmid, 2011; Schmid & Köpke, 2017) is rare, and when it occurs, it only affects a handful of individuals. Typically, studies have detected measurable effects of attrition in morphosyntax with immigrants with a LOR beyond 10 years (Gürel, 2004, cf. Chamorro et al., 2015). The Mexican immigrants who showed morphosyntactic attrition reported in Montrul et al. (2015) and Montrul (2022) ($n = 21$) had a mean LOR in the United States of 19.5 years compared to 9.12 years in the Romanian immigrants. Those Mexican immigrants who showed omission of DOM were older (mean 48.3 versus mean 43.2), had been in the United States longer than the ones who did not omit DOM (27.3 years versus 23.1 years) and had acquired English later in life (22 versus 20.2). The two immigrants with the lowest accuracy on DOM (both 33%) had been in the United States for 33 and 37 years, respectively. Figures 2 and 3 show their acceptability of ungrammatical sentences in Spanish, with the omission of DOM (Figure 2) and acceptance of accusative clitic doubling (Figure 3), which is ungrammatical in Mexican Spanish (but grammatical in other varieties).

³To my knowledge, no studies in the L1 attrition field have looked at whether the attriters have children, how many they have, how old they were when they had the children and the social networks of the attriters. I concur with the sentiment of one anonymous reviewer that previous published data on L1 attrition is of limited use to further corroborate the hypothesis and that futures studies should control for these factors.

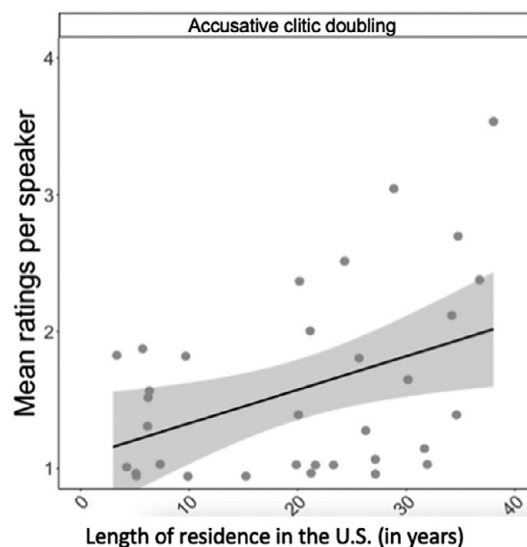


Figure 3. Relationship between length of residence in the U.S. and acceptability ratings on animate definite objects with clitic doubling by the adult Mexican immigrants (Montrul, 2022). The output of the model showed that there was a significant correlation between LOR and acceptability of the target construction ($SE = .01$, $\beta = .02$, $p < .05$).

These data show that it takes several years of immersion in the second language and restricted input and use of the native language for attrition to be detected in oral production and grammaticality judgment tasks. However, some native speakers may start to show changes in lexical access as soon as they start L2 acquisition (Bice & Kroll, 2015), suggesting that changes in processing before changes in production are possible but hardly permanent (see also Chamorro et al., 2016). By the time adult immigrants start showing non-native patterns in their language production, comprehension and grammaticality judgments of morphosyntax, as in the studies reported in Montrul (2022), their children have probably well passed the period when they were most likely to be influenced by the parental input, i.e., preadolescence. Of course, this proposal raises several questions: When exactly do heritage speakers begin influencing their parents? Do heritage speakers initiate the change in the parental generation, or do they simply reinforce incipient variability in the parental generation? Is there a way to tease apart changes in the parental generation due to LOR in the host country versus heritage-speaker-initiated changes?

Considering studies on DOM, monolingual children show some variability with DOM (about 20–25% omission depending on the language), before age two or three (Coşkun Kunduz & Montrul, 2021; Ticio & Avram, 2015). Studies of DOM with bilingual children have shown that DOM lags in development very early; the earliest data we have is from 3-year-olds (Ticio, 2015), who produce DOM about 25% of the time (i.e., 75% omission) (but see Requena, 2023's reanalysis of these data). Montrul and Sánchez-Walker (2013) showed that children ages 6–14 (mean 11) continue to show very high rates of DOM omission (almost 40%). This means that children are omitting DOM when they are younger, and during that time, the parents may be producing DOM at ceiling. Some variability and DOM instability before age three is part of the developmental picture in monolingual and bilingual acquisition. The problem is what happens after age three, when bilingual development now appears to lag. So, the developmental trajectories of partial, interrupted acquisition in children (heritage speakers) and attrition in adults (parents or other caregivers) do not match,

