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Heritage language acquisition: What it reveals and why it is important for formal linguistic theories

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Abstract

This paper discusses the interplay between acquisition and theory construction. It endeavors to show how a more direct and crucially bi-directional relationship between formal linguistic theory and the study of heritage language bilingualism can provide mutual benefit. It will be argued that data from acquisition—not exclusively but indeed especially from heritage language bilingualism—provide windows into the tenability of formal linguistic proposals. As a result, acquisition evidence—both developmental and in ultimate attainment—should be welcomed by all formal theorists, as they can confirm or disconfirm otherwise seemingly unverifiable theoretical arguments. Our claims will be illustrated by three research areas: language change, differences between functional and lexical features, and the interplay between core syntax and other components of the grammar.

1 | INTRODUCTION

Within the study of language acquisition—monolingual or the various types of bi/multilingual—there is a perennial tension between description and explanation. Indeed, based on theoretical proposals, it is crucial to have accurate descriptions of how language acquisition processes obtain. Studying this through measured observation and empirical experimentation has been the focus of language acquisition studies for decades. Nevertheless, descriptions alone—however robust and accurate—are themselves not explanatory; descriptions are necessary yet (almost always) insufficient

ingredients for ultimate explanations. Descriptions thus provide us with *what* needs to be explained; that is, any given property X under specific conditions Y. Explanation is the account for what descriptions reveal; the proposed *why* the development of property X under conditions Y obtains the way it does. Inherently, explanations of a given study are linked to larger questions of theoretical importance.

The above should be relatively uncontroversial, applying ubiquitously to all academic disciplines. While it underscores the intrinsic relationship between the two sides of language acquisition studies—the empirical and the theoretical—it does not refer to other mutually beneficial and indeed theoretically reciprocal relationships that we believe are underappreciated. While the relationship between formal theory and acquisition is generally acknowledged, it is often taken to be uni-directional. The *modus operandi* for acquisitionists working under formal linguistic approaches is to adopt and incorporate into their studies the general tenets of linguistic theory, inclusive of abstract constructs and theoretical proposals. In fact, doing so embodies the historical genesis of formal acquisition theory itself as well as the steps undertaken to this day when forming specific hypotheses, predictions, explanations, and generalizations. A successful formal acquisitionist is at the same time a formal theorist; not only interpreting formal linguistic theory to incorporate it appropriately into acquisition studies but also indeed generating evidence that must be interpreted in formal linguistic terms. Thus, there is at least a clear and well-established one-way dependence. In this paper, we would like to argue that there should be more true, two-way interdependence.

This paper attempts to show what formal theories have to gain from work on heritage language bilingualism. More specifically, we endeavor to show how a more direct and bi-directional relationship between formal linguistic theory and the study of heritage language bilingualism can provide mutual benefit. In our view, data from acquisition—not exclusively but indeed especially from heritage languages—provide windows into the tenability and falsifiability of abstract formal linguistic proposals and often embody the only true means to test them. Our goal is not to offer a state-of-the-art report of heritage language bilingualism (see Polinsky, 2018 for an updated, extensive review of the field); rather, we offer illustrations and examples of how and why heritage speakers are important for theories seeking to model the mental competence of a speaker more generally. In some cases, such evidence complements already existing proposals in the literature. In others, it provides new and/or stronger evidence.

2 | BACKGROUND

Even though many of the issues we touch upon have consequences for a range of linguistic theories and their intersection, we limit our scope to generative investigations of the human language capacity, where evidence from heritage speakers might be a particularly illuminating tool for the theorist (Polinsky, 2018; Scontras, Fuchs, & Polinsky, 2015). Heritage speaker development and outcomes embody an unprecedented testing ground for linguistic innatism precisely because "heritage speakers constitute an outcome often assumed to be impossible outside of pathology or trauma: children exposed to a language from birth who nevertheless appear to deviate from the expected native-like mastery in pronounced and principled ways" (Polinsky & Scontras, 2019, p. 2). For example, what is common across heritage speakers, irrespective of the heritage language and context, can shed light on what is truly core or universal, since what is subject to difference adds pieces to the dynamic relationship between input quantity and quality as well as other factors needed for the shaping of specific mental representation outcomes.

