

Parameters in language acquisition and language contact

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15.1. Introduction: Language acquisition and linguistic theory

The Principles and Parameters model (P&P) of Universal Grammar (UG) (Chomsky 1981) seems ideally suited to address the logical problem of language acquisition—how human speakers come to know as much as we do based on limited language experience. As Jackendoff (2011: 268) notes: “the primary goal of modern linguistic theory [...] is [to provide] an explanation of the human language capacity and how it enables the child to acquire adult competence in language.” Parameter theory addresses the logical problems by vastly simplifying the language acquisition process: the task of the language learner is to choose among competing (ideally binary) values along an array of antecedently given parameters. The “stages” in acquisition thus represent the instantiation of particular parameter values, correct or incorrect vis-à-vis the target grammar. If a parameter is set incorrectly, it must eventually be reset based on “triggers” in the input, and the resetting gives rise to a new “stage” or grammar. In this chapter, we explore the role of parameters in

current P&P research in first- (L1) and second-language (L2) acquisition contexts as well as contact and heritage grammars.

We focus on argument omission parameters (null-subject / null-object parameters), because they provide a good illustration of the general conception of parameter theory (as well as its virtues and shortcomings) and because they are also among the most empirically robust and best studied parameters in terms of acquisition. We begin in the following section by discussing L1 acquisition, comparing grammar-based, parameter(-mis)setting hypotheses to performance-based accounts of missing arguments in child language, first null subjects and then null objects. The focus of Section 15.3 shifts to adult L2 acquisition, in particular the “(re)setting” of argument omission parameters. The P&P framework addresses two essential questions concerning L2 acquisition: (i) to what extent is UG accessible to learners after the so-called critical period, and (ii) what is the influence of the native language on L2 development and ultimate attainment? We also discuss performance-based explanations for some L1/L2 differences. Section 15.4 concludes our treatment of argument omission parameters with a discussion of contact and heritage grammars, where we consider the role of UG principles and parameters and also the effects of performance factors in accounting for the outcomes of heritage language learners whose grammars are often qualitatively different from those of L1 children, despite the fact that they acquire language naturalistically in early childhood.

15.2. Parameters in L1 acquisition

Parameter theory satisfies several theoretical desiderata with respect to L1 acquisition: First, children’s grammatical “rules” and “errors” are not random nor do they arise from otherwise unmotivated principles. Deviations from the adult target grammar are constrained by the parameter space of UG, much in the way grammatical variation across adult languages is constrained. Parameter theory thereby makes precise the claim that child grammars are not fundamentally different from adult grammars (cf. Hyams 1983; Klein 1982; White 1981), a hypothesis now referred to as the “continuity hypothesis” (Pinker 1984). Second, the deductive structure of parameters subsumes what would otherwise be disparate grammatical properties that would have to be individually learned helping to explain the speed and ease of acquisition, and third, parameter (re) setting provides a partial solution to what Felix (1987) called the “stage-transition question,” viz., what accounts for the transition from one grammatical stage to the next?

15.2.1. Missing subjects in child language

The missing subject phenomenon in child language is illustrated in (1): 2–3-year-old children acquiring non-null-subject languages such as English, Danish, and French nevertheless optionally omit them:

- (1) a. Want more apple [English] (Brown 1973)
 b. Ikke kore traktor [Danish] (Hamann and Plunkett 1998)
 not drive tractor
 ‘(I, you, he) doesn’t drive the tractor’
 c. A tout tout tout mangé [French] (Hamann and Plunkett 1998)
 has all all all eaten
 ‘(He) has eaten everything’

There have been various parameter accounts of the null subject (NS) stage in child language, beginning with Hyams’ (1983, 1986) proposal that all children start out with the “Italian” setting of the pro-drop parameter (Rizzi 1982). This analysis captured the missing subject phenomenon and a number of seemingly related properties, but ultimately failed on empirical grounds. In particular, a direct comparison of English- and Italian-speaking children at similar grammatical levels show differences both in frequency and distribution of null subjects (Valian 1991). The English-speaking children showed far fewer NSs (30% vs 70% for Italian children) and far more overt pronouns than would be expected if they were speaking a true pro-drop language. It was also observed that in English NSs failed to occur in subordinate clauses or in (finite) post-*wh* environments, in marked contrast to Italian child language (Guasti 1996). Similar root/first position effects were found for French, Dutch and German-speaking children (Clahsen, Kursawe, and Penke 1995; Crisma 1992; Levow 1995; Hamann 2000; Haegeman 1995). In a further twist, De Haan and Tuijnman (1988) showed that Dutch and German children—in contrast to English and French-speaking children—also dropped objects from first position, in what looked more like topic drop than pro-drop, an option that exists in adult V2 languages as well. The rise and fall of this early proposal provides a good illustration of the testability or falsifiability of parameter models of L1 development: A child language with a hypothesized parameter value *p* should approximate an adult (or child) language whose true value is *p*.

More recently, other parameter models have been proposed to account for the NS phenomenon (Hyams 1992; Jaeggli and Hyams 1988; Yang 2002; see Hyams 2011 for review), the most far-reaching of which is Rizzi’s (2005) “root null subject parameter” (RNS) account, which as the name suggests, focuses on the NS phenomenon in non-pro-drop languages showing the root restriction. The RNS parameter specifies that a subject may be null in the specifier of the root.¹ Rizzi shows that RNS is also a property of some adult languages, for example certain varieties of Brazilian Portuguese. Thus, children born into languages that have no pro-drop or topic drop options will nevertheless drop subjects in root contexts.

The various parameter models differ from each other in grammatical details, and in other respects as well. For example, Yang’s “variational” model incorporates a statistical component and Rizzi’s assumes children’s grammars set an initial null-subject setting under pressure from a computational strategy favoring parametric values that reduce the load on the production system (null subjects are computationally less costly than overt subjects, by hypothesis). Despite these differences, all parameter models argue that children’s grammars differ from the respective adult (non-null-subject) targets in licensing null subjects as a grammatical option.