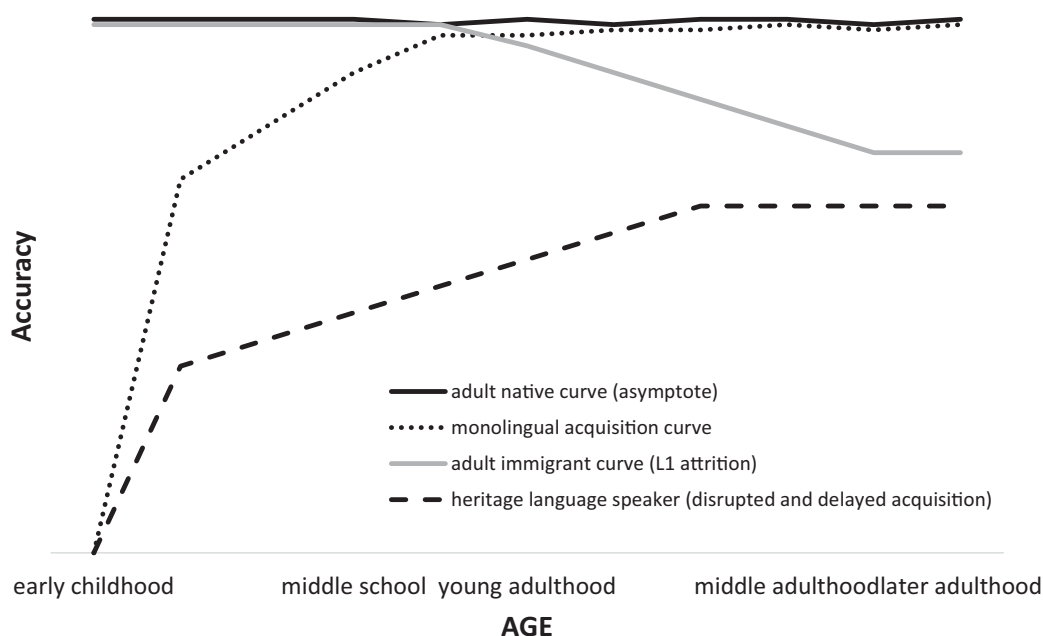


Figure 4. Possible developmental trajectories of L1 acquisition, L1 attrition and acquisition in heritage speakers and their caregivers.

as illustrated in Figure 4. Therefore, as bilingual children are growing up, if they show nontarget development between preschool and middle school, it is highly unlikely a result of their parents' input.

One way to test this hypothesis is to directly compare the linguistic knowledge of heritage language children and that of their parents. If the parents show almost ceiling production while the children show extensive variability, then it is difficult to link the grammars of the children (I-language) to the parents' production (E-language).

4. Empirical evidence

Recent studies have focused on how children acquire the heritage language across the school-age years (Chondrogianni & Schwartz, 2020; Daskalaki et al., 2020; Flores et al., 2017; Jia & Paradis, 2015). Some have tested heritage language children and their parents. Cuza et al. (2019) elicited the oral production of DOM in SVO matrix sentences (*Llamé a mi abuela*, "I called my grandmother") and in sentences with clitic left dislocations (*A mi abuela la llamé*, "My grandmother, I called") in Spanish-speaking monolingual and bilingual children ages 5–11 (mean 8;2), and in the Mexican parents of the bilingual children with a mean LOR in the United States of 13.8 years. The monolingual children and the bilingual parents were at ceiling, but the heritage language children omitted DOM 35% of the time. Cuza et al. (2019) did not find L1 attrition of DOM in the parents tested; DOM was present in the children's input 99% of the time. There were no age differences within the bilingual children: older children did not omit DOM more than younger children, which also supports the observed "stability" of this phenomenon in different bilingual samples (Montrul & Sánchez-Walker, 2013).