2.1 | Theoretical preliminaries

Formal linguists have generally relied on data from what they have assumed are monolingual speakers[1] when developing linguistic analyses. The latter can in part be explained through the cognitive shift that happened in the mid 20th century:

> *Linguistic theory is concerned primarily with an ideal speaker-listener, in a completely homogeneous speech-community, who knows its language perfectly and is unaffected by such grammatically irrelevant conditions as memory limitations, distractions, shifts of attention and interest, and errors (random or characteristic) in applying his knowledge of the language in actual performance (Chomsky, 1965, p. 3).*

Chomsky and other generative grammarians were interested in delineating competence from performance, and in order to study the competence of a given speaker, the above idealization seemed reasonable at the time. Understood within the context of its intended remit, the implicit oversimplification is justified, making it easier to study data and develop theoretical proposals. Often mistakenly taken to be so, generative grammar is not a theory of the fine-grained processes of language acquisition itself, but rather constraints on the acquisition path, as clarified in the following quote:

> *The investigation of generative grammar, when concerned with acquisition, has led to the conclusion that elements of domain-specificity have a crucial role in determining the hypothesis space (the set of potential grammars). In this context, it is useful to keep in mind that generative grammar is the theory of the possible states attained. As such, generative grammar itself is neutral about how the final state (a grammar/I-language or probability distribution over them) is attained. […]generative grammar is about the phenotype (Rothman & Chomsky, 2018, p. 765)*

One of the core points of generative grammar is that linguistic theory should contain a "specification of the class of potential grammars" (Chomsky, 1965, p. 24). In modern parlance, this means that the goal was to specify what a possible human language grammar could look like, requiring the researcher to identify not only the possible patterns but also the constraints on grammar formation.[2] A descriptively adequate grammar is needed in order to move to the next level, explanatory adequacy. Chomsky (1965, pp. 25–26) defines an explanatorily adequate grammar as one providing an account of how the child can acquire said grammar. Needless to say, in order to explore how children (and adults) acquire a target grammar, we need to know what that target grammar looks like. Hence, descriptive adequacy is a prerequisite for explanatory adequacy. Later, Plato's problem (Chomsky, 1986), or "the poverty of the stimulus" as it is often referred to, came to occupy a central role within generative grammar, as it pinpointed the question of how children know so much about their language given the relative scarcity of input they receive; see, for example, Hyams (1986), Pinker (1994), Crain and Pietroski (2001); see also Schwartz (1998), Rothman and Slabakova (2018) for the case of second language acquisition (L2A).

In the early 1980's, formal work considering bilingual grammars started to emerge (see Hyams et al., 2015; Meisel, 2011; Slabakova, 2016 for reviews), where bilingual simply refers to communicative competencies in more than one language, thus applying to a continuum of bilingual subtypes. Given that the multilingual mind contains multiple languages (I-languages to be precise, cf. Chomsky, 1986), it may or may not be differently organized compared to the mind of a monolingual (see Slabakova, 2016 and references therein for extensive discussion, and Putnam, Carlson, &

Reitter, 2018 for a recent integrated model of linguistic and cognitive competence). Although generative grammar is neutral with respect to how the final state of knowledge obtains, this does not mean that its claims/proposals are divorced from acquisition. On the contrary, they must bear out in acquisition data. Importantly, a multilingual mind contains significant evidence about possible grammars. Over half the world is at least bilingual, and so the notion of a possible grammar needs to encompass and accommodate the data from multilingual individuals as well as monolingual ones. Multilingual speakers offer a range of new research questions that simply cannot be asked for monolingual speakers (Romaine, 1995; Rothman, Amaro, & de Bot, 2013; Rothman, González Alonso, & Puig-Mayenco, 2019; Wei, 2014); crucially, they embody a unique natural laboratory for understanding the phenotype and as such may offer new arguments for the poverty of stimulus, since the input to heritage speakers may be severely restricted. Our focus in the present paper is to explore more deeply the acquisition–theory relationship with a specific subset of bi-multilinguals in mind: heritage speaker bilinguals.

2.2 | Who counts as a heritage speaker?

There are many characterizations of heritage speakers in the literature (e.g., Benmamoun, Montrul, & Polinsky, 2013; Montrul, 2008, 2016; Polinsky, 2008, 2018; Rothman, 2009). Despite significant differences, they tend to have the following three points in common, which we take to be generally valid:

(1) a. Heritage speakers are minority language speakers in a majority language environment.
b. Heritage speakers are bilingual.
c. By the time they are adults, heritage speakers tend to be dominant (i.e., more proficient) in the language of their larger national community.

Researchers are fully aware that the proficiency levels of heritage speakers vary enormously, mostly due to social factors and language experience. Polinsky (1995) stresses that heritage speakers are not a homogeneous group, but rather exist along a spectrum of those who merely understand the language to extremely proficient heritage speakers who may only lack some registers of the heritage language. The literature to date has provided many examples of heritage speakers whose proficiencies differ from those of monolinguals, and in this context heritage speakers have often been portrayed as "incomplete" learners: "An incomplete learner or heritage speaker of language A is an individual who grew up speaking (or only hearing) A as his/her first language but for whom A was then replaced by another language as dominant and primary" (Polinsky, 2008, p. 40). Similarly, Benmamoun, Montrul, and Polinsky (2013; p. 133) consider as "crucial" in their description of heritage speakers 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."