An alternative perspective is provided by various performance accounts proposing that subject omission is *solely* an effect of children's limited production abilities and not a property of their grammar (L. Bloom 1970, P. Bloom 1990, Valian 1991). The performance hypothesis is also consistent with the root property of null subjects: if sentence initial position is the locus of sentence planning then this might create a processing bottleneck which is lessened by dropping the subject. Also, Bloom (1990) found that in English-speaking children the VP length of their utterances decreases as a function of subject "heaviness" with the VP longest when the subject is missing: his hypothesis is that subject omission allows for increased resources to be deployed to the VP.² In a similar vein, Gerken (1991) has proposed that children's productions are constrained by a metrical template, favoring (the prevalent in English) trochaic (S-w) over iambic (w-S) feet. This leads children to disproportionately drop pronouns in subject position (he-SINGS) over object position (SEES-him).³

Parameter models do not easily account for the VP length effects.⁴ At the same time performance accounts do not readily provide a basis for explaining certain syntactic contingencies, for example, the fact that in most languages subject omission is much more frequent in root infinitives than in finite clauses during the same period (see Hoekstra and Hyams 1989 for review of relevant findings).

A crucial difference between parameter and performance accounts relates to children's sentence comprehension: if production constraints are responsible for missing subjects and children do not have a NS grammar then they should reject null subjects in comprehension. Conversely, if they have a NS grammar it would underlie both production and comprehension and thus children who drop subjects in production should also accept them in comprehension. In the next section we report the results of a comprehension study on null subjects.

15.2.2. Comprehension of null subjects in L1

In adult English, null-subject sentences can be interpreted only as imperatives. If children in the NS stage have a grammar that *also* licenses null-subject sentences as declaratives, we expect them to accept such sentences in comprehension in both imperative and declarative contexts.

Orfitelli and Hyams (2012) tested English-acquiring children's comprehension of null-subject sentences using a modified version of Truth-Value Judgment (TVJ) experiment (Crain and McKee 1985; Crain and Fodor 1993). The experimental scenarios consisted of a story about a pair of pictures. The first picture always showed two older children engaged in a particular activity, such as drawing a picture or playing with blocks, while the second picture always showed two younger children in close proximity to the relevant items (e.g. paper and crayons, or blocks) but not interacting with them. Participants were told that while the four children have the same babysitter, only the younger children had to wait for the babysitter to tell them what to do. The older children are old enough to choose their own activities without permission, and because of this, the babysitter should not tell them what to do. This sets up a mood-based dichotomy in which the pictures of the older children are compatible only with declarative sentences, but not imperatives (because they

are autonomous), while the pictures of younger children are compatible only with imperative sentences (because they are waiting to be told what to do).⁵

Following the presentation of the story, one of the two pictures was removed, and the participant was asked to judge the appropriateness of one of five sentence types as applied to the remaining picture: habitual declarative sentence (2a), progressive declarative sentences (2b), *please*-imperative (3a), vocative imperatives (3b), and null-subject sentences (4).⁶

- (2) a. They always play with blocks
b. Now they are playing with blocks
- (3) a. Please play with blocks
b. Hey kids, play with blocks
- (4) Play with blocks

Thirty participants were included in the final analysis, 10 each in 6-month intervals between 2;6 and 4;0. All 30 performed well on declarative and imperative trials of both sub-types, showing that they understood that the imperative mood could only be applied to the pictures of the younger children and declarative mood only to the pictures of the older children. On the NS condition, however, a logistic regression model found a significant difference between the youngest and middle age groups ($p = 0.013$), as well as the between the middle and oldest age group ($p < 0.0001$). Until approximately 3;6, children were allowing NS sentences to have a non-adult declarative interpretation in addition to the adult imperative interpretation, exactly matching the patterns seen in NS production. These data suggest that the NS stage is caused by a principled grammatical difference between child and adult English, and cannot be explained solely on the basis of processing. When the data from the younger two groups of participants was examined in detail, a striking pattern emerged. Although they accepted NS sentences as imperatives and declaratives, the children in the study did not merely answer *true* to every NS item. Instead, they treated the NS items as if they were declaratives in approximately 50% of the trials, and provided follow up justifications consistent with this interpretation. On the other 50% of the trials, they interpreted the NS sentences as imperatives, again with appropriate follow up justifications. This suggests that they were not using the context of the scenario (declarative versus imperative) to decide which structure to project. Instead, the children appeared to be resolving the syntactic ambiguity in one direction or the other, and only then considering whether this mood would match the scenario that had just been presented. Why are children unable to integrate the contextual (or other) information necessary to assign the correct interpretation? This may be where processing factors may come into play. Unlike adults, English-acquiring children initially permit two structures for NS sentences, rendering them ambiguous. When interpreting the meaning of an NS sentence, then, children have to decide between a declarative and imperative representation for the sentence, evaluate the representation relative to the context of the situation, and revise their representation when necessary. This revision process is precisely the kind that children have been previously shown to have difficulty with. In studies of both

lexical (Swinney and Prather 1989) and sentence-level (Trueswell et al. 1999; Syrett and Lidz 2005) ambiguities, children appear to consider only a single option, and have difficulty focusing on multiple cues to lexical or syntactic interpretation. In contrast, the adults in these studies not only show evidence of initially considering both possibilities, but are also able to integrate multiple types of evidence (e.g. lexical and referential information, intonation, etc.) to arrive at a meaning.

It seems that in contrast to adults, who can revise incorrect parses to reflect additional contextual and other information, children are unable to revise an incorrect interpretation, even in the face of disambiguating contextual evidence. When children exit the NS stage at approximately 3½ years, their grammar changes, and the processor is no longer faced with the problem of ambiguity resolution.

Overall, we have seen that an adequate explanation of the NS stage *must* reference a fundamental difference between child and adult grammars. Performance factors, however, may also play a role in children's resolution of the mood ambiguity associated with NS utterances. Children's limited processing resources may not allow them to integrate all sources of information needed to resolve the ambiguity, as seen in studies of ambiguity in other parts of the grammar.

15.2.3. Missing objects in child language

Cross-linguistic studies of object omissions in child language are sparser than those for subject omission. However, there is wide agreement that object omission manifests itself differently and to a different extent, in Romance languages than in English. Studies of English child language typically report object omission at very low frequencies (under 10%) and only at the earliest stages of development (Valian 1991, Wang et al. 1992). In Romance languages, on the other hand, it has been widely documented that null objects constitute a non-negligible portion of children's utterances in contexts where, by adult standards, an object clitic would have been expected.

