

Article

# Differential Access: Asymmetries in Accessing Features and Building Representations in Heritage Language Grammars

Silvia Perez-Cortes <sup>1,\*</sup>, Michael T. Putnam <sup>2</sup> and Liliana Sánchez <sup>3</sup>

<sup>1</sup> Department of World Languages and Cultures, Rutgers University-Camden, Camden, NJ 08102, USA

<sup>2</sup> Center for Language Science, Penn State University, University Park, PA 16802, USA; mike.putnam@psu.edu

<sup>3</sup> Department of Spanish and Portuguese, Rutgers University-New Brunswick, New Brunswick, NJ 08901, USA; lsanchez@spanport.rutgers.edu

\* Correspondence: sp1019@camden.rutgers.edu

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**Abstract:** In this article, we propose that elements of heritage language grammars—both in the form of axiomatic features and larger combined representational units—are not easily lost over the course of the lifespan. This view contrasts with alternative explanations for the steady-state representation of these grammars that suggest truncated acquisition or erosion are the primary culprits of perceived language loss. In production and comprehension processes for heritage bilinguals, particular elements are more difficult to access than others, leading to differential ways to access representations and feature values. To illustrate and support this hypothesis, we build on previous work by examining the interpretation and use of obligatory mood selection in Spanish desiderative constructions in three groups of heritage speakers with different levels of language proficiency.

**Keywords:** differential access; heritage speakers; input vs. intake; language acquisition; language maintenance

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## 1. Introduction

In this paper, we propose that some of the major features that have been identified as properties of heritage language acquisition and maintenance (overextension of defective verbal inflection such as the use of indicative for subjunctive, lack of morphological markers such as differential object marking, or default gender forms) can be better characterized as cases in which the bi/multilingual mind has differential access to competing representations. Under this view, grammatical representations (including lexical items) consist of multiple layers of information (i.e., phonological, morphological, semantic, etc.), whose inter- and intra-configurational mappings vary in strength over the course of the lifespan and may be more or less difficult to access, thereby generating differences between more accessible and less accessible mappings. Therefore, grammatical knowledge in scenarios commonly defined as “attrition” is not considered lost but rather more difficult to access due to the pressures of speech in real-time (see, e.g., (Christiansen and Chater 2016) *Now-or-Never* processing bottleneck). Differential access can progressively lead to restructuring processes, where some degree of “divergence” from previously established configurations at the representational level is possible (Scontras et al. 2015, 2018). Restructuring, however, does not take place automatically, nor is it completely predictable. If restructuring occurs, it often does so during later stages in heritage language development and under specific conditions of limited processing capacity for production and comprehension (Polinsky 2018). Following Putnam and Sánchez (2013), we propose that these conditions may include contexts in which competition between alternative structures results in a

certain level of optionality in production that may occur in parallel—or be followed by—difficulties in comprehension. We provide empirical support for this hypothesis presenting data from Perez-Cortes' (2016) study of heritage speakers' (HS) acquisition of obligatory mood selection. In this work, Perez-Cortes tested a total of 69 Spanish HS with different levels of proficiency in the heritage language using four experimental tasks: a truth-value judgment, two production tasks (written and oral), and an acceptability judgment task. Results showed that early Spanish-English bilinguals' mastery of subjunctive selection in obligatory contexts was highly dependent on the interplay between their level of proficiency, age of onset of bilingualism, and frequency of Spanish use. Additionally, findings indicated that, in most cases, participants' production of subjunctive mood was significantly more affected than their interpretation, suggesting an asymmetry between these two domains.

A crucial aspect of our proposal is that the representations generated by heritage speakers (i.e., the I-language) are in most instances arguably richer and more detailed than what may be commonly observed exclusively in language production. Evidence in support of this hypothesis, such as studies that confirm that terminal receptive bilinguals can still possess a rather detailed knowledge of the morphosyntax of a grammar (Sherkina-Lieber 2011, 2015), and that elements of grammar that were previously acquired can be revitalized (Dahl et al. 2010; Flores 2010, 2015, 2019; Pierce et al. 2014), force us to revisit common narratives of "attrition" and "incomplete acquisition" to explain a process that is more complex than generally assumed. Previous proposals on heritage language acquisition have focused primarily on the role of input and more recently on the notion of mastery originally proposed by Berman (2004) (see Montrul 2016) for an extension of these initial ideas) to explain differential outcomes in heritage bilinguals. This body of work has opened up the possibility of providing more detailed accounts of how differences in the quality and quantity of input influence the process of language acquisition, requiring input and output to have a more central role in explaining their contribution to language development and variable outcomes. A first approach to such a model would be one in which the relative weight<sup>1</sup> of both languages (Language A and Language B) in input and interaction result in comprehension and production outputs that may be differentially affected in the integration of the linguistic elements attributed to each source grammar. In time, the representation of a particular phenomenon could be affected by these outputs in processing for comprehension and production. Research on cognitive neuroscience of bi/multilingualism conducted over the past three decades supports this position, showing that grammars are simultaneously active in the minds of bi/multilinguals, who may experience a certain level of crosslinguistic influence, as well as difficulties in accessing specific linguistic representations and lexical items during processing (for a complete review, see (Kroll and Gollan 2014; Putnam et al. 2018)). In the present paper, we concentrate on the latter, providing empirical evidence in support of a differential access-view in heritage language development. Our goal is to propose a model that provides a principled account of how differences in access to linguistic representations for comprehension and production affect representation in heritage bilinguals according to their levels of linguistic activation and proficiency.

This article adheres to the following structure: First, we present a summary of previous studies on heritage language acquisition, reviewing the core issues currently faced in the research with a strong focus on comprehension and production asymmetries and divergent outcomes. Then, we present our proposed model and provide empirical data to support it. Finally, we analyze the findings and discuss the implications for the study of heritage language acquisition and development.

## 2. Modeling Heritage Speakers' Grammars

Over the course of the previous two decades, scholars have advanced our knowledge of the description of heritage language (HL) acquisition and maintenance and the understanding of their

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<sup>1</sup> The term "relative weight" refers to the relationship between activation and strength of representation in the mind of a bi/multilingual.

variable nature (Aalberse and Muysken 2013; Montrul 2016; Polinsky 2018; Polinsky and Scontras 2019; Rothman 2009; Rothman and Treffers-Daller 2014; Scontras et al. 2015; *inter alia*). Some questions, however, remain open for discussion, such as the determination of how quantity and quality of input affect acquisition and maintenance, the role of intake in the process of heritage language acquisition, and how best to model production and comprehension asymmetries in these populations. In this section, we discuss some of these heavily debated topics, connecting them to our current proposal.

One of the main challenges in describing and theorizing about HL acquisition involves arriving at a clearer distinction between input and intake. Heritage speakers are usually exposed to input in the heritage language at home, but the extent to which this input becomes intake is still in need of more detailed exploration. Following Putnam and Sánchez (2013), we understand intake as the formal units of grammar that are manipulated and acquired from the raw input (see also (Lidz and Gagliardi 2015) for a detailed treatment of the input/intake distinction in L1 acquisition). This empirical problem has important consequences for our understanding of how HL development occurs, and how it may differ from that of other bilingual populations. The existing body of work on heritage language acquisition has opened up the possibility of providing more detailed accounts of how differences in the quality and quantity of input as the vehicle for intake influence the process of language acquisition, requiring input and also output to have a more central role in explaining their contribution to language development and variable outcomes.

Putnam and Sánchez (2013) propose that language activation is a critical component for linguistic input to be converted to intake and hence consolidated linguistic knowledge. In their view, the commonly attested acquisitional path among heritage speakers that goes from reduced levels of activation for production to reduced levels of activation for comprehension purposes may result in varying degrees of integration of phonological, syntactic, and semantic knowledge. A crucial point worth noting here is that this model should not be misunderstood to advocate an exclusively usage-based model of the acquisition of language. (Polinsky 2018, p. 31) summarizes this position best in stating that “not all input turns into intake”. Therefore, although frequency undoubtedly plays an essential role in language acquisition and maintenance, it should be understood that (Sánchez 2013) make reference to input that has contributed to intake. Putnam and Sánchez (2013) conceptualize that the core base of atomic linguistic knowledge is represented as features that function as the essential building blocks of larger representations. They propose the following four-stage model to account for various stages of observed performance in heritage language production and comprehension:

- Stage 1: Transfer or re-assemble of some FFs (formal features) from the L2 grammar to the L1 phonological features (PF) and semantic features which may coincide with the activation of L2 lexical items on a more frequent basis from the standpoint of linguistic production;
- Stage 2: Transfer or re-assemble of massive sets of FFs from the L2 to the L1 PF and semantic features, while concurrently showing significantly higher rates of activation of L2 lexical items than L1 lexical items for production purposes (i.e., they might code-switch more than bilinguals in the previous situation);
- Stage 3: Exhibit difficulties in activating PF and semantic features (as well as other FFs) in the L1 for production purposes but are able to do so for comprehension of some high frequency lexical items; and,
- Stage 4: Have difficulties activating PF features and semantic features (as well as other FFs) in the L1 for both production and comprehension purposes.” (Putnam and Sánchez 2013, pp. 489–90)

The extent to which these stages are clearly distinct and form part of a continuum in development is an empirical matter that requires further research. In this paper we propose that asymmetries in the quality of linguistic representations observed in production and comprehension tasks make a strong case for permanence of linguistic representation in heritage grammars, a situation that corresponds approximately to Stage 3 in Putnam and Sánchez’s (2013) model. Thus, while comprehension may be indicative of a higher degree of access to more lexical and grammatical knowledge (i.e., richer representations), production might be a window into the integration of different language components in a highly demanding online task. In particular, we seek to understand how

asymmetries in access to the lexicon and syntactic representations have an impact on the development of heritage grammars.