Similar findings are reported by Coşkun Kunduz and Montrul (2022), who investigated DOM in Turkish heritage language children (ages 7–14) and their parents in the United States. Turkish native speakers in Turkey were tested to establish whether the adult

Turkish first-generation immigrants in the United States manifested L1 attrition. A group of adult heritage speakers in the United States (second-generation immigrants) were included to see whether omission of DOM could be attributed to L1 attrition in the adult heritage speakers (as in Polinsky, 2011). The Turkish immigrants performed at ceiling in two oral tasks, like the native speakers in Turkey. However, both the child and adult heritage speakers showed extensive variability and omission of accusative case marking with specific direct objects, which is the way that Turkish instantiates DOM. Correlation analyses of child–parent dyads found no relationship between the language of the parents and the language of the children, suggesting no evidence of L1 attrition directly impacting the omission patterns found in the children and in the adult heritage speakers. In a related study with the same participants and tasks, Coşkun Kunduz and Montrul (2023) tested the production and comprehension of evidentiality markers *-DI* and *-mİş*⁴, another feature that has been found to be vulnerable in adult heritage speakers of Turkish (Karayayla, 2020). Another group of very young Turkish speakers in Turkey (3–6 year-olds) was included to establish when in monolingual acquisition Turkish children know the difference between the two evidentiality markers depending on whether the source of information is direct (*-DI*) or indirect (*-mİş*). Results revealed weak mappings between the indirect evidential marker *-mİş* and its pragmatic use in storytelling as opposed to intact knowledge of the Turkish evidentiality system in the first-generation immigrant group. The child and adult heritage speakers, on the other hand, were the least accurate groups in both tasks, performing even more variably than the 3–6-year-old monolingual children in Turkey. The individual analysis of the child–parent dyads confirmed that the nature of the parental input is an unlikely source of the

⁴The vowels are in capital letters because they stand for a variable sound, since Turkish has vowel harmony. Once the affix attaches to the root, the vowel of the affix matches the vowel of the root in height and roundness: e.g., *gör-dü/ gör-müş* "saw."

variability observed in children and eventually in adult Turkish heritage speakers.

Another study showing little relationship between the linguistic knowledge of first-generation immigrants and their children (second-generation) is Daskalaki et al. (2020), who studied subject positions in Greek heritage language children in Canada (most second-generation but a few third-generation immigrants) and their parents, as well as an age-matched group of monolingual children and parents in Greece. Postverbal subjects are obligatory in Greek interrogative sentences, while in declarative sentences and in wide focus contexts, postverbal subjects are variable and depend on semantic and pragmatic conditions. The child monolinguals and their parents were all at ceiling (99%) in an elicited production task. Whereas the heritage children showed an overall accuracy of 45% and produced more infelicitous preverbal subjects than postverbal subjects in wide focus than in embedded questions, the first-generation immigrant parents were very accurate. Results from second-generation parents and third-generation children were different because the parents did show some variability and their children even more. This study shows that the parental input to monolingual children can be different from the parental input to bilingual children for the parents who are themselves heritage speakers, but most importantly, they also refute the hypothesis that second-generation heritage speakers receive attrited input from their parents.

Requena and Dracos (2021) examined second-generation Spanish-English bilingual children ages 5–14 (heritage speakers) to determine whether they interpret Spanish copulas *ser* and *estar* with adjectives like first-generation adults in their community. Some adjectives can be used with either copula, but there is a semantic and pragmatic aspectual distinction. *Estar* is specified for aspectual properties (Schmitt & Miller, 2007), while *ser* is unspecified for aspect. By age 4 monolingual Spanish speakers have acquired the semantic and pragmatic interpretation of the two copulas (Requena, 2021). Adult heritage speakers of Spanish have been shown to extend *estar* to uses of *ser* (Silva-Corvalán, 1994; Geeslin & Guijarro-Fuentes, 2008), and the two Spanish-English bilingual children followed longitudinally by Silva-Corvalán (2014) from ages 1;00 to 6;00 also showed extensions of *estar* to *ser* contexts. Requena and Dracos (2021) investigated the effects of age, language exposure/use, and proficiency on copula selection. Some of the adults were the parents of the children, so their language can be considered representative of the input to the children. In a picture selection task, the adults showed much higher selection of the temporary picture with *estar* (92%) compared to the children (67%). For the children, higher Spanish proficiency increased the selection of the picture with *estar* and decreased the preference for *ser*. The low-proficiency children were at chance like the 3-year-old children in Requena's (2021) L1 acquisition study. Even though they did not exhibit exact adult-like usage, high-proficiency children did exhibit knowledge of the semantics and pragmatics of the copulas. There is no basis to conclude that the low proficiency children are receiving attrited input from the parents.