Studies of (simultaneous) bilinguals during early childhood have often been excluded from the conceptualization of heritage speakers, possibly because they do not match the image of an incomplete learner (Kupisch, 2013). Simultaneous bilinguals have figured prominently in developmental studies since the 1980s, which convincingly show that bilingual children separate their two languages from early on and develop in a qualitatively similar way as monolingual children (see de Houwer, 1995; Meisel, 2011; Serratrice, 2013 for overviews), which appears to be in contradiction to the heritage language research cited above. In our view, there are good reasons to subsume simultaneous bilinguals under the label of heritage speakers (see also Putnam, Kupisch, & Pascual y Cabo, 2018),

since they match the description in (i–iii). In fact, it may be even harder for simultaneous bilingual children (than for successive bilinguals) to acquire the minority language because they are exposed to the majority language from birth (see Kupisch & Rothman, 2018 for discussion).

In this paper, we take someone to be a heritage speaker if s/he actively speaks a minority language in a given national environment, and s/he has at least one parent or grandparent who speaks/spoke this language to him/her as a primary language in young childhood. Any individual meeting the three characteristics above are (a sub-type) heritage speakers, irrespective of their relative competence outcomes compared to monolinguals. In using this definition, we do not make any preliminary assumptions about the acquisition outcome, which—in our view—is nonrandomly dependent on extralinguistic factors (see Pascual y Cabo & Rothman, 2012; Bayram Iverson, Miller, Mayenco, Miller, Rothman & Westergaard 2017 *inter alia)*; nor do we distinguish between different types of minority languages and their social prestige.

2.3 | Central questions in studying heritage grammars

Heritage speakers offer a unique set of research questions, all of which have not yet been exhaustively investigated. We will not attempt to answer them in this paper, but would like to point out their importance. Some of the most central questions are formulated in (2) (see e.g., Benmamoun et al., 2013; Kupisch, 2018; Kupisch et al., 2014; Kupisch & Rothman, 2018; Montrul, 2008, 2016; Pascual y Cabo & Rothman, 2012; Pires & Rothman, 2009a, 2009b; Polinsky & Kagan, 2007; Polinsky & Scontras, 2019; Rothman, 2007, 2009).

(2) a. What, if any, is the baseline to which a heritage speaker grammar can/should be compared?

b. What is/determines the path of acquisition for heritage speakers?

c. Which areas of heritage speaker grammar may be vulnerable to change or cross-linguistic influence? Why are these areas vulnerable (and potentially not others)?

d. What role does quality and quantity of input play in the acquisition outcomes of heritage bilingualism?

e. What role does literacy play in shaping grammatical representations in general and specifically in explaining differences between heritage speaker bilinguals compared to monolinguals?

f. To what extent is continuous exposure to input and degree of engagement with it required to maintain a given heritage speaker grammar and what does this tell us about the plasticity of grammar(s), on the one hand, and plasticity of the mind more generally, on the other?

g. How do domains in heritage speaker grammars differ when said domain was never fully acquired (via arrested development)versus when it was acquired an eroded (via attrition)?

This set of questions highlights ways in which studying heritage languages and their acquisition is useful for understanding language more generally. Determining what is open to variation might prove crucial in defining what is universal linguistically (Polinsky, 2018). Exploring the role of literacy (as a proxy for language standardization via education) in explaining differences between bilingual and monolingual natives might also have implications for what is part of core grammatical knowledge. These are just mere examples of how studying heritage speaker bilinguals could be fruitful for formal theory in ways studying monolingual acquisition cannot address. In the next section, we provide some examples of how the study of heritage speakers profitably contributes to our formal models of human linguistic competence, illuminating the bidirectional relationship between multilingual data and formal models.

3 | THE BIDIRECTIONAL RELATIONSHIP BETWEEN HERITAGE SPEAKER ACQUISITION AND FORMAL MODELS: THREE CASE STUDIES

Space being at a premium, we provide the following three examples of theoretical implications emerging from work on heritage speakers not originally done with the intent of commenting on such: (i) the nature of language change, (ii) the distinction between lexical and functional categories, and (iii) the difference between core syntax and other components of the grammar. We present each of them in turn.