These concerns are not entirely new to formal models of HL acquisition and maintenance. The feature reassembly/restructuring model, for example, initially proposed for second language acquisition studies (Lardiere 1998, 2000, 2005) and later on extended to heritage language acquisition (Cuza and Pérez-Tattam 2016; Putnam et al. 2019; Putnam and Sánchez 2013), has focused on the difficulties in mapping abstract syntactic features onto morphology in production. Similarly, the Bottleneck Hypothesis (Montrul 2018; Slabakova 2008) also identified the morphological component as the locus of higher difficulties in L2 acquisition and other types of bilingual acquisition including that of heritage speakers. While these approaches have contributed to our understanding of the interface between syntax and morphology, they have not explored the factors that may bring about variability in outcomes or the areas of morphology that are at the center of acquisitional difficulties (Giancaspro 2017). Following Putnam and Sánchez (2013); Giancaspro (2017); Perez-Cortes (2016) and Putnam et al. (2019), who assume that the feature reassembly process is partially related to levels of language activation, we advance a theoretical model that is capable of capturing the asymmetries in the quality of linguistic representations in heritage production and comprehension.

Our approach goes beyond mere feature restructuring and reassembly and attempts to provide a formal account of how some components of the grammar may be accessed and activated differently for comprehension and production purposes. A key component of this updated model is that it allows the inclusion of factors such as linguistic proficiency and semantic/pragmatic complexity—in addition to activation—to explain the wide variability of outcomes in heritage language acquisition. Based on Perez-Cortes (2016) and the production/comprehension asymmetries found in her study, we argue that, rather than attrition or language loss, variable outcomes in HL acquisition, especially at high and intermediate levels of proficiency, stem from reduced or inhibited access in language production, a result that is eased, or altogether absent, for language comprehension.

### 3. Differential Access in Heritage Grammars

In this section, we establish the fundamental tenets of our proposal and explain how it expands on previous work by Putnam and Sánchez (2013). Our primary objective is to provide content to the notion of differential access by focusing on the role played by the activation of linguistic information in the form of representations during the integration of morphology, semantics, and syntax in real-time production and comprehension. We also explore how these processes may lead to permanent changes in the grammar systems of individuals across the lifespan.

The concept of “differential access” is built upon the foundation of decades of research in cognitive neuroscience pointing toward the constant co-activation of both (or multiple) grammars in the mind of bilinguals throughout their lives (Abutalebi and Green 2007; Dijkstra 2005; Goral et al. 2006; Kroll and Bialystok 2013; Marian and Spivey 2003; Putnam et al. 2018; Sunderman and Kroll 2006; Van Heuven et al. 2008; *inter alia*). As one of the source grammars becomes more dominant over the course of time, particular grammatical and processing preferences have the potential to override—or, in Grosjean’s (2008, p. 63) terms, “seep through”—the now less-dominant system. Here we issue a note of caution to prevent the potential misconception that the notion of differential access will ubiquitously result in transfer effects from the dominant source grammar. On the contrary, as noted throughout the vast literature on both diachronic and synchronic language as well as the sub-disciplines of bi/multilingualism (e.g., second language acquisition, language attrition, etc.), grammar systems undergoing some form of restructuring can take various paths.<sup>2</sup> They may show

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<sup>2</sup> Probabilistic models such as Emergent Grammars (MacWhinney 2015), Harmonic Grammar (HG; Legendre et al. 1990; Pater 2009; McCarthy and Pater 2016) and Gradient Symbolic Computation (GSC; Goldrick et al. 2016a, 2016b; Putnam and Klosinski 2019; Smolensky et al. 2014) also acknowledge that the connections between linguistic representations and their various interpretive interfaces are gradient rather than discrete (see also Christiansen and Chater’s (2016) *Chunk-and-Pass* model), forcing the inevitable restructuring—at least to some degree of linguistic representations.

restructuring due to cross-linguistic effects in the integration of syntactic features, lexical items, and discourse-related phenomena (Sánchez 2003, 2004; Leal et al. 2014), or they may show cross-linguistic influence at the morphosyntactic and syntactic levels (Cuza 2013).

Our model makes predictions about these particular issues, crucially distinguishing between HSs' optionality emerging as a result of difficulties accessing and retrieving lexical items and their associated functional features, or as a sign of restructuring at the representational level. In that respect, we model processes that start as differential access but may lead to restructuring. We adopt (Putnam and Sánchez's 2013) four-stage model outlined in the previous section to describe what happens in HSs' interpretation of subjunctive in Spanish desiderative constructions (see Section 4.1), as well as their production. By examining the performance of HSs in both domains, identifying whether they appear to be in similar or different stages of the continuum, we are able to determine whether divergences present in their use are a result of multiple access or unstable or unconsolidated grammars (see e.g., Putnam et al. 2019). The key point is that as particular lexical items, features, and grammatical structures become more difficult to compute and access, alternative options which can be more efficiently retrieved emerge as viable choices.<sup>3</sup> Importantly, what on the surface may appear to be, and has commonly been classified as, attrition or incomplete acquisition, could perhaps be better understood as a combination of factors such as (i) the inability to repress particular attributes of the more dominant grammar, which results in (ii) additional difficulties (in the form of cognitive cost) in fully accessing elements of the less-dominant source grammar.<sup>4</sup>

Our proposal also provides a more nuanced understanding of inter-speaker variability within and across proficiency levels. The extension of (Putnam and Sánchez's 2013) four-stage model to the analysis of HS performance in production and interpretation not only allows us to account for a wider range of outcomes in the acquisition of HL grammars, but it also reveals crucial underlying differences between HS with comparable levels of proficiency in the HL and similar rates of production. The flexibility of this analysis minimizes the significance placed on linguistic proficiency—at least in the way it is measured by most researchers—to understand HS outcomes, allowing for the evaluation of how other variables such as rates of linguistic activation (Perez-Cortes 2016), or the frequency of certain lexical items and constructions (Giancaspro 2017; López-Otero 2018) as predictors of HS performance.

Therefore, one of the core points of this paper is to elevate the treatment and labeling of these facts beyond the narrative of attrition and language loss, and to view this restructuring process as a result of differential access of particular elements of grammar resulting in computational difficulties due to a higher cognitive load. In that sense, our model proposes an account for the variability observed within and across heritage bi/multilinguals due to the differences in the gradience of stored representations and the cognitive load involved in online language processing. Ultimately, the way in which we conceive the nature of heritage grammars can explain the increased rate of differential outcomes and non-categorical results in HS performance, which tend to surface in morphologically complex items such as preterite vs. imperfect contrasts or indicative/subjunctive forms in Spanish. The presence of early linguistic competition in HS would account for why their grammars differ from monolinguals' and bilinguals' dominant language grammars that exhibit stronger links between phonological forms and the relevant set of atomic feature–attribute values, leading to more uniform and seemingly categorical outcomes.

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<sup>3</sup> (Sánchez Forthcoming) proposes the notion of “alignment” as a matrix of features from different language components across languages that emerges as a unit of memory storage.

<sup>4</sup> An Anonymous reviewer asked for clarification on how our model differs from others that account for the fact that some structures are never learned by child heritage bilinguals. In our model, divergence in heritage grammars is not necessarily indicative of restructuring, incomplete acquisition, or attrition, but rather of differential access. The model focuses on comprehension-production mismatches that other models might have previously attributed to other processes. However, we do not believe our proposal is incompatible with the idea that some structures may have not been acquired due to a decreased exposure to the HL during childhood.

In our view, variable rates of activation of a particular source grammar across a significant period may increase the probability of changes in the access of information from this system and its subsequent mappings and connections. HL grammars are, consequently, represented along a continuum, allowing for the conceptualization of an individual's performance along a gradient (and dynamic) scale. Variability in the output is also proposed to be affected by structural (di)similarity across grammatical systems and a higher cognitive load due to competition from the dominant language. Our model also assumes that elements of grammar are activated at different rates for comprehension and production, affecting the degree to which they can be accessed for these two purposes. In fact, one can conceptualize certain areas of the interface of syntax and morphology as involving the activation of multiple patterns of mapping features onto morphological templates and phonological manifestations (Sánchez Forthcoming). Keeping track of all of this gradient information over time and especially under pressure may lead to rebundling and restructuring that is easier to produce (and eventually, easier to comprehend). This view of language assumes that connections between the multiple levels of grammar are generally "lossy" (Chater et al. 2015; Christiansen and Chater 2016) and that there is always a certain degree of white noise and incomplete transmission in monolingual and bi/multilingual grammars. This assumption explains why variability exists in the former (Dąbrowska 2012), and even more noticeably in the latter, often heavily affected by changes in frequency of activation (Scontras et al. 2015, 2018).