In Spanish, when a direct object denotes a definite or specific referent that is salient in the discourse, it is typically expressed with an object clitic. Clitics are marked for gender and number and their distribution is limited to positions immediately preceding a finite verb (5a) or immediately following a progressive participle, infinitive, or imperative (5b):⁷

- (5) Context: Talking about some dogs
- | | | | |
|----------|--------|---------------------------|-----------|
| a. Anita | *(los) | lava | [Spanish] |
| Annie | them | washes | |
| b. Anita | está | lavando-los | |
| Annie | is | washing-them | |
| | | ‘Annie is washing (them)’ | |

Persistent object clitic optionality was first observed among typically developing French-speaking children (Clark 1985; Grüter 2006; Müller et al. 1996; Pérez-Leroux et al. 2008), but the phenomenon has also been found in Italian (Guasti 1993/94; Schaeffer 1997; Tedeschi 2009), Romanian (Avram 2000; Babyonyshev

and Marin 2004), Catalan (Gavarró et al. 2010; Wexler et al. 2004) and Spanish (Bedore and Leonard 2001; Castilla and Pérez-Leroux 2010; Fujino and Sano 2002, Mateu to appear). In all these studies suppliance rates for object clitics seem to reach a productive level (viz. 90%) only between the ages of four and five, converging on the finding that object clitics typically appear later than other functional elements, such as subject clitics and definite determiners.

As with the NS stage, theoretical explanations for this inconsistent use of object clitics can be divided into those that attribute the difficulty with object clitics to the competence domain and those that attribute it to the performance domain. Representational accounts claim that the child's early grammar differs from the adult grammar in that it can syntactically represent a sentence with a null referential object. Müller et al. (1996) and Müller and Hulk (2001) propose a parameter account in which early Romance grammars allow referential null objects in the same way topic-drop languages like Chinese do. In a different account, Pérez-Leroux et al. (2008, 2012) propose that children's overgeneration of referential null objects results from their failure to restrict the null structure to the appropriate context, i.e. non-referential contexts. A different account is that of Schaeffer (2000), who attributes the delayed acquisition of clitics to a deficit in the child's pragmatic system which in turn leads to the optional marking of referentiality / specificity and the resulting null-object constructions.

Other authors have argued that object clitic omission in children is evidence of their computational limitations or their immature performance system, rather than to a divergent grammatical representation or constraint. For example, Jakubowicz and Rigaut (2000), and Prévost (2006) argue that it is the placing of (pre-verbal) clitics in a non-canonical argument position that creates computational problems for children. More recently, Grüter and Crago (2012), and Mateu (to appear) claim that producing (pre- or postverbal) clitic constructions requires more complex operations and more working memory resources than creating transitive constructions with full DPs, leading to children's inconsistent use of object clitics.

Both types of accounts lead to an expectation that children will omit object clitics in production. But only processing accounts specifically claim that children's verbal working memory will be a good predictor for their rate of clitic omission. Additionally, as with the NS case, if clitic omission results from an option available in the child's grammar, we predict that children will accept referential null objects in comprehension. On the other hand, performance accounts predict that children who omit clitics in production will reject referential null objects in comprehension, as clitic omission is due to processing or working memory limitations. In the following section, we discuss results from a study testing these predictions.

15.2.4. Comprehension of null objects in L1

Mateu (to appear) addressed these questions in a study investigating object clitic omission in Spanish-speaking children aged 2–4 ($n = 32$; mean = 3;5). In her elicited production study, she found that 2- and 3-year-olds omitted clitics at high rates, and that at this same age they also overused full DPs, as illustrated in Figure 14.1.

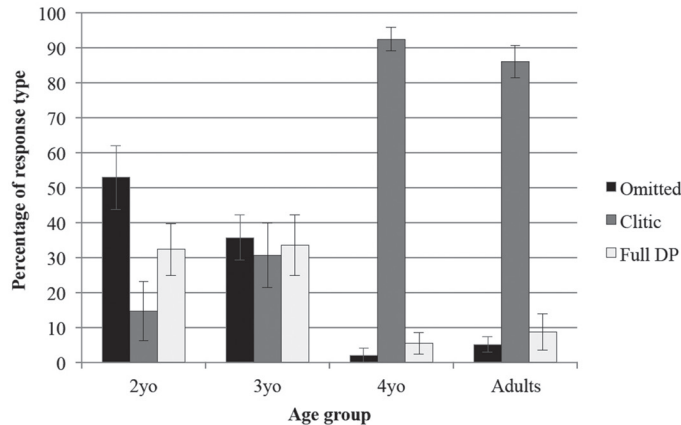


FIGURE 14. Elicitation Task: rate of clitic omission, clitic production and full DPs in Mateu (to appear).

When investigating the relationship between object clitic omission and several other independent linguistic and non-linguistic measures, including mean length of utterance (MLU), subordination index, vocabulary size (i.e. number of different words), verbal working memory (i.e. non-word repetition span), and age, only one variable showed a significant predictive value for clitic omission: verbal working memory ($p = 0.001$). These results suggest that limited verbal working memory may impair clitic production, and also that children may produce full DPs as a compensatory strategy, at the expense of violating pragmatic rules.

To test comprehension, Mateu used a sentence-picture matching task designed such that the child with a null object grammar would allow the target sentences (e.g. *Diego vuela* “Diego flies”) to match a transitive picture/interpretation (e.g. *Diego lo vuela* “Diego flies it”). Results showed that regardless of the high clitic omission rates in the elicitation task in the two younger groups (Figure 14.1), no individual child assigned a transitive interpretation to an intransitive scene in more than 1/6 of items, paralleling Grüter’s (2006) results for French.

On the other hand, children’s performance on the clitic conditions (6) was at chance in the younger two groups, despite perfect performance in the control conditions (full DPs). Notably, performance was significantly lower when the verb was longer, i.e. progressive (6a vs 6b) and when there was an additional constituent at the end (6c vs 6d) (cf. Bloom 1990; Valian 1991).

- (6) a. *Diego lo vuela muy alto*
 Diego it flies very high
 ‘Diego flies it very high’
 b. *Diego lo está volando muy alto*
 Diego it is flying very high
 ‘Diego is flying it very high’
 c. *Diego está volándolo*
 Diego is flying- it
 ‘Diego it is flying’

- d. Diego está volándolo-lo muy alto
 Diego is flying- it very high
 ‘Diego it is flying very high’

Neither of these results is predicted under the hypothesis that children have a null object grammar. Further analyses confirmed that children’s performance in the clitic conditions was again predicted by the verbal working memory score, consistent with the hypothesis that clitic omission is in fact affected by processing limitations, in line with performance accounts.