3.1 | Mapping language change in real time

The grammar of heritage speakers often changes during their lifetime. This is due to a range of different factors, which are much discussed in the literature under various labels (see Kupisch & Rothman, 2018; Montrul, 2008, 2016; Pascual y Cabo & Rothman, 2012; Polinsky, 2018; Putnam & Sánchez, 2013; Scontras et al., 2015). Given this propensity for change compared to a given appropriate baseline, heritage speakers are ideal for modeling linguistic change, which can be studied in real time. Many scholars have argued for a close interplay between acquisition and change (e.g., Lightfoot, 1979, 1999; Clark & Roberts, 1993; Dresher, 1999; Pires, 2006; Lightfoot & Westergaard, 2007; Roberts, 2007; Biberauer, Holmberg, Roberts, & Sheehan, 2014; Westergaard, 2008, 2009a, 2009b; see also Liceras, 1985; Montrul, 1997 on L2 acquisition and its parallels with language change). However, there are not many studies using empirical L1 acquisition data to adjudicate between different hypotheses regarding language change (see Pires & Rothman, 2009a, 2009b). Heritage speakers offer a great possibility in this regard, since a change will typically be accelerated. Often, particular linguistic properties disappear from the colloquial language while persisting in the written or educated language. Similarly, there may be innovations in the colloquial language that will be eliminated through norming and formal instruction. However, many heritage speakers do not acquire the written form of their heritage language, since in typical cases, they have no or highly restricted formal education in this language. A diachronic account would argue that if a property is absent in the primary linguistic data, then this property would be subject to change and possibly be lost entirely. Certain ecologies of heritage speakers enable us to test this prediction, which brings us to the case study we review here.

Colloquial dialects of Brazilian Portuguese have been argued to not instantiate inflected infinitives (infinitives carrying overt person/number agreement; see Pires, 2006 *inter alia*), despite educated Brazilian Portuguese natives displaying full competence of them in acceptability/comprehension

judgment tasks (Quicoli, 1996; Rothman & Iverson, 2007).[3] An example is shown in (3) in the plural, taken from Pires & Rothman (2009b; p. 217).

(3) a. sai-r-**mos** b. vocês/eles/elas saí-r-**em**
we.to.leave-INF-1PL you.PL/they to.leave-INF-3PL

Consistent with the diachronic account of inflected infinitives surfacing in monolingual competence as a byproduct of later acquisition of the standard variety, Rothman (2007) argued that the lack of knowledge of inflected infinitives found in heritage speakers of Brazilian Portuguese is due to the insufficiency or even utter absence of this property in the colloquial Brazilian Portuguese input heritage speakers are likely to have had access to as their primary linguistic data. Not being educated in standard Brazilian Portuguese, they would have no way to recover this property, unlike monolinguals who can acquire it later via exposure to the standard in late childhood or early adolescence. Pires and Rothman (2009b) followed up on Rothman's work by comparing Brazilian Portuguese heritage speakers' knowledge of inflected infinitives with heritage speakers of European Portuguese. Importantly, all varieties of European Portuguese differ from its Brazilian siblings in having inflected infinitives in their spoken standard. Pires and Rothman set out to tease two hypotheses apart:

H1 If heritage speakers of both Brazilian and European Portuguese show a similar competence profile compared to the monolingual baseline, being a heritage speaker can be taken as the deterministic variable that explains why inflected infinitives are not acquired.

H2 If heritage speakers of Brazilian Portuguese are different from the monolingual baseline, while heritage speakers of European Portuguese are not, that would support the proposal that differences in the input are the determining factor.

Based on their empirical findings showing that European Portuguese heritage speakers in fact did not differ at all from native controls tested in Portugal, Pires and Rothman argue in favor of H2. Heritage speakers of Brazilian Portuguese are not failing to acquire this domain of grammar; rather, they have acquired the relevant variety but have not attained the monolingual baseline, which comes with formal education. As they put it: "This result makes H[eritage]S[peaker]s an important new source to test diachronic proposals that are complicated by the maintenance in formal dialects of properties argued to have been lost but which are still present in the standard dialect used to educate monolinguals" (Pires & Rothman, 2009b, p. 216). Put differently, case studies such as this one contribute data that are very hard or close to impossible to obtain in monolingual settings, underlining what heritage speakers can contribute to the development of accurate formal theories, in this case concerning language change.

3.2 | A lexical vs. functional distinction

The literature is rife with discussion about the distinctions between functional and lexical categories, in some cases leading to an argument that there is no dichotomy, but rather a scale whereby semi-lexical categories also exist (e.g., more or less verb, more or less noun; see Corver & van Riemsdijk, 2001). This is not the place to resolve this issue, but heritage language data join other instances of language acquisition data to demonstrate that there is a distinction between functional

and lexical categories, increasing the overall support for models of grammar recognizing the difference between functional and lexical structure. Here, we will consider some such evidence.