Comprehension/production asymmetries have been attested in a wide range of studies, including monolingual and bilingual populations (see (Grimm et al. 2011; Hendriks and Koster 2010; Hendriks 2014) for an extensive review of this issue). According Litcofsky et al. (2016), differences between these two domains lie in the fact that they are modulated by different factors. While comprehension in the weaker language seems to be primarily influenced by bilinguals' working memory capacity, production is heavily dependent on their level of linguistic proficiency (Litcofsky et al. 2016, p. 15). These findings are particularly relevant for the study of heritage speakers, as they offer an explanation as to why there seems to be more variability in the outcomes of the latter than in the former. Another reason why production may be more affected than comprehension concerns the very nature of the mechanisms involved in the real-time processing of language, as proposed by Chater et al. (2016) and Gershkoff-Stowe and Hahn (2013). While access to the same representations may be involved in both cases, the presence of two types of information (the referent and the linguistic expression) during comprehension facilitates the process of grammatical activation. In production, however, the process starts at the conceptual level, involving the much more demanding process of combining and assembling linguistic units across different components of grammar. It is at this stage that there is a higher potential for feature rebundling and restructuring leading to differential outcomes.

#### *Operationalizing Activation and Access*

Admittedly, concepts such as activation and (differential) access in cognitive systems are challenging to define and model. Here, we provide a brief overview of these terms. To start, we adopt the following representation to illustrate the connection between linguistic proficiency and activation:

##### 1 Proficiency > activation > automaticity

Based on the body of work dedicated to the study of bilinguals' inhibition and control (Abutalebi and Green 2007; Lim and Godfroid 2015; Segalowitz and Hulstijn 2005; *inter alia*), we propose that individuals with higher levels of proficiency in a given language will exhibit a higher degree of automaticity when accessing, selecting, and assembling the features involved in the comprehension and production of a particular structure belonging to that linguistic system. In the case of the empirical evidence analyzed here (Perez-Cortes 2016), this would entail that highly proficient bilinguals would be more likely to successfully access and (re)assemble the necessary specific grammatical information involved in generating a particular aspect of the grammar—subjunctive mood in this paper. This is precisely what was reported in Perez-Cortes (2016), as well as in the

previous work on the acquisition of mood in early and late bilinguals; high proficiency in the less-dominant source grammar (either the heritage language or the L2 in the case of second language learners) was often an indicator of higher levels of accuracy in obligatory and variable mood selection (Gudmestad 2006; Iverson et al. 2008; Montrul 2007, 2009; *inter alia*). Research by Segalowitz and colleagues (e.g., Favreau and Segalowitz 1983; Segalowitz and Gatbonton 1995; Segalowitz et al. 1998; *inter alia*) connect the advantage found in high-proficiency bilinguals to the fact that they are more likely to recover from long periods of inhibition when having to access and reassemble the specific feature configurations involved in different morphosyntactic properties (i.e., mood, gender, aspect). According to Segalowitz and Gatbonton (1995, p. 134), this is due to an enhanced level of automatization, by which “the economical restructuring of underlying processing mechanisms” present in this group facilitate the selection of the appropriate features involved in a particular structure, blocking any alternative competing systems that might be available.

Our model, however, also proposes that there is a connection between the frequency of activation of the weaker language and the notions of proficiency and automaticity. The evidence collected in neuroimaging and processing studies points to an increase in the level of brain activity when bilinguals process a language to which they have reduced exposure, signaling the presence of an effortful and cognitively taxing process (for an in-depth review on the neural correlates involved in bilingual morphosyntactic processing, see (Roncaglia-Denissen and Kotz 2015)). This observation is also true of low proficiency bilinguals, whose diminished experience with the heritage language affects their ability to access its lexical items and corresponding functional features (Wartenburger et al. 2003). Consequently, we argue that these two variables (proficiency and frequency of use i.e., activation of the weaker language) will be strong predictors of heritage bilinguals’ degree of automatization when accessing and reassembling specific lexical items and feature configurations. Specifically, we propose that, following the work by De Carli et al. (2015), Gollan et al. (2008), and Paradis (1985, 1993), higher levels of proficiency and use of the heritage language will facilitate access to lexical items, functional features, and the routinization of their combination.<sup>5</sup>

If we assume that automaticity is derived from higher levels of proficiency and activation in a particular grammar system, more advanced control and use of a particular language would have positive effects on a bilingual’s ability to do the following:

- Access, select, and compile the appropriate grammatical information for structures containing obligatory mood selection in Spanish; and,
- Inhibit (i.e., block) competing structures from another co-activated source grammar, such as non-finite constructions and indicative verbal forms (see Section 4.1 for more details)

While the notion of frequency of activation and its correlation with lexical and syntactic diffusion represents a core component of our differential access model, we would like to emphasize that a decrease in language use, which may lead to (severe) divergence, does not erase information previously acquired. Our proposal, in fact, argues that these elements of the heritage grammar still exist in the mind of the bilingual, although they may be more difficult to access and retrieve. The consequences of this position cannot be understated, because although cases of abrupt change and restructuring can and do take place in heritage grammars (e.g., Hopp and Putnam 2015; Polinsky 2011; Putnam and Salmons 2013 and Yager et al. 2015), some instances of “restructuring” either maintain a level of grammatical complexity or, in limited instances, actually increase it, as noted by Yager et al. (2015). What this suggests is that restructuring in heritage grammars may not always default to some sort of reassembly of the featural/information content of constructions. Current models of feature reassembly (see Putnam et al. 2019 for an overview) assume that the grammar is permanently impacted whenever features have been redistributed differently from a previous state of the grammar. The data presented in this article—as well as previous research on grammatical representations in receptive bilinguals—challenge this assumption as a default strategy in modeling

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<sup>5</sup> While the effects of frequency of language use will not be explored in this article, they can, in principle, be incorporated into the model as factors that further modulate HS’ access. See Perez-Cortes (2016, pp. 251–59) for more details.

the acquisition and maintenance of heritage grammars across the lifespan. The concept of differential access suggests that a mechanism such as feature reassembly may not be the initial default process in heritage language maintenance. According to this view, the expected situation is that the grammar may remain active, but access for comprehension is more readily available than access for production purposes. In an attempt to illustrate the potential outcomes in these two domains, we revisit the stages of HL acquisition and loss proposed in Putnam and Sánchez (2013, pp. 489–90) by providing empirical evidence found in Perez-Cortes (2016) to establish a basic formalization of how each step involves different degrees of feature activation at a morphological, syntactic, semantic, and pragmatic level.

#### 4. Providing Empirical Evidence: Obligatory and Variable Mood Selection in Spanish HS

Perez-Cortes' (2016) study examined the acquisition of early acquired obligatory and variable mood selection in Spanish HS. This domain of language has been reported to be particularly troublesome for early Spanish/English bilinguals, who appear to undergo a significant degree of attrition/restructuring in the use of subjunctive morphology (Bookhamer 2013; Carando 2008; Correa 2011; Cuevas de Jesús 2011; Iverson et al. 2008; Martínez-Mira 2006, 2009a, 2009b; Mikulski 2006, 2010; Montrul 2007, 2009, 2011; Pascual y Cabo et al. 2012; Silva-Corvalán 1994; Torres 1989; *inter alia*). Despite this widespread trend among heritage bilinguals, the sometimes-unstable connection between morphophonological forms and semantics does not necessarily imply incompleteness of semantic representations. While instability might hold for a large percentage of low-proficiency HS featured in Perez-Cortes's study (see Section 5 for more details), participants with intermediate and advanced levels of proficiency in Spanish exhibited a strong command of the syntactic and semantic constraints operating in desiderative predicates with obligatory subjunctive selection. These are the types of cases where our differential access proposal is more likely to explain the optionality observed in heritage bilinguals.

The empirical focus on the (morpho)syntactic-semantic and (morpho)syntactic-pragmatic interface properties of modality—and TAM categories (i.e., tense, mood, and aspect) more generally—sits at the heart of important current theoretical debate and controversy. Mucha and Zimmermann (2016, p. 10) explicate two fundamental questions in this area of inquiry:

The theoretical problems revolve around the question of the universality of TAM categories, which can take either of two forms. First, do the semantic concepts underlying tense, aspect, and modality constitute cross-linguistic universals, and do languages differ only in which categorial distinctions are overtly grammaticalized (Jakobson 1959; von Stechow and Matthewson 2008)? Second, are the relevant TAM concepts universally coded in particular functional positions, which are projected in every language (Ritter and Wiltschko 2004; von Stechow and Matthewson 2008)?