The results from these studies thus suggest that the linguistic principles that govern object clitic constructions in Romance-speaking children are adult-like from the beginning, but the means for integrating clitics may require more refined and developed mechanisms of memory and language processing. In the section that follows, we shift our attention to the role of parameters in L2 acquisition in adults. Most importantly, we address a question that has been at the heart of L2 acquisition research from a P&P-perspective since its inception; namely, to what extent can parameter settings be (re)established in a developing grammar?

15.3. Second language acquisition and linguistic theory

As in the L1 studies highlighted in the previous section, the P&P model of UG has significantly informed studies of second language (L2) acquisition, especially adult L2 acquisition (see White 1989, 2003 for detailed review and also Haznedar and Gavruseva 2008, Haznedar 2013 for review of child L2 studies). Adult L2 learners face a logical problem similar to L1 learners—they come to know much more about the L2 than can be deduced solely from the input they are exposed to, and this knowledge crucially cannot be explained on the basis of L1 transfer (e.g. see Rothman 2008, Schwartz 1998, Schwartz and Sprouse 2013).

As is its appeal for theories of child L1 acquisition, the parameter model also provides a way to address the poverty-of-the-stimulus problem in adult L2. Under this approach, the task of adult learners is theoretically no different from children’s; they must select for his L2 the appropriate value among competing ones for the same array of antecedently given parameters. While it is understood that the child’s initial state of acquisition is UG, the initial state for adults and their ability to access UG is less clear. Thus, two questions dominated the early L2 field: (a) do adults continue to have access to UG, and (b) what—if any—is the role of the L1 in L2 development? With respect to parameters, the question becomes: is the initial state of the parameters in L2 acquisition like the child’s (unmarked UG settings—if UG is accessible at all) or is it the settings of the L1? The answer to this question is of great consequence for understanding not only the starting point of the L2 acquisition process, but also its development and ultimate attainment.

Not surprisingly, central themes within the early years of generative L2 acquisition theory and beyond have been concerned with initial state modeling and hypothesizing about the extent of UG-accessibility in adulthood. Several initial

stages models within the P&P framework were advanced in the 1990s, including No Transfer / Full Access (Epstein et al. 1996), Full Transfer / Full Access (Schwartz and Sprouse 1996), Minimal Trees (Vainikka and Young-Scholten 1996), Valueless Features (Eubank 1993), among others. These models argued for various degrees of transfer at the level of parametric values (features and their specifications) from the L1. At the same time, they advanced various views of UG (in)accessibility in L2 development, ranging from no accessibility (e.g. Bley-Vroman 1989, 2009; Clahsen and Hong 1995), to limited/partial accessibility (e.g. Tsimpli and Roussou 1991, Hawkins and Chan 1997) through complete full accessibility (e.g. Schwartz and Sprouse 1996; White 1989, 2003).

As is the case for child language, the application of the parameter model to L2 acquisition satisfies a number of theoretical desiderata. First, it predicts that adult L2 grammatical “rules,” stages, and “errors,” like children’s, will not be random, unmotivated or otherwise inconsistent with natural language. Although there is some disagreement among scholars who interpret available data differently, we maintain a “continuity” view of L2 grammars, viz. that deviations from the target L2 grammar are constrained by the parameter space of UG (White 2003, 2008). This view does not entail that L2 grammars are the same as L1 adult grammars; rather, the claim is that they are not *fundamentally* different. Second, the deductive structure of parameters is able to explain how L2 adult grammars, like child L1 grammars, project beyond the confines of the input (e.g. so-called L2 poverty-of-the-stimulus knowledge). Third, a parameter (re)setting approach might provide insight as to why some grammatical properties seem harder than others for L2 learners to acquire, for example, when L1 transfer of parameter setting results in a language that is a superset of the “target” L2. Finally, the parameter approach has provided a framework within which various hypotheses can be formulated and from which precise predictions can be made, often shedding light on complicated and seemingly variable data.

The tension between performance and competence explanations has also featured prominently in adult L2 acquisition. For example, in the production of obligatory inflectional morphology L2 learners consistently make both omission and commission type errors. When L1 transfer fails to explain these errors, we are faced with the question of whether these errors are performance-based or reflect a different grammatical representation. Several performance accounts have been put forward, including the Missing Surface Inflection Hypothesis (MSIH) (Prévost and White 2000) and the Interface Hypothesis (IH) (Sorace 2011). The MSIH maintains that L2 learners have difficulty mapping syntactic function to morphophonological form in production. This predicts asymmetries between production and comprehension in much the same way performance-based explanations do for L1, as discussed in the previous section. By appealing to possible processing limitations inherent in managing more than one linguistic system (e.g. the tension of inhibitory control and its release, as well as limited attentional resources), the IH explains difficulties with discourse integration that exist even at the highest levels of L2 proficiency. We can see from this discussion that hypothesizing about performance variables at the level of L2 production is also a central theme in P&P approaches to adult non-native acquisition.⁸

In this section, as in the L1 section, we focus on argument omission parameters (null-subject / null-object parameters) and their possible role, and interplay with

other deterministic variables, in explaining the facts of L2 acquisition. We begin with the literature on null subjects, which is perhaps the most widely studied linguistic domain in generative L2 research and then turn to the less studied domain of null objects.

15.3.1. Missing subjects in adult L2

The null-subject parameter has long been seen to support both the full transfer and full access hypotheses, based on the interplay between null-subject languages such as Spanish and non-null-subject languages such as English. We see a different developmental trajectory depending on which type of language is the L1 and which is the L2.

The case of L2 learners of Spanish who have a [– pro-drop] L1 is relatively straightforward. These learners show mastery of the syntactic environments in which null subjects are permitted—a finding consistent with the availability of parameter resetting, hence full access to UG. However, these learners do not necessarily reach fully native-like attainment on null subjects. In particular, they show difficulties with appropriately restricting the pragmatic licensing of null arguments in both productive and receptive tasks until extremely late in development (Al-Kasey and Pérez-Leroux 1998; Liceras 1989; Liceras and Díaz 1999; Liceras et al. 1999; Rothman and Iverson 2007). This pragmatic result has been taken to indicate some type of difficulty for L2 learners at the syntax-pragmatics interface (e.g. Sorace 2004; Sorace 2011; but cf. Rothman 2009).