Benmamoun, Montrul, and Polinsky (2013; p. 147) argue that "the functional domain, which arguably plays a critical role in syntax, seems to be more vulnerable (than the lexical domain) regardless of whether it is realized by affixes on lexical hosts or through phonologically independent markers." Functional projections are marked by functional morphology, and they include, among others, phrases expressing tense, agreement, definiteness, etc. Lexical projections introduce lexical items such as nouns, verbs, and adjectives, although often such projections are decomposed so that a verb may consist of an uncategorized root that combine with a verbal categorizer. Argument structure is currently understood as mainly functional (see e.g., Alexiadou, Anagnostopoulou, & Schäfer, 2015; Lohndal, 2014 and Marantz, 2013), although there is a lexical component too, which has given rise to much controversy concerning the nature of argument structure (see the essays in Alexiadou, Borer, & Schäfer, 2014 for discussion). A decomposition approach is taken within Distributed Morphology (DM; see Embick & Noyer, 2007, Embick, 2015; see Borer, 2005 for a different root-based perspective). Consider (4).

(4) a. √KICK b. v c. n

/ \ / \

v √KICK n √KICK

As illustrated in (4), the lexicon consists of uncategorized roots. Roots are only categorized for their word class when they merge with a specific categorizer head, which is to say that (4b) is interpreted as a verb and (4c) as a noun (see Alexiadou & Lohndal, 2017 for a discussion of how roots are categorized). Thus, lexical items can be considered categorized roots.

A number of case studies led Benmamoun, Montrul, and Polinsky (2013; p. 147) to conclude that "functional categories are relatively more vulnerable than lexical categories, although there is significant variation among the latter as well." This means that lexical items are more stable and better retained than functional items, relatively speaking, whether they are realized as independent items or as affixal morphology. Benmamoun, Montrul, and Polinsky (2013, pp. 141 and 142) mention the evidence for this listed in (5a) for the nominal domain and (5b) for the verbal domain (see Benmamoun et al., 2013 for primary sources).

(5) a. Gender agreement in Russian, Spanish, and Swedish, definiteness agreement in Swedish and Hungarian, case marking in Russian and Korean, concord in Arabic.

b. Agreement in Russian, lexical aspect in Russian, grammatical aspect in Hungarian and Spanish, mood in Hungarian, Russian, and Spanish, inflected infinitives in Brazilian Portuguese.

All of the examples in (5) are clearly functional and typically realized by functional morphology.

Findings such as the above raise a range of issues for theoretical models. Is there something about functional structure that requires reinforcement through a certain amount of input to be acquired and retained, or are the features of functional units different from features on lexical units? In the case of the former scenario, the continuum of heritage speaker outcomes might begin to indicate what the

critical mass of exposure is. If we could reliably measure what the amount of input had been across different heritage speakers with various levels of outcome representations in the heritage language, we would have some indication of what minimally sufficient input is for any given property. What kinds of features are more vulnerable might reveal more general insights into the status, compositionality, and relative complexity of the building blocks of mental grammars (Lohndal, 2013).

Heritage grammars can also provide important evidence regarding the fine-grained details of functional structure (see Ramchand & Svenonius, 2014 on the nature of the functional sequence of such a hierarchy). Scontras, Polinsky, and Fuchs (2018) consider the morphosyntax of gender and number agreement in monolingual and heritage speakers of Spanish who are English-dominant, using the experimental paradigm of agreement attraction developed in Scontras et al. (2015). A core finding is that heritage speakers at low proficiency may restructure their agreement categories. In particular, they use less functional structure and often fewer PF/overt realizations. Whereas it is argued that native speakers have two functional projections, one for gender and one for number (6a) (see Scontras et al., 2015 for extensive discussion of the relevant literature), heritage speakers bundle both functional projections into one, here simply called FP (6b).

(6) a. $[_{DP}\ D \ldots [_{NumP}\ Num \ldots [_{GenP}\ Gen \ \ldots [_{nP}\ n \ldots]]]]$

b. $[_{DP}\ D \ldots [_{FP}\ F_{Num+Gen} \ \ldots [_{nP}\ n \ldots]]]$

The two features number and gender are able to merge because they are adjacent in the functional architecture of the nominal phrase. Scontras, Polinsky, and Fuchs (2018, p. 22) argue that heritage speakers "show evidence of a grammar of agreement that has succumbed to pressures from representational economy," representational economy entailing fewer functional features and projections or alternatively the lack of PF realizations related to mapping issues (cf. Lardiere, 2000, 2009; Prévost & White, 2000 on this in L2 settings and Riksem, 2017 in a heritage setting). While some heritage grammars may bundle number and gender features together instead of having one functional projection for each, others may lack these features entirely.

Again, we see how heritage speakers provide a window into the architecture of linguistic variation and formal modeling. Scontras, Polinsky, and Fuchs (2018, p. 22) also argue that heritage speakers should be included "in the intra-individual variation within native grammars," since they obviously are native speakers by definition (i.e., exposed to the language from birth), as also argued by Rothman and Treffers-Daller (2014).