The challenge of describing and analyzing TAM categories in formal models faces additional complexity in the mind of bilinguals, where the notional partitions of time, aspect, and mood in natural languages face the challenge of (possibly) divergent mappings of form-to-meaning in both source grammars (see, e.g., Błaszczak et al. 2016 for a detailed treatment of related topics). In the subsequent section we provide a comparative overview of the main characteristics of mood selection in Spanish and English from both a descriptive and theoretical perspective. This will serve as the background to our theoretical analysis of differential access that takes into account the complexity of TAM in bi/multilingual grammars.



#### 4.1. A Brief Overview of Mood Selection in Spanish and English

In Spanish, the modality of a proposition can be conveyed by means of different linguistic expressions (modal verbs, adverbs, indicative/subjunctive verbal inflection). Crucially, all of these grammatical manifestations are considered operators (or markers of operators) that quantify over predicates, which are in turn evaluated in light of all possible worlds (Fábregas 2014). Traditionally, indicative/subjunctive selection has been explained on the basis of a realis/irrealis contrast, by which predicates are either associated with actualized situations occurring at the moment of the utterance, or with events that remain in the realm of thought and alternative worlds (Haverkate 2002). Since this distinction was not able to fully capture the variation observed in predicates that allowed for mood alternations, Quer (2001, 2009) introduced the differentiation between intensional, also known as lexically selected, and extensional (i.e., polarity) subjunctives. Our proposal will be focused on the acquisition of the former, illustrated by (2):

- 2 Juan quiere que hable/\*habla menos  
 Juan wants that talk.3SG.SUBJ/\*talk.3PL.IND less<sub>S<sub>SEP</sub></sub>  
 “Juan wants him/her to talk less.”

It is assumed that in this type of structures—formalized in (3)—the selection of subjunctive by the verb in the matrix clause is expressed by the presence of an uninterpretable feature [*u*W] in Force, which then enters into an Agree relation with the head of MoodP (adapted from Kempchinsky 2009).

- 3  $V_w[CP [ForceP Force [uW]] [FinP Fin [uW] Op] [TP (DP) T [MoodP [Mw+V] [TP...]]]]$

The presence of subjunctive mood in Spanish desideratives also has the peculiarity of triggering obviation effects, barring the subject of the subordinate clause from being co-referential with that of the matrix clause, as exemplified by (4a). This effect, present in many Romance languages is known as subjunctive disjoint reference (SDR; Bianchi 2001; Picallo 1984, *inter alia*), and it is argued to be derived from the presence of a quasi-imperative operator (Op) in the embedded clause of certain predicates (Kempchinsky 1986, 2009). Subject co-referentiality is also possible, but in this case, an infinitival clause is the complement of the desiderative verb, as observed in (4b):

- 4 a. [Juan<sub>i</sub> quiere [que [pro<sub>i/j</sub> hable menos]]]  
 Juan<sub>i</sub> wants that pro<sub>i/j</sub> talk.3SG.SUBJ less  
 “Juan wants him/her to talk less.”  
 b. [Juan<sub>i</sub> quiere [pro<sub>i/j</sub> hablar menos]]  
 Juan<sub>i</sub> wants pro<sub>i/j</sub> talk.INF less<sub>S<sub>SEP</sub></sub>  
 “Juan wants to talk less.”

While in (4a) it is not possible for “Juan” to be considered as a possible agent of the event reported in the subordinate clause, the infinitival complement clause represented in (4b) allows for such a reading, where both subjects (Juan and *pro*) are necessarily co-referential. This layer of complexity increases even further when we examine how English expresses these constructions. Like Spanish, English is also able to grammaticalize modality by means of mood morphology. Subjunctive use in modern English, however, is limited to formal registers, and tends to appear in idiomatic expressions or rather archaic constructions (see Aarts (2012) for a historical overview on the use of this form). A more frequent alternative to express notions such as desires, commands, or opinions are (*for*)-*to* infinitival constructions (Ojeda 2005, p. 56), such as the desiderative predicate in (5):

- 5 I want (*for*) him/her to talk less

The infinitival construction in (5) has been posited to exhibit a similar underlying structure to the ones proposed for Spanish, where the prepositional (*for*)–*to* construction—like the operator in (3)—has an inherent modal value associated with non-factual, hypothetical readings (Iverson et al. 2008; Van Gelderen 2001; Ojeda 2005, 2008). In this case, it is the preposition *for*—and not the verbal morphology (subjunctive)—that hosts the interpretable feature (W):

- 6  $V_w[CP [ForceP Force [uW]] [FinP Fin for [W]] [TP (DP) T [to...]]]]$

Assuming the parallel activation of Spanish and English in heritage speakers (Kroll and Gollan 2014; Marian and Spivey 2003; Kroll et al. 2014; Putnam et al. 2018; *inter alia*), it is expected that this group of bilinguals must overcome a series of structural as well as morphological contrasts across the two languages. The first one will be the realization that, while Spanish and English share a similar underlying structure for co-referential desiderative predicates, the former lacks optional control—OpC for short—(Pérez-Tattam 2006), a specific type of ECM-constructions that English uses to express disjoint readings in these cases:

- 7 a. I want [PRO<sub>i</sub> to talk less]  
 b. (Yo<sub>i</sub>) quiero [PRO<sub>i</sub> hablar menos]  
 (I<sub>i</sub>) want [PRO<sub>i</sub> to talk.INF less]  
 “I want to talk less” (co-referential)  
 c. I want [(for) him/her to talk less]  
 d. (Yo<sub>i</sub>) quiero [que hable<sub>j</sub> menos]  
 (I<sub>i</sub>) want [that talk.3SG.SUBJ<sub>j</sub> less]  
 “I want him to talk less” (disjoint reference)  
 e. \*(Yo) quiero [(para) él/ella hablar menos]  
 (I) want [(for) him/her to talk.INF less]  
 “I want (for) him/her to talk less” (disjoint reference)

As seen in the contrast between (7c) and (7d)—and further confirmed by the ungrammaticality of (7e)-Spanish desideratives cannot express disjoint reference by means of OpC-constructions. Instead, they must be introduced by the complementizer *que* “that” followed by a (subjunctive) finite form. As illustrated in the examples provided in (7), Spanish desideratives also differ from their English counterparts in another important way: while the feature [w] is hosted by the subjunctive form in MoodP, it is the prepositional construction (*for*)-to that bears it in the latter. As a result, Spanish HS attempting to use these structures in their home language will need to recognize that the introduction of a deontic model of evaluation is represented by the presence of subjunctive mood—and not by these prepositions—in the subordinate clause. Based on the results obtained in Perez-Cortes (2016), we argue that potential instances of morphological optionality and surface restructuring are very often the by-product of differential access, where competition within and across languages is more likely to affect production than bilinguals’ underlying grammatical representations.

#### 4.2. Participants and Methodology

Perez-Cortes’ study included the participation of 25 Spanish-dominant controls (10 males, 15 females; mean age: 26;  $SD = 4.5$ )<sup>6</sup> and 69 HS of Spanish (15 males and 54 females; mean age: 22;  $SD = 2.6$ ). Members of this last group had either been born in the US to Hispanic parents ( $N = 52$ ) or had moved from a Spanish-speaking country before age 6; 0 ( $N = 17$ ; mean age of onset: 5; 3;  $SD = 2.8$ ). All subjects gave their informed consent for inclusion before they participated in the study, which was conducted in accordance with the Declaration of Helsinki and approved by the Instructional Review Board of Rutgers University (Protocol #E14-445). Information about participants’ linguistic histories, including age of onset of bilingualism, level of education in Spanish, frequency of language use, as well as self-reported proficiency and language dominance in comprehension and production was gathered using a language background questionnaire. According to these records, 58% of the sample had been exposed to Spanish and English almost simultaneously (birth–three years old; mean age: 1; 0,  $SD = 1.3$ ), while 42% had done so sequentially (after three years old, mean age: 5; 3,  $SD = 1.6$ ). Participants’ reflections about their use of English and Spanish revealed that a considerable percentage of them still preferred to speak to their parents in Spanish (42%), although the vast majority of them used English to communicate with their siblings (72%), their partners (77%), and also at work (72%), at school (74%), and in the community (70%). The influence of the majority

<sup>6</sup> For more details about the control group, please refer to Perez-Cortes (2016, pp. 101–3).

language is likely to have started during their schooling years: approximately, a third of the sample (29%) had never been enrolled in a Spanish class (i.e., they only received instruction in English), and the rest of the participants had either taken rather basic language classes since elementary school (38%), high school (19%), or had just started formal instruction in Spanish during college (14%). Despite these preferences, participants also reported a significant percentage of code-switching in all the aforementioned environments (52%), especially when their interlocutor was familiar with both languages, as in the case of partners (62%) and siblings (56%), reinforcing the hypothesis that Spanish and English grammars were likely to be simultaneously active.

Participants' Spanish proficiency was evaluated using an adapted version of the *Diploma de Español como Lengua Extranjera* (DELE; Montrul 2008), widely used in generative language acquisition studies to assess lexical knowledge and mastery of nominal and verbal inflection. Based on these results, HS were classified in three groups (advanced:  $N = 31$ ; intermediate:  $N = 23$ ; and low:  $N = 15$ ), as summarized in Table 1.