Finally, Mai et al. (2022) investigated knowledge and use of the Mandarin *ba*-construction through elicited narration in heritage Mandarin children ages 4–14 and their parents in the UK. Mandarin and English have basic SVO order, but in Mandarin SOV order is possible with the *-ba* construction, which takes the form ([NP1]-*ba*-NP2-VP) and is the preferred way native speakers express statements in disposal and causative contexts, as in (1). NP1 is the subject/topic and can be overt or null based on

syntactic, semantic and discourse conditions independent of this construction. NP2 (*qingua*) is the object.

- (1) [Ta [ba [_{vp} qingua [v'guan * (zai pingzi li).]]]]
 3sg BA frog shut at bottle inside
 "He trapped the frog in the bottle."

In monolingual acquisition, the *ba*-construction emerges around age 2 and becomes highly productive by 2;6 (Deng et al., 2018). Adult heritage speakers have been found to underuse the *ba*-construction, preferring SVO sentences instead. Mai et al. (2022) investigated the extent to which school-age Mandarin heritage children in the UK produced the *ba*-construction and how their productions compared to that of their parents, the input providers, in terms of (i) structural frequency, (ii) the linear structure of [(NP1)-*ba*-NP2-VP], and (iii) the types of nominal and verbal phrases used in NP2 and VP. All heritage language children and the parents narrated a frog story. No correlation was found between the children and the parents' productions because the heritage children produced the *ba*-construction less frequently than their parents and used a more limited set of nominal and verbal phrases. None of the child–adult differences in the UK groups were attested in the children and adults tested in Beijing. Mai et al. concluded that the lower frequency of the structure and reduced diversity of the nominal and verbal phrases in the heritage children's construction can only be attributed to the diasporic context in the UK, where input in the heritage language is significantly less abundant.

To summarize, all these recent studies comparing heritage language children and their parents on different linguistic phenomena converge on the same outcome: by school-age, structural patterns and frequency in the parental input no longer determine the children's output. In all these cases, the parents are at or close to ceiling in their linguistic performance, as in the idealized grey solid line in Figure 4, while their children are not (dashed line). For school-age heritage children, hearing more utterances with DOM, evidential markers, subject position, copulas and the *ba*-construction from the parents does not necessarily boost their production or comprehension of all these structures. All these studies point to the conclusion that simplification in the children's grammars most likely arises by how their internal grammars process and make do with insufficient input in the heritage language and cross-linguistic influence from the societal majority language before the closure of the critical period, when their native language representations are still nimble and malleable.⁵

Finally, Requena and Dracos (2021) also suggest that low-proficiency second-generation children are a catalyzing locus of accelerated language change observed by Silva-Corvalán (1994). Because there are a few reported cases of first-generation immigrants displaying some of the same patterns as second-generation immigrants (heritage speakers) (Montrul et al., 2015; Montrul, 2016a, 2022; Pascual y Cabo, 2020), I suggest that attrition in the first generation of adults who have children may arise through reverse language transmission.

⁵However, as Daskalaki et al. (2020) found, the situation may be different for parents who are themselves heritage speakers (second-generation immigrants) and their children (third-generation immigrants). Their study found that the second-generation parents also had higher preference for SVO patterns, and this pattern was amplified in their third-generation children (see also Labov, 2007). More studies of second- and third-generation heritage speakers are needed to understand whether this is in fact the case.

5. Reverse language transmission and language change

Montrul (2014, 2022) made the novel proposal that heritage speakers are active agents in the diachronic evolution of Spanish as a distinct language variety of the United States. Although Meisel et al. (2013) argue that simultaneous bilingual children are like monolingual children and cannot be agents of language change, studies of child and adult heritage speakers show that simultaneous bilinguals can and do in fact fail to replicate the parental input, not because their language learning mechanisms are inefficient, as claimed to be for adult L2 acquisition past a critical period (Meisel, 2011), but because *heritage speakers do not receive sufficient exposure to the heritage language during the critical period*. Like Birdsong (2018), I use “critical period” as a generic term that also subsumes sensitive periods. Hartshorne et al.’s (2018, p. 12) results of L2 acquisition point to “a grammar-learning ability that is preserved throughout childhood and declines rapidly in **late adolescence**.”