The data from L2 English learners with a [+ pro-drop] L1 raise an empirical puzzle, however, because their performance on certain receptive tasks differs from their production data. On grammaticality judgment tasks, low proficiency learners incorrectly accept ungrammatical referential null subjects in English (Davies 1996; White 1985, 1986). This acceptance declines with increasing English proficiency, consistent with an initial L1-setting of the parameter, followed by a resetting during development. Moreover, White (1985, 1986) finds that French-speaking learners of English accept significantly fewer null-subject sentences than Spanish-speaking learners—a contrast which is predicted under a transfer account, as French is not a null-subject language.

In contrast to the judgment data, and unlike child L1 learners, however, adult L2 learners with [+ pro-drop] L1s *produce* very few NS sentences (in both spontaneous and elicited production), and do so only in the earliest stages of L2 development (e.g. Hilles 1986; Phinney 1987; Ruiz de Zarobe 1998). If acceptance of null subjects in judgment tasks is evidence of transfer, why do we not see the transferred L1 grammar reflected in production? There are two possibilities a priori: if the interlanguage grammar permits null subjects till late in L2 development, then learners' failure to omit subject in production must be for some independent reason; alternatively, if the grammar does not license null subjects, then perhaps learners accept null subjects in the judgment task because of processing difficulties in their L2. These two possibilities lead to different predictions: if L2 learners permit null subjects in judgment tasks because of processing difficulties in their L2, and not for grammatical reasons, then in a comprehension task they should disallow a declarative interpretation of

a NS sentence as do native English speakers. On the other hand, if transfer *has* occurred, and their interlanguage grammar is [+ pro-drop] then they should be able to interpret a subjectless sentence in English as a declarative.

Using a battery of tests, including a grammaticality judgment task, a production task, and the same comprehension task used in Orfitelli and Hyams (2012) to test L1 English children, Orfitelli and Grüter (2013) tested whether null subjects are licensed in the grammar of L2 learners whose first language is [+ pro-drop]. They replicated previous judgment task results, finding that learners incorrectly accept NS sentences in approximately 30–40% of sentences, and this acceptance declines with increasing proficiency ($r(15) = -.80, p < .05$). Also as previously reported, participants did not produce NS sentences in elicited speech. We thus see the same between-task contrast noted previously. It is the comprehension task that disambiguates the two different findings: L2 learners, even at low proficiency levels, interpret NS sentences as English monolingual speakers do—as imperatives. This strongly suggests that they have acquired the target, English representation, and that transfer of null subjects has not occurred between the L1 and L2. In this respect they differ from the L1 children studied by Orfitelli and Hyams, who showed evidence of a [+pro-drop] grammar. Thus, acceptance of NSs by L2 learners on judgment tasks would then be understood as a performance effect, consistent with previous evidence showing that processing resources significantly correlate to L2 responses on some judgments (McDonald 2006). Together with the L1 data, this suggests a perhaps controversial methodological lesson: that errors on a grammaticality judgment task may be best captured by a processing-based explanation, in contrast to errors on comprehension tasks, which reflect an underlying difference in grammatical representation.

The NS parameter also provides an important testing ground for L2 mastery of the syntax-pragmatic interface, which has previously been argued to pose particular difficulty for L2 learners. Null subjects must be grammatically licensed, but their precise distribution is governed by various pragmatic and discourse factors, for example, they must refer to an established topic, and conversely, pronominal reference to the topic must be null and not an overt pronoun. In an examination of L2 Spanish acquisition by native English speakers, Rothman (2009) reports that intermediate and advanced learners have mastered the syntactic requirements of the Overt Pronoun Constraint (OPC)⁹ (Montalbetti 1984), but do not show a native distribution of null and overt subjects—the discourse mediated consideration—until advanced levels of learning. Non-target behavior does not appear to be a simple instance of L1 transfer, however, as Rothman finds a general overuse of pronouns, both overt and null, as opposed to simply an overuse of overt pronouns that would be predicted based L1 English interference. The L2 results provide strong evidence that the grammatical licensing of NSs and the syntax-pragmatic interface principles that govern their distribution belong to separate linguistic modules—with the interface principles posing a more substantial learning challenge.

15.3.2. Null objects in adult L2 acquisition

Like null subjects, languages can either license phonetically unrealized objects (e.g. European Portuguese) or not (e.g. English). For the languages that do allow

for non-overt objects, the syntax is not uniform; some languages license *pro* (e.g. Brazilian Portuguese) and have true null objects whereas others have a topic-operator syntax (e.g. Chinese, European Portuguese). Although the distinction is not always immediately obvious, the two cases can be teased apart by various syntactic tests. For example, true null objects (*pro*) can occur in syntactic islands, whereas the operator-bound null object—derived by movement—will be blocked in islands. Language-specific conditions conspire to further differentiate the distribution of overt and null objects in topic-operator languages. This cross-linguistic, micro-parametric variation creates a rich domain for L2 research, especially for the effects of transfer with a parameter model. We can examine the acquisition or the unlearning (depending on the directionality of the L1 → L2 pairing) of null objects across languages that either allow or disallow null objects. And we can investigate the effects of different syntactic / semantic / discourse requirements on the transfer of null objects between different kinds of null-object languages.

Yuan (1997) examines the L2 acquisition of English by Chinese speakers, a language pairing that requires the unlearning of null objects. In his study, he examined both null subjects and objects (both possible in Chinese), revealing an asymmetry in the opposite direction of that found in the development of L1 English. Chinese learners of L2 English reject illicit null subjects, but are far less likely to detect ungrammatical null objects. Yuan explains this asymmetry based on the type and threshold of evidence needed for the two properties to be unlearned; unlearning null subjects is easier because of evidence in the input indicating the specifications of AGR and T.