**Table 1.** Descriptive statistics for participants' proficiency in Spanish.

Group	N	Mean Score (Range)	SD
Advanced	31	85% (95–79.5%)	6.6
Intermediate	23	68% (77–61%)	5.4
Low	15	47% (56–36%)	6.6

The experimental part of Perez-Cortes' investigation consisted of the completion of three written<sup>7</sup> untimed tasks (a Truth-value Judgment Task (TVJT), a Picture-Based Sentence Completion Task (P-BSC), and an Acceptability Judgment Task) during a 45–60 min session. At the end of this interview, participants were invited to take part in a second session with the aim of completing a brief elicited production task (7–10 min long) involving the oral narration of a children's story (*Frog goes to dinner* (1969) by Mercer Mayer). For the sake of brevity, this paper will focus on the analysis of participants' interpretation and use of subjunctive morphology in desideratives, and their awareness of the complementizer *que* followed by subjunctive as a marker of disjoint reference in desiderative predicates (see Perez-Cortes 2016) for more details on co-referential constructions or reported speech contexts featuring variable mood selection).

To test their interpretation, participants were asked to follow a short Powerpoint presentation in the form of a TVJT featuring 64 contexts with several characters interacting with each other.<sup>8</sup> After being exposed to this information, a sentence appeared on the screen, and they were instructed to determine whether it accurately described the situation they had just witnessed. The condition displayed in (8) is one of the four variations (true or false for each type of desiderative structure) used in the TVJT:

8 Example of disjoint reading condition.

Dora: Yo estoy cansada y vuelvo para casa, pero tú quédate a jugar un poco más

("I am tired and I am going home, but you can stay and play a bit more.")

Boots: ¡De acuerdo! Gracias Dora.

<sup>7</sup> As pointed out by one of the reviewers, we agree that the modality of the experimental tasks—written instead of aural—as well as the degree of metalinguistic awareness involved in their completion could have affected the processing patterns of heritage speaker group (Bowles 2011; Montrul 2012). While we acknowledge that these factors might have negatively impacted their performance, especially in the case of the AJT, which involves a high level of metalinguistic awareness, we would like to argue that the triangulation of 3 types of data (judgments, interpretation and production) allowed for an understanding of HS' grammatical representations as well as potential locus of variability that would have otherwise been overlooked.

<sup>8</sup> The data reported in this article focus on half of the structures originally tested by Perez-Cortes (2016). Out of the 64 sentences mentioned in the text, only 12 tested participants' interpretation of disjoint reference (6 items) as well as co-referential (6 items) desideratives. For more information on Anonymous' methodology, see (Perez-Cortes 2016, pp. 109–20).

("Ok! Thanks Dora.")

*Target sentence:* Dora<sub>i</sub> quiere que (pro<sub>i</sub>) siga jugando

Dora<sub>i</sub> wants that (pro<sub>i</sub>) keep.3SG.SUBJ playing

"Dora wants (Boots) to keep playing."

Based on the dialogue presented at the beginning of the trial, participants were expected to indicate that the target sentence provided at the end was true. The opposite answer would have been expected in a co-referential scenario, as the subjunctive form in the embedded clause of the target sentence would disallow such interpretation. As exemplified by (8), True or False responses provided information about participants' interpretation of Spanish obviation effects in connection to the use of subjunctive in desideratives. Although this property may initially appear tangential to mood selection, the particular configuration of these constructions in English (as seen in Section 4.1) could potentially affect the way Spanish/English bilinguals handle desideratives with disjoint referents (i.e., expressed by the use of subjunctive), given that both interpretations—co-referential and disjoint in reference—are generally expressed by means of infinitival constructions in English.

The P-BSC task included a total of 40 items (20 target scenarios and 20 fillers) that appeared on an animated Powerpoint presentation<sup>9</sup>. Each scenario involved a two-step process. First, participants were asked to read a short context accompanied by the picture of an animated character, and then they were prompted to answer a question that appeared on the same screen by writing a complete version of the sentence provided using the verb between the brackets:

#### 9 Condition 1: Disjoint reading.

Bob Esponja y Patrick planean viajar a Hawaii, pero Bob piensa que su amigo debe visitar la isla antes que él.

("Sponge Bob and Patrick are planning to travel to Hawaii, but Bob wants his friend to visit the island before him.")

*Target sentence:* Bob Esponja quiere \_\_\_\_ (viajar) a Hawaii antes que él

Sponge Bob wants \_\_\_\_ (to travel.INF) to Hawaii before him

"Sponge Bob wants (space) to travel to Hawaii before him."

In this case, for example, participants were expected to use the verb *viajar* ("to travel") in the context of a disjoint reading, where the use of the subjunctive form (*viaje*) was expected.<sup>10</sup> The wide range of experimental tasks analyzed in this study allows for the examination of morphological and syntactic competition in heritage grammars, simultaneously assessing the degree to which they impacted the interpretation and production of specific linguistic structures.

## 5. Reanalysis of the Data from the Tasks

A quick look at the results obtained in interpretation (Truth-Value Judgment task) and production (Picture-Based Sentence completion task) reinforces the hypothesis that morphological optionality at various proficiency levels is likely to be the result of differential access to richer underlying representations, which appear to be unaffected by superficial divergences.

<sup>9</sup> Out of the total, only 10 scenarios were designed to elicit the production of disjoint reference and co-referential desideratives (five items per structure).

<sup>10</sup> As observed in the example provided in (9), the researcher opted to leave out the complementizer *que* ("that") from the target sentences in order to allow for a wider and more informative range of responses.

Table 2 reveals interesting patterns regarding the interpretation and production of disjoint reference and co-referential desiderative contexts. First, it is worth noting that morphosyntactic variability was already present in the results of the control group of Spanish-dominant bilinguals, who exhibited a certain degree of optionality in both structures and across different tasks.<sup>11</sup> These findings underline the challenge of determining an appropriate baseline standard of comparison for heritage speakers (see Polinsky 2018: Section 1.2 for discussion). In the case of this study, it will be important to recognize that such a degree of optionality likely represents individuals' grammars that display some degree of instability in certain key domains, which may have an effect on the input received by heritage bilinguals. It is possible that, as suggested by Rothman (2009) and Rinke and Flores (2014), ongoing changes in the input variety of monolingual populations may have affected the development of heritage grammars. In this case, and following our model, it would mean that the group of bilinguals interviewed in Perez-Cortes (2016) may have a larger array of constructions available when interpreting and producing the contexts hereby examined. Crucially, some of the options present in the grammars of the Spanish-dominant controls may partially overlap with those available in the HSs' dominant language (i.e., the possibility of restructuring disjoint reference contexts by using Optional control constructions), potentially increasing the likelihood of differential access and resulting in optionality and cross-linguistic transfer.

**Table 2.** Overall accuracy as a function of condition, experimental task and group. (Adapted from Perez-Cortes 2016.)

Groups	Context			
	<i>Disjoint Reference</i> ( <i>Querer que+ Subjunctive</i> )		<i>Co-Referential</i> ( <i>Querer+ Infinitive</i> )	
	Interpretation	Production	Interpretation	Production
Controls	88%	87.5%	85.3%	90.6%
Advanced HS	83%	84.7%	77.7%	94.3%
Intermediate HS	80.8%	55.7%	74.3%	87.8%
Low HS	64.4%	18.7%	54.4%	81.3%

The performance of the experimental groups with regard to the co-referential context appeared to be rather stable, significantly differing from the control group only in the case of low proficiency bilinguals. While it may be unexpected that participants obtained more accurate results when asked to produce these structures—rather than interpreting them, it is possible that the previously mentioned preference for simplified structures (see footnote 11) could have contributed to their increased use, while forcing a reinterpretation of disjoint reference contexts (Perez-Cortes 2016, pp. 187–88). This hypothesis would explain the results obtained in this last condition, where the performance across groups was much more variable. Specifically, advanced HS tended to be more accurate than their intermediate and low-proficiency counterparts, who displayed more optionality in their responses. While these effects were observed across experimental tasks, they were more prominent in the sentence-completion exercise, implying that higher proficiency in the heritage language facilitates the selection and retrieval of lexical items and their corresponding functional features (FFs) for production purposes. This hypothesis was confirmed when participants' responses were analyzed in more detail. In particular, the results obtained in the disjoint reference condition, where the use of subjunctive would be expected, showed that optionality at the syntactic and morphological level increased as the proficiency in the heritage language declined:

<sup>11</sup> Sociolinguistic research focused on the interpretation and production of these sentences in Spanish monolinguals report that there is a percentage of this population who tends to hypercorrect subjunctive forms in disjoint reference contexts by overextending infinitival forms (Gallego and Alonso-Marchs 2014), although the opposite trend, that is, the overuse of subjunctive in similar contexts, has also been documented (Morales 1999; Serrano 2004).