Heritage speakers use the heritage language less frequently in late childhood and early adolescence than in early childhood, before the closure of the critical period, when the language capacity is still flexible and malleable. Less frequent use and activation of the heritage language leads to slow and taxing processing and parsing of the heritage language, under cognitive and social pressure from the majority language. Among the several factors that could explain the critical period, Hartshorne et al. also consider age-dependent changes in neural plasticity (see also Birdsong, 2018; Mayberry & Kluender, 2018). Finally, Hartshorne et al. (2018) further found that bilinguals from birth were not entirely monolingual-like, which could also be attributed to the amount of language exposure rather than to timing of exposure, as I defend in this article. Birdsong (2018, p. 10) even writes: “Among international adoptees and heritage speakers, dominance shifts involve attrition of the L1, a representational and functional loss which likewise reflects neural plasticity.” Therefore, under certain circumstances, heritage speakers are driving the changes of their heritage language (not the majority language) which, when diffused or spread to other generations and speakers with different proficiency in the heritage language, creates a new variety of the language, in the same manner proposed for the diachronic evolution of standard languages with many non-native speakers (McWhorter, 2007).

My claim that heritage speakers can be agents of language change because of the timing of acquisition (Figure 4) and when changes may spread is entirely consistent with sociolinguistics proposals that pre-adolescents are the main agents of language change (Tagliamonte & D’Arcy, 2009). Socio-psychological factors involving linguistic maturation and evolving social relationships have an impact on the way in which language change is transmitted (Fagyal et al., 2010). A recurrent finding from dialectal research is that children acquire the vernacular of their primary caretaker, most often the mother (Kerswill, 1996; Kerswill & Williams, 2000a; Labov, 2001). Hence, the vernacular that children first speak is that of their female caregivers, and women have also been portrayed as leading linguistic changes (Labov, 1989; Shin, 2013). But upon school entry, children quickly adopt the vernacular of their peers, a critical stage in the incrementation of linguistic change (Labov, 2001): the speech of 8-year-olds shows a striking departure from the speech of their parents in phonological processes, morphologically conditioned phenomena, and lexical rules (Kerswill & Williams, 2000b). There is a weak correlation between linguistic features of 4-year-olds and their caregivers, but for 6–12-year-olds there is no correlation between caregiver and children’s features

because the speech of the 6–12 year-olds accommodates to that of their peers, not their parents’. From this point on, social pressures encouraging conformity to peer group norms interact strongly with individuals’ declining ability to accommodate linguistically, at least in lexically complex processes, and probably, morphosyntax.

Between ages 12 and 17, past the critical period for language, children are essentially adults in terms of their abilities to acquire language, but in sociolinguistic variation, it is at this stage when some of the most dramatic changes seem to come about: “Adolescents are clearly significant agents of change; their social networks allow them to have wider contact than younger children, and their desire for a distinct social identity means that they are willing to modify their speech. At the same time, during this period (at age 16 at the very latest), they can no longer have the ability to acquire lexically complex rules, new oppositions or new intonational systems.” (Kerswill, 1996, p. 198).

In situations of societal bilingualism where the heritage language is always threatened, as in Ireland (Gathercole & Thomas, 2009; Mueller Gathercole, 2007), Fhlannchadha and Hickey (2021) found that changes in gender marking in Irish-speaking children (ages 6–13) were reflected in the adult input. But at this time in their linguistic development, heritage speakers of Irish have extensive exposure to input from L2 learners from pre-school onwards in most educational settings. Jones (1998) found that Welsh children in immersion schools adopted the errors of the L2 learners of Welsh rather than influencing the L2 learners to use the correct form, or following the model provided by their parents, which did not show changes. Therefore, as heritage language children grow older, they do not necessarily adopt the speech patterns of their parents, if their social networks in the heritage language include other peers.