Work by Bruhn de Garavito and Guijarro Fuentes (2002) shows complete successful acquisition (English → Spanish) in the opposite direction of Yuan's (1997) Chinese to English findings. While not generally considered a true null-object language, standard Spanish also allows null objects in certain semantically restricted circumstances (see Campos 1986; Sánchez 2003), viz. dropped objects must be indefinite, non-specific, as seen in the question-answer pairs (7) vs (8):

- (7) Q: ¿Trajiste la cámara? [Spanish]
brought-you the camera
'Did you bring the camera?'
A: Sí, *(la) traje
yes, it brought-I
'Yes, I brought it'

- (8) Q: ¿Trajiste galletas?
brought-you cookies
'Did you bring cookies?'
A: Sí, (*las) traje
yes, them brought-I
'Yes, I brought them/some'

(Bruhn de Garavito and Guijarro-Fuentes 2002: 60)

In (7), a definite, specific object may be replaced by an object clitic, but cannot be omitted in the answer. In contrast, as seen in (8), an indefinite, non-specific object

must be dropped in the response. This alternation is also seen in clitic left dislocation and topicalization structures, as in (9) and (10), respectively:

(9) Estos zapatos, *(los) compré la semana pasada
 These shoes, them buy-I the week last
 ‘These shoes, I bought last week’

(10) Café, (*lo) tomo todas las mañanas
 Coffee, (*it) drink-I every the mornings
 ‘Coffee, I drink every morning’

(Cuza, Pérez-Leroux, and Sánchez 2013: 97)

Following Huang’s (1984) analysis for Chinese and Raposo’s (1986) for European Portuguese, Campos (1986) claims that the dropped object in cases like (8) and (10) involves operator movement to the left periphery. Because covert movement is implicated, the dropped object cannot occur in islands even when they meet the semantic definiteness and specificity conditions.

Bruhn de Garavito and Guijarro Fuentes (2002) show that English learners of L2 Spanish have knowledge of both the syntactic (island) and semantic (specificity) constraints. Bringing together the results of Yuan (1997) and Bruhn de Garavito and Guijarro Fuentes (2002), it seems that it is easier for L2 learners to acquire null objects than to unlearn them. This is unsurprising given that the unlearning requires additional, if not different kinds of evidence from the input (i.e. it faces the negative evidence problem). However, it should be noted that Bruhn de Garavito and Guijarro Fuentes also examined European Portuguese (EP) learners of L2 Spanish, whose native grammar differs from Spanish in not being constrained by the specificity and definiteness restrictions on null objects. The EP learners were also highly successful despite the more restrictive distribution of null objects in Spanish. Together, these two groups show that dropped objects can be acquired when an L1 lacks this syntactic option and that the micro parametric properties of null object distribution can be acquired as well.

Rothman and Iverson (2013) asked whether in the course of L2 acquisition, a learner could replace *pro* in object position with an operator-licensed empty category. This would be the task for Brazilian Portuguese (BP) learners of Spanish. As noted earlier, BP permits null objects in syntactic islands in contrast to EP and Spanish. Rothman and Iverson’s results show that BP learners, like the EP learners just discussed, acquired the semantic (definiteness / specificity) constraint in Spanish, rejecting all instances of definite dropped objects, while accepting indefinite ones (11a). But they were unable to fully acquire the Spanish syntax. They incorrectly accepted dropped objects in CP islands (11c) and adjunct islands (11d) (though not in DP-islands, 11b), but interestingly, restricted these to [– definite, – specific] contexts. The following examples illustrate their interlanguage grammar:

- (11) Q: ¿Juan trajo cerveza a la fiesta?
 ‘Did Juan bring beer to the party?’
 a. A: Su novia me dijo que * (la) trajo
 ‘His girlfriend told me that he brought (some)’

- b. A: Existe el rumor de que *(la) trajo
‘There exists the rumor that he brought (some)’
- c. A: Que *(la) trajo es obvio
‘That he brought (some) is obvious’
- d. A: Sí, todos nos emborrachamos porque *(la) trajo
‘Yes, we all got drunk because he brought (some)’
(adapted from Campos 1986: 355)

The following table schematizes the differences between the various null-object languages under discussion:

	Obeys island constraints	Obeys specificity/ definiteness constraint
Spanish	✓	✓
Brazilian Portuguese	×	×
European Portuguese	✓	×

Thus, BP learners of Spanish whose L1 obeys neither island conditions nor specificity/definiteness restriction on null objects (both of which hold in Spanish) were able to acquire the Spanish semantic conditions on null objects, but not the syntactic conditions (at least not completely). These results contrast with the finding that English L2 learners of Spanish have acquired both the syntactic and semantic constraint for Spanish null objects, but accord with the findings for EP L2 learners of Spanish. These learners also acquired the more restrictive conditions on Spanish null objects and transferred their L1 syntax, which matches the L2.

At first blush, it seems curious that the English learners were more successful at acquiring the Spanish syntax than the BP learners. However, a possible interpretation of the BP L2 Spanish learners’ island violations is that they transfer their L1 object *pro* to Spanish—with additional feature specifications—rather than switching to an operator-bound null object, possibly because of the negative evidence required to move from *pro* to an operator-bound null object which has a more restricted distribution. According to Rothman and Iverson (2013), English learners are more successful precisely because there is no burden to “unlearn” stemming from L1 transfer.

15.4. Contact and heritage grammars

In the previous sections, we have made the case for the role of parameters in L1 and adult L2 acquisition. In this final section, we supplement the discussion by demonstrating how and to what extent (some version of) parameters can model grammatical outcomes (i) developing from sustained contact with another variety over the course of many years, and / or (ii) resulting from a lack of activation of an L1 grammar acquired earlier in life but later replaced by another L2. Dialects

and languages spoken by this latter group are common referred to as “heritage grammars” and represent a particular challenge to the parameter-setting model of language acquisition and change.

One of the biggest challenges surrounding the treatment of heritage grammars is to arrive at a working hypothesis of the grammatical competence of these speakers. Polinsky (1997, 2006) and Montrul (2002, 2004, 2008) have argued that in some instances the steady state adult grammars of heritage language speakers appear to be significantly simplified because of a process known as “incomplete acquisition.” According to this hypothesis, a distinction is made between performance errors (such as lexical retrieval) that we might find in a “fully acquired grammar” versus errors resulting from “incompletely acquired grammars” or representations, which are assumed to reflect competence.¹⁰ According to Montrul (2009: 241), sequential bilinguals who exhibit an incompletely acquired-grammar are exposed to “less than optimal input conditions during the period of later language development that takes place during the pre-school and school years (4–13 years) when many aspects of grammar may not reach full development and remain incompletely acquired.”

The larger goal of this section is to present a brief overview of research into null subjects and null objects in contact and heritage varieties of Spanish and to show how parameters have provided a better understanding of these grammars. We will offer evidence from both production and comprehension and also discuss apparent competence-performance mismatches, similar to those discussed in the previous L2 section.