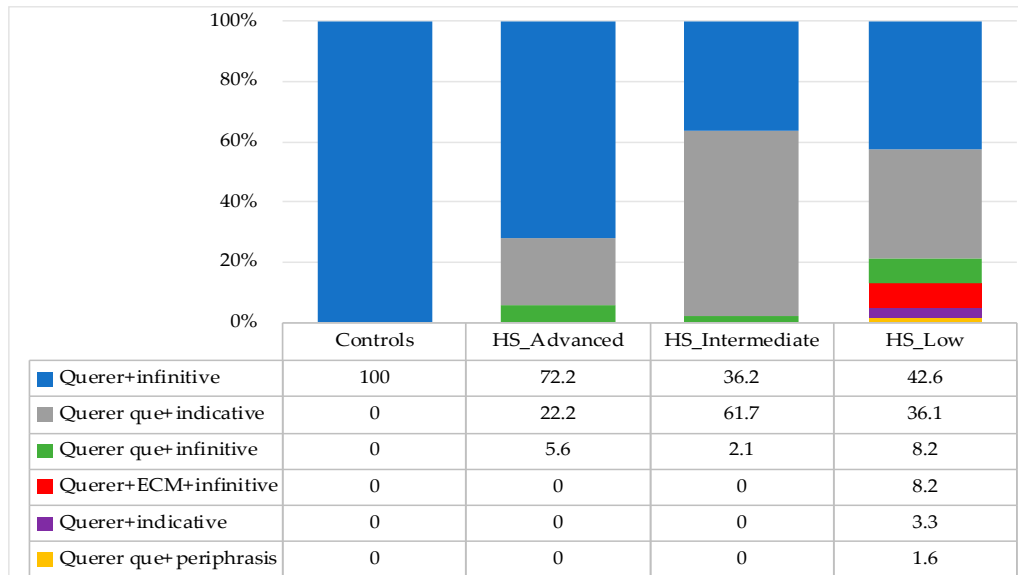
As Figure 1 indicates, one of the most frequent divergences reported across all the experimental groups was the restructuring of the structure of disjoint reference desideratives, where the complementizer *que* (“that”) introduces the subordinate clause featuring subjunctive mood, in favor of a less syntactically complex construction: *querer* + verb (infinitive). This strategy accounted for the totality of divergences in the control group, as well as a 72.2% of the ones documented in advanced HS. The adoption of this grammatical configuration to express Spanish disjoint-reference desideratives,<sup>12</sup> as well as the emergence of other alternatives, such as the use of the complementizer followed by indicative or infinitival forms in the embedded clause, are likely to have alleviated processing demands during production. In the case of the HS groups, for example, lower levels of proficiency in the heritage language triggered the selection of alternative—but ungrammatical—structures that gradually converged with the equivalents found in the dominant language (English), such as sentences introduced by the complementizer *que* (“that”) that featured infinitives as subordinate verbs (10), constructions lacking a complementizer followed by an indicative form, as in (11), or the case of optional control structures of the type seen in (12):

- 10      Bob Esponja quiere que Patrick \*viajar a Hawaii antes  
           Bob Sponge wants that Patrick travel.INF to Hawaii before  
           “Sponge Bob wants Patrick to travel to Hawaii before.”
- 11      El jefe quiere \*María pone canciones más modernas  
           The boss wants María put.3SG.IND songs more modern  
           “The boss wants María to play more modern songs.”
- 12      La mama quiere \*los niños caminar más rápido  
           The mother wants the children walk.INF more fast  
           “The mother wants the children to walk faster.”

---

<sup>12</sup> This type of divergence, which is a grammatical option in Spanish, involved the simplification of a disjoint reference desiderative (i) into an infinitival construction (ii), used to express co-referential readings. As pointed out by Perez-Cortes (2016), this structural change might be the result of a semantic re-interpretation of the context, although this may not always be the case—see alternative glosses for example (ii):

- i      La mamá quiere que coman más  
           The mother wants that eat.3PL.SUBJ more  
           “The mother wants them to eat more.”
- ii     La mamá quiere comer más  
           The mother wants eat.INF more  
           “The mother wants to eat more” or “The mother wants them to eat more”



**Figure 1.** Distribution of divergences produced in the disjoint reference condition.

As previously reported in Table 2, these divergences did not invariably result in representational deficits, reinforcing the hypothesis that differential access during the integration of morphology, semantics, and syntax is responsible for optionality in production. The only instances where the adoption of these forms seemed to have led to considerable restructuring were found in low proficiency HSs’ interpretation of disjoint reference (64.4%). The results obtained in the Acceptability Judgment (AJT), summarized in Table 3, provide additional information about HS’ grammatical preferences regarding the obligatoriness of subjunctive in disjoint-reference desideratives:

**Table 3.** Percentage of rejections of unacceptable structures.

Group	*Querer que + Indicative	*Querer que + Infinitive
Controls	100%	100%
Advanced	83%	91%
Intermediate	53.3%	60%
Low	10.3%	2.6%

A series of paired sample *t*-tests confirmed that proficiency modulated participants’ level of morphological optionality. While advanced and intermediate HS were aware of the need for an inflected form in the embedded clause of disjoint-reference desideratives, intermediate HS often exhibited optionality between subjunctive, indicative and infinitive. This tendency was amplified in HS with low proficiency in Spanish, who were not able to identify ungrammatical examples of disjoint reference contexts. Despite the considerable percentage of morphological optionality reported in the sentence production and acceptability judgment tasks, it has been shown that these divergences are not necessarily a sign of restructuring and deficits in the underlying representations of HS grammars. In fact, the only HS group where this seemed to be occurring was that of low proficiency bilinguals, whose limited command of the heritage language appeared to have affected their ability to retrieve lexical items and their corresponding FFs (as theorized in Putnam and Sánchez 2013). As pointed out by one of the reviewers, some of the results, especially in the case of low proficiency HS, could have been affected by the nature of the task. Several studies have reported that grammaticality judgements, particularly when they are presented in written form, trigger a high level of “correct” responses as result of parsing difficulties and working memory strains (McDonald 2000; Orfitelli and Polinski 2017). These pressures could be responsible for the low rates of rejection of ungrammatical sentences, especially in the case of low-proficiency HS, or for some of the

inconsistencies found between participants' judgements and their production.<sup>13</sup> Although this is a limitation of the study—and of grammaticality judgements in general—we would like to argue that the results obtained from this task are still valuable, as they (1) provide information about potential structures that might be available in participants' mental grammar; and (2) allow for the triangulation of three types of data (judgments, interpretation, and production) to help better understand HS' grammatical representations as well as potential locus of variability.

## 6. Further Discussion and Theoretical Analysis

The analysis provided in the previous section gives a general overview of HS grammars with respect to their interpretation and use of desideratives. There are however, some questions regarding participants' performance, which remain unanswered using the current approaches:

*Q1: Is a particular instance of morphological optionality a reflection of a representational deficit/restructuring or a result of missing surface inflection?*

The only way to respond to this question is to adopt a model that examines speakers' production and interpretation scores in parallel, highlighting their interdependence when assessing heritage bilinguals. Doing this systematically facilitates the process of differentiating between HS whose lack of subjunctive use is an indication of restructuring, from those where it is a sign of morphological optionality, ultimately providing a more accurate evaluation of their place along the HL grammatical continuum. Perez-Cortes (2016) has several examples that manifest the need for a model capable of accounting for these asymmetries and their significance in HL grammars. The performance of a low proficiency participant (HS019) in her study, for instance, is one of these cases. The non-existent rates of subjunctive production this speaker obtained in one of the tasks contrasted with their interpretation results (83% accurate), indicating that lack of subjunctive use was more likely not a result restructuring or incomplete semantic representations but of differential access. While this participant was highly capable of identifying the semantic implications of using subjunctive in the embedded clause of desideratives (i.e., marker of disjoint reference as opposed to co-reference), this was not the case for other heritage bilinguals with a similar proficiency level. This brings forth a second question:

*Q2: What is the role of proficiency in HS' performance? More specifically: how can we explain inter-speaker differences within a particular proficiency group as well as similarities between bilinguals with different linguistic abilities?*

Perez-Cortes (2016) has plenty of these examples, such as the case of two advanced HS of Spanish who exhibited the same rate of subjunctive production (40%) but obtained very different results in interpretation (83% vs. 42%) or participants who displayed very similar rates of subjunctive production and interpretation despite having very different levels of linguistic proficiency. The key to accommodate this data is to use a model that interprets these differences as the reflection of differential levels of automaticity and access. Heritage speaker proficiency has often been measured by their lexical and grammatical knowledge (i.e., administering modified versions of standardized linguistic assessments). Our model, while taking proficiency into account, focuses on early bilinguals' ability to successfully inhibit and access certain grammatical representations as indicators as well as predictors of their performance. The results reported in the previous section, especially those concerning participants' production or disjoint reference and co-referential contexts, have also revealed the complexity behind heritage speakers' optionality. From indicative forms to embedded subordinate clauses headed by a prepositional complementizer, participants' wide range of

<sup>13</sup> This is the case, for example, of low proficiency HS, whose low rates of production of ungrammatical *querer que* + infinitive (8.2%) contrast with the high levels of acceptance reported in the AJT (almost a 98% of these structures were deemed grammatical).



responses are often analyzed as different instantiations of this group's morphological variability. However,

*Q3: Is there a way to reconcile these results in a single model?*

We propose that the nature of these representations provides additional evidence for the parallel activation of Spanish and English during language production, showing the degree to which participants have difficulties blocking the emergence of competing structures in these contexts. In some cases, heritage bilinguals—generally, those with low proficiency in the HL—exhibit lower levels of automaticity when accessing, selecting and assembling the linguistic features involved in obligatory subjunctive selection, which may, in turn, prevent the inhibition of forms that are identical or very similar to those available in their dominant language.