If adolescents are agents of language change, they provide us with a new way of understanding the mechanisms of language change in heritage languages, which points to different patterns of directionality of change and diffusion: parent-to-child (direct transmission), child-to-adult (backward transmission) and adult-to-adult. The studies found that both first-generation immigrants and second-generation heritage speakers omit DOM and dative case with psych verbs (Montrul & Sánchez-Walker, 2013; Montrul et al., 2015; Montrul, 2016a, b; Montrul, 2022; Pascual y Cabo, 2020), overextend pronominal subjects in same reference contexts and preverbal subjects (Domínguez & Hicks, 2016; Montrul & Sánchez-Walker, 2015; Otheguy & Zentella, 2012) and extend the copula *estar* to *ser* contexts (Requena & Dracos, 2021; Silva-Corvalán, 2014) support the possibility of backward transmission in Spanish with respect to ongoing changes in the language. My proposed backward transmission (child-to-parent) is based on relating the age of the child during heritage language development, when input to the heritage language becomes progressively reduced, with how long it takes for L1 attrition to manifest in the parental generation (see Figure 2). A study comparing mothers and child heritage speakers as well as mothers and adult heritage speakers (Montrul, 2022, pp. 277–279) found that the mothers of both child and adult heritage speakers were largely at ceiling with the production of DOM in two oral tasks, and statistically more accurate than their own children. Accuracy on DOM in the child and adult heritage language groups ranged from 0% to 100%. There was incipient variability with DOM in 4 of 14 (28.5%) mothers of the adult heritage speakers, compared to 1 of 20 (0.5%) mothers of the child heritage speakers. So, the age of the children and the LOR of the parents must be considered in studies of child–parent dyads to understand this phenomenon.

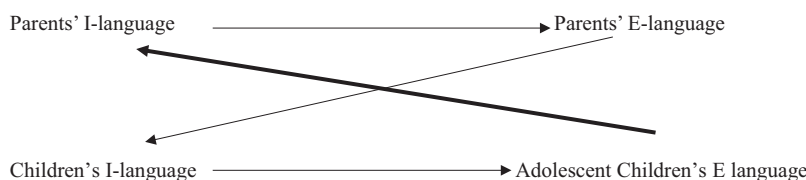


Figure 5. The dynamics of language acquisition and change in Spanish in the United States.

Spanish-speaking adolescent and young adult heritage speakers influencing their parents would now be a case of adult-to-adult transmission since linguistically speaking, 17-year-olds and older are adults, as in Figure 5.

The teenage years are the time when many heritage speakers, who may now willingly embrace their heritage identity and are eager to regain contact with their language and culture, begin to use the language more with the parents at home. While progression of linguistic change slows in early adulthood, there are also suggestions that speakers participate in ongoing developments throughout the life cycle (Labov, 2001; Shin & Otheguy, 2013; Tagliamonte & D'Arcy, 2009), and this may be the reason why some of their adult parents' speech (first-generation immigrants) starts to converge with the speech of their children, who show variability with respect to DOM, overt pronouns, dative case, copula selection and so forth. As pointed out by an anonymous reviewer, limited literacy may also contribute to accelerating language change in heritage speakers. Many, but certainly not all, heritage speakers are illiterate in their heritage language; their grammars being unconstrained by the effects of orthography and standardization efforts. Previous literature suggests that literacy safeguards against attrition, impeding or at least de-accelerating it in heritage language children (Zaretsky & Bar-Shalom, 2010), and possibly in adulthood (Armstrong, 2024). An input environment restricted to mainly the family supports a feedback loop leading to the possibility of the linguistic output of the second generation feeding the input to the first generation.

Therefore, Spanish heritage speakers contribute to shaping the variety of Spanish spoken in the United States. U.S. Spanish is made up of bilingual speakers with different bilingual profiles and different levels of proficiency: these include speakers of historical Spanish spoken in the region before the arrival of the English colonizers (e.g., New Mexico and other parts of the Southwest), Spanish-dominant speakers from Spain and Latin America, U.S.-born balanced Spanish-English bilinguals, English-dominant bilinguals and speakers of Spanish as a second language. Spanish-speaking families increasingly speak more English at home as children grow up but do not abandon Spanish (Hurtado & Vega, 2004). As shift in language happens from Spanish to English and from one generation to the next, different levels of language use occur within the home domain, allowing exposure of Spanish to children and exposure of English to parents. Therefore, there are different levels or degrees of language use and exposure falling under the use of Spanish only or the use of English only, and the continuum in between. Heritage language speakers are an important segment of this population, and they contribute to shaping the variety of Spanish spoken in the United States. Increased use of subject pronouns (Otheguy & Zentella, 2012) and variable use of DOM with animate and inanimate objects are "stable" defining feature of U.S. Spanish, different from the variable use of null and overt subjects and DOM in other varieties of Spanish. A prediction this proposal makes, worthy of future research, is that adult Spanish-speaking immigrants in the United States who do not have children