15.4.1. Null subjects in contact varieties of Spanish

The null-subject parameter has been studied much less in heritage grammars (Montrul 2004; Montrul and Louro 2006; Tsimplici, Sorace, Heycock, and Filiaci 2004). To date, the most commonly studied properties have been (a) the obligatory nature of null expletives, (b) the availability of null referential subjects, (c) the availability of postverbal subjects with unaccusative verbs, and (d) the lack of that-trace effects. Research in this domain has mostly concentrated on (b) and (c) above.

Montrul’s (2004) work on null subjects in the grammar of English-dominant heritage speakers of Spanish focuses on two syntactic properties traditionally associated with the null-subject parameter; namely, the syntactic licensing of null subjects, and the availability of postverbal subjects with unaccusative verbs. With respect to the first property, she investigated the contrast between overt and null subjects as illustrated in examples (12) and (13) below (Montrul 2004: 127):

(12) Ella/ mi amiga llam-ó a la puerta
 She/ my friend called-he to the door
 ‘She/my friend knocked on the door’

(13) Llam-ó a la puerta
 Called-he to the door
 ‘She knocked on the door’

Montrul (2004: 128) also looked at the distribution of overt and null referential subjects. In the case of unaccusative verbs, she focused on the availability of postverbal overt subjects:

- (14) a. *María* *lleg-ó* *ayer*
 Maria arrived-she yesterday
 'Mary arrived yesterday'
 b. *Ayer* *lleg-ó* *María* (preferred)
 Yesterday arrived-she Maria
 'Yesterday Mary arrived'

She also examined the pragmatic and semantic conditions under which null subjects are allowed.¹¹ The data consisted of the oral speech of 24 heritage speakers of Spanish of Mexican American background in a story-telling task. Heritage speakers were divided into two groups according to proficiency (intermediate and advanced speakers) using an independent proficiency measure. Montrul (2004) did not find any statistically significant differences in the distribution of referential overt subjects or of postverbal subjects with unaccusative verbs between the two groups of heritage speakers and a control group of Spanish-dominant second language learners of English. She did, however, find differences between the two heritage groups with respect to what she defined as "redundant overt subjects." Montrul concluded that while syntactic properties are not affected by contact with English, the pragmatic conditions for appropriate use of null subjects are. This study suggests that the two properties associated with the null-subject parameter are acquired in a way similar to how they are acquired by sequential bilinguals who are Spanish dominant. The findings are also similar to the results reported in the previous section for intermediate and advanced L2 Spanish learners who had little difficulty with the syntactic constraints on null subjects (Overt Pronoun Constraint) but who acquired the discourse constraints on the use of null and overt subjects much later (Rothman 2009).

As enlightening as this research may be, it does not provide a complete picture of the complexity of null subjects in heritage language speakers. In a study of various features associated with null-subject languages, including overt vs null subjects, verb subject inversion in interrogative and declarative sentences, expletive null subjects and *that*-trace effects, Cabrera-Puche (2008) found that Dominican heritage speakers of Spanish living in the US differed from their monolingual counterparts in the Dominican Republic in at least two respects. They accepted null subjects at higher frequencies in interrogative sentences (as shown in (15a), and they showed more (overt) preverbal subjects in declarative sentences (as in 15b, from Cabrera-Puche 2008).

- (15) a. *¿Qué cre-íste?*
 What believed-you
 'What did you believe?'
 b. *Ellos llev-aron muchas medallas*
 They take-3.PL.PST many medals
de oro al podio
 of gold to-the podium
 'They brought many gold medals to the podium'

It has been claimed that Caribbean varieties of Spanish, in particular Dominican Spanish (Toribio 2000), are undergoing a shift from a null subject to an overt subject language. Of particular relevance in this variety is the availability of a third person over expletive pronouns (Jimenez-Sabater 1977). The data just cited seem to indicate that contact with English did not affect heritage speakers' acceptance of null subjects in interrogative sentences in grammaticality judgment tasks. This despite the higher frequency of overt subjects than their monolingual counterparts in a production task given to the same participants.

Heritage speakers in contact with non-Caribbean varieties of Spanish accepted null subjects to a greater degree than the heritage speakers exposed to Dominican Spanish. Cabrera-Puche (2008) proposes that contact with other varieties of Spanish that exhibit higher frequencies of null subjects may in fact be a possible influence for these findings.

This type of evidence seems to point in the direction of differences in grammaticality judgment data and oral production data. It indicates that heritage speakers might be able to restructure grammars on the basis of evidence coming from other varieties of their language, and that the properties of null-subject languages have multiple variables that involve differences between sentence types (declaratives vs interrogatives).

15.4.2. Null objects in contact varieties of Spanish

In addition to null subjects, null objects are also affected by cross-linguistic influence in language contact situations. In traditional work by Huang (1984) for Chinese and Campos (1986) regarding Spanish, it has been posited that null objects are licensed by a topic operator. When speakers of null-object languages acquire languages with overt direct object pronouns, they should be able to reset the topic condition for licensing of null objects in the appropriate contexts. As we saw for second language acquisition in section 2, in language contact situations null objects may emerge in overt object languages even if they are not licensed in non-contact varieties. This is precisely the situation in Andean Spanish, a language in contact with Quechua, a null-object language.

There is evidence from production data that this contact variety of Spanish allows for null objects with definite antecedents, as shown in the following sentence with a null object with a definite referent (Sánchez 2003: 130):

- (16) a. Este hombre está tocando un cartoncito
 This man is touching a cardboard (piece)
 'This man is touching a little cardboard (piece)'
 b. habiendo su perro y su sapo y su motelu
 having his dog and his frog and his turtle
 'there being his dog and his frog and his turtle'
 c. este hombre está abriendo
 this man is opening
 'this man is opening (the box)'

Despite the fact that Quechua lacks overt 3rd person direct object markers on the verb, speakers of Andean Spanish in contact with Quechua still have 3rd person proclitics and clitic doubling structures. Contact generates a new grammatical configuration in Spanish in which null objects and direct object clitics are both possible as shown by the availability of clitics in (17):

- (17) Y el perro le mira también
 and the dog him looks too
 ‘And the dog looks at him too’

(Sánchez 2003: 120)

As argued in Sánchez (2003), the choice between the two (16c vs 17) is related to the nature of the discourse topic that either the null object or the clitic refers to. While clitics have continuing topics as their most frequent antecedents in discourse, null objects appear to have a very specific deictic function in discourse and refer to elements present in the context but not necessarily previously mentioned. This indicates that null objects are sensitive to pragmatic constraints.