The findings in Perez-Cortes (2016)—and more broadly, those reported within other studies focusing on heritage grammars—can be systematized following a modified version of the four-stage model established by Putnam and Sánchez (2013). In the remainder of this section we analyze the data reviewed above from Perez-Cortes (2016) through the lens of this four-stage model. First, the different stages and FFs in this model to date have been approached from a global perspective; here we take a more circumspect look at the model and how a specific feature—namely, modality—is affected. Second, we recognize that the stages as originally proposed do not allow for an independent assessment of production and comprehension. Stages 2 and 3, for instance proposed an imbalance between production and comprehension that affected mostly production. We explore here the need for a more flexible approach. Third, we emphasize the notion that the stages represent a conceptualization that allows us to segment a process that is a continuum. For that reason, the boundaries between them may be lossy at times. Here, we propose a more specific view of the stages of development illustrating the gradual loss and systematic restructuring of obligatory subjunctive selection desideratives:

We assume that as adult grammars develop, they may diverge from the grammar bilinguals acquire as children, but at the same time they may also show stability in certain domains. Thus, we incorporate into this discussion the grammars of Spanish HSs whose results in comprehension and production tasks do not seem to differ or differ minimally from those of monolingually raised speakers or from bilinguals acquiring the language in a context that favors activation of the heritage language to a great extent. The syntactic representation found among those speakers would be

13  $V_w[CP [ForceP Force [{}_w] [FinP Fin[{}_w] Op[TP T [MoodP [M[{}_w]+V ]]]]]]$

In this case, subjunctive is interpreted as the morphological marker of irrealis mood. Disjoint-reference desideratives are linked to the presence of the complementizer *que* (“that”) and subjunctive in the subordinate clause, while co-referential contexts are characterized by the presence of the verb *querer* (“want”) followed by an infinitival form. In the production of *quiere que* structures in disjoint reference contexts, the irrealis feature [w] is associated to the use of subjunctive forms, generating sentences such as the one reproduced in (14):

14 Quiere que las secretarias **hablen**[w] menos

Wants that the secretary talk.3pl.SUBJ less

“He wants the secretaries to talk less.”

#### STAGE 1:

$V_w[CP [ForceP Force [{}_w] [FinP Fin[{}_w] Op[TP (DP) T [MoodP [M[{}_w]+V ]]]]]]$

While the presence of subjunctive morphosyntax in the subordinate clause is still interpreted as the morphological marker of irrealis mood, the acceptance of other forms in the same position starts to emerge at this stage. Despite the variability present in the forms that can potentially be interpreted

as markers of imperative force, bilinguals are still able to: (i) differentiate between co-referential and disjoint reference contexts, and (ii) reject instances of optional control in Spanish.<sup>14</sup>

In production, the first dissociations between the irrealis feature [w] and subjunctive morphology also start to surface. The resulting feature reassembly generally involves the use of indicative forms in the subordinate clause of disjoint-reference desideratives, which are now associated with the irrealis feature [w], as illustrated in (15):

- 15 \*Quiere que las secretarias **hablan**[w] menos  
 Wants that the secretaries talk.3.pl.IND less  
 “He wants the secretaries to talk less.”

At this stage, the acceptance of some unexpected structures in a comprehension task coexists with generalized acceptance of the expected structures and with some dissociations between irrealis mood and subjunctive forms in production. This indicates that at Stage 1, both acceptance and production are somewhat affected by difficulties in accessing a representation.

**STAGE 2:**

$V_w[CP [ForceP Force [uW][FinP Fin[uW][TP (DP)T [MoodP[M_{[W]}+V ]]]]]]$

$V_w[CP(\emptyset) [ForceP Force [uW][FinP Fin[uW](para) [TP DP T [MoodP[M_{[W]}+V ]]]]]]$

At this stage, subjunctive is only marginally interpreted as the morphological marker of irrealis mood, and the acceptance of other forms, such as indicative or infinitives becomes more widespread. For the first time, the contrast between co-referential and disjoint reference contexts is less clear, allowing for the incipient acceptance of optional control structures (see footnote 14 for an example) to represent the former.

In addition to the increasing use of indicative mood in the embedded clause of disjoint reference contexts, other forms appear to now be associated with irrealis mood. This is the point where heritage bilinguals start to associate infinitival forms—more common with (16a) than without a complementizer (16b)—and periphrastic constructions (17) with the irrealis feature [w]:

- 16 a. \*Quiere que las secretarias **hablar**[w] menos  
 Wants that the secretaries talk.INF less  
 “He wants the secretaries to talk less.”
- b. \* Quiere (**para**) las secretarias/ellas **hablar**[w] menos  
 Wants (for) the secretaries/ they to talk.INF less  
 “He wants the secretaries to talk less.”

- 17 \*Quiere que las secretarias **tienen que hablar**[w] menos  
 Wants that the secretaries have to talk.3PL.INF less  
 “He wants the secretaries to talk less.”

**STAGE 3:**

$V_w[CP(\emptyset) [ForceP Force [uW][FinP Fin (para) [w][TP (DP) T [INF ]]]]]]$

<sup>14</sup> These constructions—ungrammatical in Spanish but possible in English—would involve the reproduction of a specific type of ECM-constructions used in English to express disjoint readings. They would replicate the structure provided below:

(i) Quiere (para) las secretarias/ellas hablar menos  
 Wants (for) the secretaries/they[fem.pl] to talk.INF less  
 “He wants the secretaries/them to talk less.”

At this point of the continuum, subjunctive is no longer interpreted as the morphological marker of irrealis mood in disjoint-reference desideratives. This results in the indiscriminate acceptance of alternative syntactic structures that would allow such an interpretation. At this stage, the inhibition of the dominant language (in this case English) would be really low, preventing the rejection of English Optional control structures featuring the presence of a prepositional complementizer (with null or overt *for*) in English (see 16b) or null or overt *para* (“for”) in Spanish, followed by a DP and an infinitival form. There is little to no differentiation of the markers that allow for either co-referential or disjoint readings.

In the production of disjoint reference desideratives there is an extended use of infinitival and indicative forms in the embedded clause, and the emergence of structures lacking the complementizer *que* (“that”). The feature [w] is presumably hosted by the (*for*)-*to* construction, which can be overtly or covertly expressed in Spanish by *para* (“for”), as illustrated by (16b) and also by (18):

- 18      \*Quiere (**para**)[w] los niños caminar más rápido  
           Wants (for) the children to walk.INF more fast  
           “He wants the children to walk faster.”

The attentive reader will have noticed that we do not make mention of Stage 4 representations in our theoretical analysis. This is due to the fact that representations associated with this stage are not explicitly attested in Perez-Cortes’ (2016) data set. If HS were to generate Stage 4–like representations, we should expect that they would be unable to produce or interpret either type of desiderative structures (i.e., disjoint reference and co-referential contexts).

The stages hereby described reflect—to a certain extent—the performance of heritage groups according to proficiency. The advanced group of HSs interviewed in Perez-Cortes (2016) generally was able to access the representation in (13) in the receptive and production tasks, exhibiting minimal rates of feature reassembly and crosslinguistic transfer (CLI) triggered by the dominant language (English). In general, this group displayed a strong command of obligatory subjunctive selection in comprehension and production, and a good understanding of the syntactic/semantic constraints that modulate obviation in desiderative constructions.

Intermediate HS, however, commonly fluctuated between Stages 1 and 2, based on their proficiency level and frequency of activation of the heritage language (see Perez-Cortes 2016, pp. 251–55 for more details). Those within the first level (Stage 1) exhibited difficulties retrieving subjunctive morphology, resulting in a growing number of comprehension/production asymmetries. The use of alternative forms such as periphrases of obligation and indicative to avoid the use of subjunctive emerges. This last tendency was popular among HS with decreased levels of Spanish use, who fell into the next level (Stage 2). At this point, HS experienced significant complications activating certain PF features associated with syntactic/pragmatic conditions. In the case of the structures analyzed in Perez-Cortes (2016), this facilitated the overextension of infinitival forms in the embedded clause of desideratives in production, as well as the emergence of optional control structures. In interpretation, participants started to display a steep decline in their mastery of obviation effects in desiderative predicates.