3.3 | Core syntax and its interaction with other components

The third example we consider concerns the resilience of core syntax. Consider the following quote from Benmamoun, Montrul, and Polinsky (2013, p. 148):

> *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.*

It is not always clear what the "basic, perhaps universal, core structural properties" of language are. However, as the authors point out, the ubiquitous resilience of some domains in heritage language competence against the odds of highly deprived access to input can be used to reveal what

is indeed core as opposed to peripheral areas of grammar (Chomsky, 1981). In Chomsky (1981), the core rules of grammar are determined by the principles and parameters that are specified as part of Universal Grammar. In addition to this core, there are also more peripheral or "marked" phenomena, such as exceptions or irregularities. The core has been the focal research point within generative grammar, as formulated by Chomsky and Lasnik (1993, p. 510): "A reasonable approach would be to focus attention to the core system, putting aside phenomena that result from historical accident, dialect mixture, personal idiosyncrasies, and the like."[4] In contemporary research, the core is more generally conceptualized as the core features and procedures in syntax. To this area, research into heritage grammars has contributed important findings regarding core properties, as seen in the observation throughout the literature that there appear to be an adherence to "default" strategies in the acquisition and development of heritage grammars (see Polinsky, 2018 for a comprehensive review). Although the field still needs to better understand the notion of a default and what the typological patterns are (see Polinsky & Scontras, 2019; Putnam, 2019), these findings show that heritage grammars illuminate the nature of grammatical mechanisms.

Work on first language attrition indicates that semantic/pragmatic features are vulnerable, whereas syntactic features remain intact (Tsimpli, Sorace, Heycock, & Filiaci, 2004).[5] In general, core syntax appears to be rather unaffected by situations that give rise to arrested development in other domains.

An asymmetry, similar to the one in syntax vs. semantics/pragmatics, can be observed in the vulnerability of morphophonological exponents as compared to the stability of syntactic features, which would support models arguing that morphological realization takes place outside of core syntax, in the tradition of realizational approaches to morphology (e.g., Anderson, 1992; Beard, 1966, 1995; Embick, 2015; Halle & Marantz, 1993). Thus, it may be that in heritage grammars syntactic structure remains unaffected, whereas it is the morphological component that is the most vulnerable. Indeed, similar arguments have been presented in second language acquisition research, both for child learners (e.g., Haznedar, 2003) and for adult L2 learners at high proficiency levels (Lardiere, 1998; Slabakova, 2008). Given that core syntax is often in place for heritage speakers, this lends further support for models of grammar that distinguish between an abstract syntactic skeleton and late-inserted morphology (e.g., Borer, 2005, 2013; Embick, 2015; Embick & Noyer, 2007; Lohndal, 2014). Such approaches argue that syntactic structures are generated by features, and morphological structure is then inserted postsyntactically (much like in Chomsky, 1957). This model has lately also been applied to heritage languages, e.g., Grimstad, Lohndal, and Åfarli (2014); Alexiadou, Lohndal, Åfarli, and Grimstad (2015); Riksem (2017, 2018); Alexiadou (2017); Grimstad (2018); and Grimstad, Riksem, Lohndal, and Åfarli (2018). Late-insertion approaches capitalize on the idea that syntactic structure is highly abstract and general, created on the basis of very general generative procedures. The fact that systematic patterns in heritage languages support such models offers additional confirmation that the models are on the right track. In general, bringing in data from different populations increases the likelihood that specific models can be falsified, as the amount of data to be explained increases. It also means that the explanatory potentials of such models is high, precisely because their intuitions are able to account for more than monolingual data and thus potentially the data of the majority of the world (which is not monolingual).

Let us consider some examples of how core syntax interacts with other components. In a study of Spanish heritage speakers, Montrul (2005) finds that even low-proficiency heritage speakers know the language-specific syntactic constraints on unaccusative verbs, for example, the order of the verb and the subject. However, their sensitivity to subtle lexical-semantic constraints related to individual verbs is reduced (cf. Sorace's, 2000b Unaccusativity Hierarchy), again demonstrating how argument structure is both structural and to some extent lexical. Another domain where heritage speakers differ

from a potential baseline is in the area of null pronominals. If the baseline is pro-drop, this property is often lost or used differently in the heritage grammar. Such findings have been reported for multiple languages: Arabic, Hindi, Hungarian, Kabardian, Polish, Spanish, and Tamil (see Benmamoun et al., 2013, p. 149 for references). Sorace (2000a, 2004), studying the language of first-generation immigrants, argues that this is because null pronominals lie at the interface of syntax and discourse. Thus, it is not a purely syntactic phenomenon. More recently, the study of interface effects in heritage speakers has become rather prominent (e.g., Leal Méndez, Rothman, & Slabakova, 2014, 2015; Montrul, 2011; Montrul & Polinsky, 2011; Sorace, 2011), even though the concept of an interface remains somewhat vague and poorly defined in formal terms.