Returning to the central theme of this chapter and the volume in general, the findings from research on the null-subject and null-object parameters in heritage languages and language contact situations present us with significant differences between production data and grammaticality judgment data in the case of null subjects and with pragmatic differences in the case of null subject and objects.

15.5. Conclusion

In this chapter we have briefly reviewed work in language acquisition and language change. We have attempted to illustrate how parameters may simplify the learning process in L1 and L2 acquisition, and also provide a guiding intuition into the possible variability in the development of heritage grammars and languages in contact from various typological backgrounds.

With respect to L1 acquisition we saw that children acquiring non-null-subject languages such as English pass through a grammatical NS stage, as evidenced by both production and comprehension data. On the other hand, Spanish-speaking children drop object clitics in production (in illicit [+ definite] contexts) though they do not accept them in comprehension tasks. We concluded that in contrast to the grammatical null subject stage, the dropping of object clitics in languages where this is not a grammatical option, represents a performance problem. This hypothesis is supported by measures of working memory. Thus, some—but not all—parameters are missed in the course of L1 development. Why one argument omission parameter is subject to “error” and the other not is an important issue that need to be addressed.

In the L2 section we saw how the full transfer and full access hypotheses play out in a parameter model by looking at the interplay between null-subject and non-null-subject languages such as Spanish and English, respectively. L2 learners seem to transfer their native parameter setting but are able to reset the value of the

NS parameter with increased proficiency in the L2. This is true in both directions, L1 Spanish to L2 English or vice versa. At the same time they show difficulty in acquiring the pragmatic restrictions governing the use of null/overt subjects. Also, L2 learners show differences across tasks measuring NS parameter effects. One interpretation of these results is that in adult L2 learner judgment tasks may be less reliable in assessing grammatical competence than production and comprehension tasks. The null object results among L2 learners are complex—varying as a function of the L1-L2 pairing. One consistent result is that learners are able to acquire the semantic restrictions on null objects in languages such as (non-contact varieties of) Spanish where they are limited to indefinite, non-specific objects. The findings with respect to syntactic acquisition are more variable. Noteworthy is the finding that going from one kind of null object (*pro*) in the L1 to another (operator-bound null object) in the L2 may pose a substantial learnability problem.

In this paper we have focused on argument omission parameters. These are but a few of the many parameters that have been proposed as part of UG. As with any theory, the precise nature of UG parameters, their specific details, and the number required to account for the range of language variation is an empirical matter and subject to constant revision. It is, of course, theoretically desirable to put principled limits on parameters, lest they lose their explanatory force. An early attempt in this direction was Borer's (1984) proposal that parameters be linked to functional features. More recent formulations of parameter theory also appeal to features, though under different assumptions (see for example, Lardiere 2009a, 2009b). Manzini and Wexler (1987) in their parameterized binding theory proposed that parameters be linked to specific lexical items. Safir (1987) noted that this approach would lead to an 'atomization' of parameters reducing their deductive power. The debate over the right granularity of parameters continues (for example, Lightfoot's 2006 theory of microcues). This kind of debate is especially pronounced in L2 acquisition and heritage language and contact languages (for example, Putnam and Sánchez 2013; Sánchez 2003, 2004; Slabakova 2009). Whatever the ultimate size and shape of parameters, we hope to have shown that the basic assumptions of parameter theory make an important contribution to our understanding of language development across the different populations of learners we have discussed here.

Notes

- 1 The RNS option is tied to the possibility of truncation, viz. clausal truncation (Rizzi 1993/94) and on the variation that languages show with respect to the level at which categories can be taken as the root in child and adult grammars. See Rizzi 1993/94, 2005 for discussion.
- 2 The VP length effect has been replicated in both spontaneous speech and elicited imitation in English (Valian 1991; Valian et al. 1996) and also in Danish-speaking children (Hamann and Plunkett 1998). Hyams and Wexler (1993) replicated the result in Italian adults. The similarity between Italian adults and the English / Danish-speaking children suggests that the VP length effect has little to do with production constraints (as presumably Italian adults are not so constrained), but rather, is

associated with some—possibly pragmatic—factor associated with argument omission. See Hyams (2012) for further discussion of the role of information structure in subject omission.

- 3 The metrical results have not always generalized to other languages. French-speaking children drop object clitics from both iambic and trochaic feet (Hamann et al. 1996; Jakubowicz et al. 1996); German-speaking children omit postverbal subjects much more than in situ objects though the metrical structure is the same (Hamann 1996); and even in English Valian et al. (1996) found that expletive subjects are omitted more than referential subjects in elicited imitation and pronominal subjects following topic sentences, which are dropped more often. In both these cases metrical factors are held constant.
- 4 Note that the VP length effect is not problematic for Rizzi's RNS account, which specifically appeals to processing limitations as the reason children's grammars are initially set to the "more economical" null subject option.
- 5 The fact that the appropriateness of sentences is determined by imperative versus declarative mood means that this design is not strictly speaking a TVJT, because rejecting or accepting an imperative sentence does not involve computing a truth-value. That said, it is similar to the TVJT in that it assesses children's interpretation of test sentences, rather than eliciting a meta-linguistic judgment (as in a grammaticality or acceptability judgment task).
- 6 Two different declarative and imperative conditions were included to prevent children from using *please* as the only indicator of imperative mood (the "magic word," so to speak), and interpreting all other sentences as declarative.
- 7 With regards to their syntactic representation, we assume a base-generation analysis of clitics. Under this analysis, the canonical object position contains an empty category *pro* to which the verb assigns a theta-role. Clitics head an independent functional projection that selects a [+specific] DP as their specifier, thus triggering movement of *pro* to this position (Sportiche 1996).
- 8 In recent years, several alternative approaches in generative L2 acquisition have questioned the usefulness of parametric approaches, in part following recent trends in minimalist theory (see for example, Lardiere's 2009a, 2009b Feature Reassembly Hypothesis).
- 9 Briefly, the OPC describes a difference in referential properties of null and overt pronouns in pro-drop and topic-drop languages, under which overt pronouns cannot be bound by a quantified antecedent (e.g. *nobody*).
- 10 This perspective on the final competence of heritage language speakers is by no means universal. See Rothman 2007; Pires and Rothman 2009; Pascual y Cabo and Rothman 2012; Putnam and Sánchez 2013; and Kupisch 2013, among others, for discussion.
- 11 This study also included the distribution of clitic objects in heritage Spanish but did not include null objects.