The group of low proficiency bilinguals also oscillated between Stages 2 and 3 depending on their command of the heritage language. In production, they favored the use of indicative mood as a default form in the embedded clause of disjoint reference desideratives, closely followed by infinitival forms. CLI was also detected at the syntactic level, where structures mirroring English patterns (Optional control structures lacking a complementizer) were increasingly more frequent. Difficulties in lexical access during production in this group of bilinguals appeared to entail a loss of semantic contrasts in interpretation. As we mentioned in the previous description, Stage 4 was not attested in the sample reported by Perez-Cortes (2016).

As we mentioned at the beginning of this section, however, there are a few issues that need to be addressed. On the one hand, results show that participants exhibit different levels of activation for receptive and productive tasks. Although the overlap of stages in interpretation and production can occur—as assumed by the previous analysis—it is very common for heritage grammars to exhibit

asymmetries in receptive and production tasks. In this extension of the Putnam and Sánchez (2013) four-stage model we consider stages of activation of representations separately for production and receptive tasks in the analysis of individual data. While in the majority of cases activation in these two domains may not exhibit great differences given their interconnectedness, we assume that it is also possible depending on factors such as language mode, levels of inhibition for different purposes, as well as context of activation that there might be individual differences that result in unusually higher levels of activation for receptive tasks than for productive tasks in some HS. The modified model allows for a separate analysis of HS’ interpretation and production, while still highlighting their interdependence, as we assume that activation in either mode is evidence of some availability of the representation. This is precisely the case of the participant with a low level of proficiency in the HL described at the beginning of the section (HS019) whose production of subjunctive (0%) contrasted with high rates of accuracy in interpretation (83%). The only way to describe this asymmetric performance is by characterizing both domains separately, locating their interpretation of disjoint reference desideratives (i.e., *querer que* + subjunctive) in Stage 1, and their production in Stage 3. By examining these two domains independently, we are able to determine that this participant’s low levels of subjunctive production are a result of differential access manifested as/through morphological optionality rather than being an indicator of grammatical restructuring.

Another important contribution of our proposal is the acknowledgement that while (grammatical/lexical) proficiency—as currently measured by most researchers working with heritage bilinguals—generally correlates with their place in the HL continuum (i.e., advanced HS’ performance is generally within Stage 1, while their intermediate counterparts’ fluctuates between Stages 1 and 2), this is not always the case. As we mentioned at the beginning of this section, this is particularly true in the intermediate and low-proficiency groups, where there is a high degree of inter-speaker variability within and across levels. The following table features a reanalysis of the interpretation and production data of three participants from each of these proficiency groups.

There are several aspects that we would like to highlight from the re-analysis featured in Table 4. On the one hand, the adoption of our model captures several instances of intra-speaker variability within and across heritage bilinguals with different levels of proficiency in their weaker language. While the latter is expected and predicted by this and other proposals describing heritage language grammars (see Section 2 for more details), variability within the same proficiency group has seldom been fully formalized. The classification of participants’ performance in stages reveals that, although there are some distinct patterns among intermediate and low proficiency HS, there is also a significant gradience in the outcomes. If we compare, for example, the performance of the six participants featured in Table 4, we observe that (1) some of them (i.e., HS026, HS040, or HS064) perform at a level that would have traditionally been linked to higher levels of proficiency and that (2) there is a wide variety of outcomes both within and across proficiency groups. Our model formalizes this type of variability using a series of interconnected and gradient stages. More importantly, however, it provides us with a more nuanced understanding of where in the continuum of heritage language development each participant is located at a particular moment in time, allowing for the potential modification of these considerations based on a wide range of factors, such as changing levels of linguistic activation.

**Table 4.** Re-analysis of Perez-Cortes (2016) data following our model (Stage 4 not attested).

Level	ID	Interpretation (TVJD) *				Production (PBST)			
		Stage 0 **	Stage 1	Stage 2	Stage 3	Stage 0	Stage 1	Stage 2	Stage 3
Interm	HS026	X (100%/100%)				X (100% <i>querer que</i> + subj.)			
	HS040	X (100%/100%)					X (80% <i>querer que</i> + ind.)		

	HS007	X (67%/50%)	X (60% <i>querer que+</i> ind.; 40% <i>querer que+</i> inf.)
	HS064	X (83.3%/83.3%)	X (60% <i>querer que+</i> subj.; 40% <i>querer que+</i> ind.)
Low	HS027	X (50%/33.3%)	X (60% <i>querer que+</i> inf.; 40% Op. control)
	HS025	X (50%/33.3%)	X (80% Op. control; 20% <i>querer que+</i> ind.)

\* This category includes the accuracy results from the co-referential and disjoint reference conditions.

\*\* Although Stage 0 does not appear in our model, it was used here to indicate that participants obtained 100% of accuracy in the task (thus, exhibiting no optionality). The grammatical representation at this stage would reflect the derivation provided in (13).

The examination of participants’ interpretation and production separately—but under the same model—also allows us to document asymmetries between these two domains more consistently, determining the degree to which the effects of differential access might have affected their mental representations of a particular structure. There are instances, for example, where there is a correspondence between HS’ interpretation and production of disjoint reference desideratives (i.e., HS026 or HS027), although the most common pattern is an asymmetry between these two domains. It is here where our model is able to distinguish between cases such as HS040’s, whose morphological optionality in production is not a result of grammatical restructuring, from those like HS025’s, where the overwhelming adoption of Optional control structures in production does reflect a change in the grammatical representation of Spanish desideratives.

As we have argued throughout this paper—and illustrated by the examples provided in Table 4—it is more accurate to examine heritage bilinguals’ grammars by focusing on the degree to which they reflect target access to certain representations as well as the ability to inhibit competing structures as a result of parallel linguistic activation. In summary, this analysis shows that the extension of Putnam and Sánchez (2013) four-stage model is flexible enough to allow for the description (and prediction) of a range of outcomes.

## 7. Conclusions

The study of the quality and depth of linguistic representations in bilingual grammars across the lifespan continues to be one of the central themes of research in heritage linguistics. Our investigation, based on Perez-Cortes’ (2016) findings, makes a strong case for the resilience of linguistic information and the limitations of radical restructuring of linguistic representations. Under this view, (aspects of) the individual sources grammars are not erased—at least not easily—but rather become more difficult to access for production and parsing purposes due to lack of activation and constant competition with (an)other grammar(s) over the course of time. The divergent nature of these representations when compared with baseline standards (à la Scontras et al. 2015, 2018) are the result of the competitive assembly process of relevant elements of grammar as they interact with other cognitive processing demands (e.g., working memory, weaker links, inhibitory control, etc.). Adopting a generative approach to acquisition, maintenance, and the underlying structure of linguistic representations, axiomatic linguistic representations are encapsulated as formal features. The association of these features with certain functional heads can be compromised (leading to feature reassembly; Putnam et al. 2019), opening up the possibility of some information being inaccessible or, in many cases, the rise in competition between alternative output forms. One of the key factors responsible for the development of heritage languages are resource constraints that drive these developmental trends.

The observation that richer linguistic representations can be successfully accessed to a greater degree in comprehension tasks when compared with those that require production exposes the different cognitive costs associated with performing these tasks. This observation supports our

principal hypothesis; namely, that richer representations in a less dominant grammar in most cases gradually become more difficult to access over the course of time, eventually resulting in permanent changes to the grammar system that may lead to restructuring and divergent representations when compared with a baseline standard.<sup>15</sup> The empirical findings from Perez-Cortes' (2016) study provide additional support for Putnam and Sánchez's (2013) proposal of the restructuring of linguistic information (in the axiomatic form of features) that takes place at both the lexical and syntactic levels. The features, connections, and representations live on longer than is sometimes assumed, leaving in many cases a permanent, indelible trace. Grammatical information is in constant conflict, and over the course of time, richer representations become more difficult to access in less-frequently activated grammars, leading to outputs that may appear to be simplified structures (Scontras et al. 2015, 2018; Polinsky and Scontras 2019).

Polinsky (2018) highlights three primary outcomes of divergence in heritage grammars; namely, (i) attrition, (ii) transfer, and (iii) divergence. These potential outcomes are a testimony to the different behaviors that bi/multilinguals employ in the acquisition process when compared with their monolingual counterparts. This difference is particularly noticeable in the way bi/multilinguals deal with linguistic intake; in particular with the ways that these individuals construct linguistic representations and the inferences they make and how these may be affected by how they access those representations. This growing body of literature continues to demonstrate that the instances of divergence found in heritage grammars are systematic, and in many cases, distinguish heritage speakers from other bi/multilinguals as well as monolinguals. At the same time, we need to develop a more fine-grained approach to how we evaluate instances of divergence since they may be reflective of differential access and not necessarily as evidence of restructuring. In fact, a detailed analysis of HSs receptive and production abilities might be revealing of the coexistence of grammatical features and structures that indicate a higher level of complexity than previously attributed to these unique native grammars.

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<sup>15</sup> See however Hendriks (2014) and Polinsky (2018, Section 3.2.2) for a discussion of instances where deviations in heritage language comprehension antecede those observed in production.

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