4 | DISCUSSION

The previous section provided three examples of how work on heritage grammars can contribute to the development of linguistic theory. First, this research can help us provide better models of language change, which can be studied in real time. Second, heritage speakers distinguish between functional and lexical (viz. roots categorized by functional projections) categories in ways that increase the overall support for models of grammar recognizing the difference between different layers of syntactic structure. Third, heritage speakers enable us to better probe the ways in which core syntax engages with other grammatical components.

In our view, formal linguistic theory needs acquisition evidence; however, evidence from acquisition does not always factor into formal theory proposals. Although formal theory has taken on board evidence from monolingual child acquisition in the past few decades, it has not yet appreciated the added value bilingual data bring to bear. Perhaps bilingual data have been viewed as tainted by the process of bilingualism itself, thus considered not suitable for the level of abstraction necessary in formal linguistic theorizing (cf. the ideal-speaker listener in Chomsky, 1965; see Lohndal, 2013 for explicit discussion in the context of multilingual speakers). One goal of this article has been to debunk this myth. To say nothing of the fact that more than half the world is at least bilingual and as a result much of the evidence used by formal linguists has actually come from bilinguals without adequate consideration of this fact, formal linguistic theory cannot afford to endeavor to describe the linguistic reality of a minority of speakers in the global context. The patterns are as evident in bilingual acquisition as in monolingual acquisition, despite differences on the surface that reflect distinct realities, each pointing in the same general direction as far as theoretical implications are concerned (see also Putnam, Carlson, & Reitter, 2018). Indeed, linguistic theory needs to explain the competence of all speakers, monolingual, and bilingual alike. Heritage speakers are indeed native speakers of the heritage language (Rothman & Treffers-Daller, 2014), despite the fact that their competence in the heritage language often times shows evidence of severe simplification, as discussed throughout. The degree of simplification likely depends on very specific extra-linguistic variables (see Kupisch & Rothman, 2018; Montrul, 2016; Pascual y Cabo & Rothman, 2012; Rothman, 2007), but regardless of what ultimately explains differences between heritage speaker bilinguals and other subsets of native speakers, especially speakers growing up speaking only one language during childhood, there is clear evidence that even the most simplified heritage bilingual grammars conform to the general principles of natural language and thus potentially reveal basic facts about language. If this logic is on the right track, studying heritage bilingual grammar is a potential goldmine for linguistic theorists who find it otherwise difficult to test abstract claims about linguistic universals and theoretical models against one another.

In Section 3, we showed a few examples where data from heritage language speakers can meaningfully inform theoretical models in generative linguistics, for example, when it comes to understanding language change, the distinction between functional and lexical structure, and the resilience of core syntactic structure towards change. One may ask whether there is anything unique about heritage speakers; that is, how the patterns of their competence contribute additional insights beyond what studies of child monolingual language acquisition can show (see Meisel, 2013 for a negative answer). Before discussing this, it is worth highlighting that heritage speaker grammars do not need to offer anything unique per se for our general argument to be valid. Even if it were the case that bilingual data only reinforced the same conclusions supported by monolingual acquisition patterns, this would make claims supported by monolingual data even stronger, since the same generalizations can be drawn from multiple sources. The added bonus would then be that of legitimizing the use of bilingual data for such purposes. The fact that we can see converging evidence from multiple areas injects ecological validity into the general argument, precisely because it is more inclusive of the linguistic landscape of the real world.

What, then, can bilingual data possibly add that monolingual data cannot? By definition, bilinguals have multiple grammars interacting in a single mind that are (on a continuum) of a distinct qualitative nature. As a result, considering bilingual data affords an opportunity to add new questions within generative grammar related to what constrains competence representations and what variables shape the formation and maintenance of mental grammars over time (cf. Section 2.3). At a minimum, considering bilingual data allows us to ponder how the interaction of two distinct languages affects the underlying representation of individual grammars as well as the levels at which the grammars interact in competence and performance. Moreover, examining bilingual evidence might provide new insights into debates related to the relationship between the grammar and the parser and language processing more generally; insights that monolingual data alone cannot reveal. Different types of bilinguals and multilinguals bring distinct variables to the table that can be used purposefully to fine-tune hypotheses. Like potential L1 attriters, heritage speaker data can illuminate what happens to grammatical representations under significantly reduced input conditions, thereby addressing the poverty of the stimulus question. Although both groups are native speakers, L1 attrition and heritage speaker data provide distinct insights: The heritage speaker data will tell us how systems develop under conditions of early reduced input, whereas L1 attrition tells us what happens post monolingual ultimate attainment after the system has been stabilized and used for many years without another strong language interfering. Both learner types also remind us that there are universal constraints on the shapes that grammatical systems can take, a cornerstone claim of generative linguistics, even under severe input reduction, as both seem to have limits on the simplification their grammars show (e.g., core syntax seems to be especially resilient in both cases). In turn, such data demonstrate that there is plasticity to competence in individuals as well as adaptive plasticity of language that would not be visible in monolinguals, since monolinguals remain, virtually by definition, in a situation of constant exposure to their native language over the lifespan.