and do not frequently interact as much with heritage speakers should be spared from L1 attrition.

6. Conclusion

Heritage language studies afford a unique and exciting opportunity to understand the nature of linguistic competence in a language acquired under different sociolinguistic circumstances, how it is transmitted from one generation to the next, and how it can change across generations. I have argued that many of the linguistic patterns typical of heritage language speakers are unlikely to arise from direct transmission of the attrited language from their parents, for both theoretical and empirical reasons. Rather, they are more likely to arise independently, through internal reanalysis from insufficient input during the critical period for language acquisition. I have also proposed that in the few cases where attrition effects have been documented in the parental generation, these may be related to backward transmission: rather than parents transmitting changes to the heritage language children, adolescents and adult heritage speakers may reinforce patterns of incipient attrition in the parents, that may have arisen independently. Admittedly, the argument advanced here is restricted to a particular age group for which data are available. It is still possible that immigrants who have children at around age 35, or 20 years after migration, and may themselves be attrited, may contribute to pass down linguistic patterns to their children, but this is an empirical question.

I have presented two maximally contrastive positions to account for intergenerational attrition: direct versus reverse intergenerational transmission. Strong positions generate hypotheses that are easily confirmed or falsified. There is room for other possible intermediate possibilities. For example, the grammars of the parents and the children may undergo structural changes independently: Children show developmental changes triggered by misparsing insufficient input, cross-linguistic influence from the majority language, peer influence, and so forth and L1 attrition in the parental generation could be solely related to LOR in the host country and influence from the majority language, which may increase with increased LOR and majority language use. The children and their parents interact linguistically, without necessarily initiating or reinforcing innovative structural changes in each other's grammars. The other possibility is that parent-child (Figure 1) and child-parent transmission (Figure 5) are both at play: Children may initiate changes first in their extensive grammatical variability, which over time becomes consistent and stabilizes, and eventually triggers changes in the parents' language, who then start to show the same patterns as well, although less than the children. When parents start showing some L1 attrition, their patterns might contribute to the stabilization of the observed variability in heritage grammars.

It is possible to think about a continuum where the children are the initiators of the process, but eventually children and their parents organically start affecting each other. The effects are

amplified in heritage children while their grammars are still flexible, whereas first-generation grammars are still resisting change given that their grammars have already been established. In conclusion, the possibility that the process may be bidirectional instead of unidirectional is not entirely ruled out.

To return to the questions posed at the end of Section 3, When exactly do heritage speakers begin influencing their parents? Do heritage speakers initiate the change in the parental generation, or do they simply reinforce incipient variability in the parental generation? Is there a way to tease apart changes in the parental generation due to LOR in the host country versus heritage-speaker-initiated changes? We covered in Section 4 one possible way to address these questions, which is by conducting experimental studies of child and adult heritage language speakers (second-generation immigrants) and their parents (first-generation immigrants). All these studies have been cross-sectional; ideally, 5-to-10-year longitudinal studies testing child–mother dyads performing an interactive oral task (as in Luo et al., 2020) could provide more direct evidence of potential attrition and acquisition over time in the same dyads. Another possibility is to do an analysis of heritage speakers and their social networks to get more detailed and precise information on the contexts of heritage language use with different interlocutors daily (Sharma, 2017; Sharma & Dodsworth, 2019; Tiv et al., 2020; Titone & Tiv, 2022). Finally, computational modelling of attrition and language transmission with an agent-based simulation of individuals who are having interactions (Fagyal et al., 2010; Stanford & Kenny, 2013) may be another way to possibly test these possibilities. However, as with most statistical models, while relationships will be uncovered, causality will be difficult to establish.

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