In this same vein, heritage speakers have been argued to be a quintessential case of hypothesis testing related to language change in real time, potentially accelerated in the case of heritage speakers compared to the normal case (Pires & Rothman, 2009b; Rothman, 2007). Heritage speaker data might very well help diachronic theorists to test competing models, providing the opportunity to examine in real time the core linguistic effects that drive change, beyond the undeniable sociolinguistic factors that do not seem to provide the entire story. It might very well be the case that some of what is referred to as incomplete acquisition is not at all incomplete, but rather reflective

of generation-to-generation diachronic changes as heritage language environments give birth to new varieties of the heritage language, reflecting the bilingual realities of heritage speaker communities. The fact that such changes seem to be constrained provides independent evidence for the universality of language processes.

5 | CONCLUSION

In this paper, we have argued that the relationship between formal linguistic theory and the study of heritage language acquisition should be a bidirectional one; that is, while linguistic theory clearly informs the researcher how to analyze acquisition data, these data should in turn be used to support, or alternatively falsify, theoretical approaches to the corresponding linguistic phenomena. We have pointed out some examples where data from heritage language acquisition can illuminate linguistic theory by strengthening already existing evidence from other populations and acquisition scenarios. Furthermore, we have provided arguments that heritage speaker data contribute unique evidence beyond what findings from monolingual speakers can tell us. Given the very definition of a heritage speaker as someone who has (at least) two linguistic systems in the mind, which typically alternate in dominance over the lifespan, the study of heritage languages can reveal important insights related to identifying vulnerable linguistic domains under cross-linguistic influence as well as constraints on possible grammars under reduced input.

In the Introduction, we discussed how descriptive and explanatory adequacy can be achieved in language acquisition studies by investigating not only the *what* but also the *why* of the development of a linguistic phenomenon, where the latter involves relating the data to linguistic theory. Throughout the paper, we have argued that a combination of an empirical and a theoretical approach is also crucial for linguistic theorizing. Any theoretical proposal about the *why* of a linguistic phenomenon can only have explanatory adequacy if it is based on accurate and carefully studied empirical data.

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ENDNOTES

[1] A quick reflection on standard practice would reveal that so-called monolingual informants and monolingual controls in empirical studies are often not monolinguals, but rather native speakers of the target language who also speak other languages, albeit with a lower proficiency. For many languages, finding true monolinguals—people with absolutely no knowledge of other languages at all—can be a formidable, if not impossible, task for practical reasons (societal bilingualism, the ubiquity of English as a lingua franca and more).

[2] It is important to keep in mind the following qualification in Chomsky (1965, p. 9): "To avoid what has been a continuing misunderstanding, it is perhaps worthwhile to reiterate that a generative grammar is not a model for a speaker or a hearer. It attempts to characterize in the most neutral possible terms the knowledge of the language that provides the basis for actual use of language by a speaker-hearer. When we speak of a grammar as generating a sentence with a certain structural description, we mean simply that the grammar assigns this structural description to the sentence." Since 1965, there has been considerable work on language processing, and there are important and as of yet unresolved questions concerning the interaction between the grammar and language use in real time (see Phillips, 1996, Townsend & Bever, 2001, Lewis & Phillips, 2015 for extensive discussion).

[3] Space does not permit a full explanation of this cross-linguistically rare property. Suffice it to say, as the name suggests, they are nonfinite forms that do inflect for person/number agreement. They are only licensed in subordinate clauses, although they cannot appear after an overt complementizer (compatible with the proposal that *que/that* bears some mood feature(s), Zanuttini, 1997). Among other characteristics, they are possible with A'-movement only (wh-movement and topicalization, but not subject raising and passives) and are subject to properties of nonobligatory control. A lot of work has been done on the formal properties of inflected infinitives (see Raposo, 1987; Quicoli, 1996; or Pires, 2006 for extensive analyses).

[4] Scholars working within different approaches to grammar have also taken issue with the core/periphery distinction (see e.g., Culicover, 1999; Culicover & Jackendoff, 2005; Goldberg, 2006).

[5] The syntax-semantics interface is generally considered less vulnerable than the syntax-pragmatics interface (see Sorace, 2011 and Polinsky, 2018 for much discussion). However, see Iverson & Miller, 2017 for reference to conditions under which syntactic features can be affected by reduced exposure, as well as Arnbjörnsdóttir, Thráinsson, & Nowenstein, 2018 or Westergaard & Lohndal, 2019 on word order in Heritage Icelandic and Norwegian, respectively).

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