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Review

The Setting of the Null Subject Parameters across (Non-)Null-Subject Languages

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Abstract: This article explores a learning model for acquiring a variety of null and non-null-subject languages (i.e., consistent, partial, semi and non-null-subject languages). This model builds upon a version of the Null Subject Parameter(s) based on the "Borer-Chomsky Conjecture" (BCC), which assumes that the presence or absence of a D(definiteness)-feature in different functional heads, together with EPP (Extended projection principle) related features, account for the distributions of null subjects in a complex typology of (non-)null-subject languages. This BCC-based learning model assumes the hypothesis that children, in order to learn the pattern of null subjects in their language, need to look at the morphology of functional elements. By reviewing acquisition studies, I examine whether the model is compatible with the data. I argue that there is no evidence of parameter missetting in any of the languages examined, and that children's early sensitivity to functional elements suggests that the BCC-based learning model is a suitable theory for the acquisition of null subjects.

Keywords: null subjects; learning model; generic null subjects

1. Introduction

In this review article[1], I discuss the acquisition of null subjects across different (non-)null-subject languages. Particularly, I examine whether the BCC-view ("Borer-Chomsky Conjecture") Baker (2008) of the Null Subject Parameter Holmberg (2010); Holmberg and Roberts (2010); Roberts (2010b, 2019) could in fact account for what is known about the acquisition of null subjects by children exposed to different languages. I bring in data from the acquisition of generic null subjects Bertolino (2020), which is commonly ignored in the literature, including by the model under consideration.

The BCC-view of the Null Subject Parameter defends that whether a language has null subjects or not depends on the interaction of specific ϕ-features on functional heads (particularly the person feature). The presence or absence of these features would lead to a diverse cross-linguistic distribution of null subjects.

The (non-)null-subject typology is more complex than initially thought. The original formulation of the Null Subject Parameter implies that a language has an unexpressed subject, like Italian, or an overt one, like English. Languages such as Italian that permit definite null subjects under unconstrained conditions are referred to as "consistent null-subject languages" (CNSLs). Languages with no null subjects, such as English, are called "non-null-subject languages" (NNSLs). "Partial null-subject languages" (PNSLs) are languages that allow definite null subjects in a more confined environment than CNSLs (e.g., Finnish and Brazilian Portuguese). 3SG definite null subjects are generally disallowed in main clause, but allowed when controlled by a subject in a higher clause. In Brazilian Portuguese, for example, 3SG definite null subjects are possible only in (i) embedded clauses when controlled by an antecedent in a higher clause; and in (ii) matrix clauses when the antecedent can be easily identified by a referent present in the pragmatic context (e.g., when the referent is physically present). Another contrast is that PNSLs permit generic null subjects (1), which are illicit in CNSLs (2)[2]: sentences ((1) and (2) are identical, but

they have different interpretations: in Brazilian Portuguese (BP) (a PNSL), the null subject is and can only be generic, but in European Portuguese (EP) (a CNSL), the null subject can only be definite). "Semi null-subject languages" (SNSLs) (e.g., Yiddish, Kriyol) only allow expletive omission and, in some cases, omission of quasi-arguments. There are also "Radical pro-drop languages" (RNSLs), such as Chinese, Korean and Thai, characterized by lacking agreement and the dropping of any argument in the structure, subject or object, in fairly unrestricted circumstances. Table 1 summarizes the (non-)null-subject typology just described (RNSLs are not included).[3]

Table 1. Null subject typology.

Types	Consistent	Partial	Semi	Non-Null-Subject
Examples	*Italian, Greek*	*BP, Finnish*	*Kriyol, German*	*English, French*
Main (3SG)	null	overt	overt	overt
Embedded (3SG)	null	null	overt	overt
Generic	overt	null	overt	overt
Expletive	null	null	null	overt

(1) Em São Paulo, ∅ não pode   andar   sem   máscara.   BP (PNSL)
    In São Paulo,   not can-3SG walk-INF without mask
    'In São Paulo, one cannot walk without a mask'.

(2) Em São Paulo, ∅ não pode   andar   sem   máscara.   EP (CNSL)
    In São Paulo,   not can-3SG walk-INF without mask
    'In São Paulo, s/he cannot walk without a mask'.

By selecting common elements of different languages and assigning them to universal and innate causes, the Principles and Parameters (P&P) theory can explain cross-linguistic disparities in the distribution of null subjects. As parameters constrain the possible linguistic structures, they facilitate the learning process: it becomes a matter of setting parameters and resetting them when necessary. Despite the advantages of parametric theories in explaining both cross-linguistic variation and language acquisition, the idea of parameters as a component of UG (Universal Grammar) is problematic for the current minimalist aim to reduce the content of the UG to minimum. This explains the choice to adopt the BCC-version of the P&P theory: if parameters are reduced to lexical functional feature (FF) differences, UG will have no more than a specification of possible FFs (or not even that, as I am going to discuss later).

The question is whether the view of the Null Subject Parameter as resulting from a certain combination of FFs has the advantage of the classical parametric theory. Chomsky (1981, p. 240ff) and Rizzi (1982, p. 117) proposed that if a language has null subjects, it carries a cluster of grammatical properties (3). With this assumption, the child has the advantage of obtaining these additional properties when he/she sets the Null Subject Parameter (e.g., the absence of complementizer-trace effects in null subject languages, which is not accessible in the input[4]).

(3) a. The possibility of a silent, referential, definite subject of finite clauses;
    b. Free subject inversion;
    c. The apparent absence of complementizer-trace effects;
    d. Rich agreement inflection on finite verbs.

The cluster of properties that the child associates with the null subjects facilitates the learning process and thus takes linguistics towards explanatory adequacy. This is a positive outcome, which ideally should be preserved in any parametric account of null subjects. As will be discussed in the following section, it is possible to keep the cluster of properties associated with null subjects in the theory advocated here.

This article is organized as follows: Section 2 describes the Null Subject Parameter(s) under the BCC-view. Section 3 looks at learning models compatible with the BCC-view

to account for the acquisition of null subjects Biberauer (2018); Biberauer and Roberts (2016); Roberts (2019). The sections that follow are devoted to research on the acquisition of different (non-)null-subject languages. Section 4 examines a potentially problematic case for the BCC-approach: the occurrence of missing null subjects in the speech of English-speaking children (and other non-null-subject languages). Although the phenomenon suggests that children take longer than expected to set the Null Subject Parameter, the most likely explanation is that missing subjects are instances of diary drop Bromberg and Wexler (1995); Haegeman (1990, 1997); Rizzi (1994). I also discuss Root Infinitives, which could not be interpreted as subject drop or as a byproduct of parametric missetting.

In Section 5, I briefly examine the evidence showing that children acquiring RNSLs know their languages allow a generalized pattern of argument dropping.

In Section 6, I look at research on children who have been exposed to CNSLs and PNSLs. I also discuss the acquisition of generic null subjects by children exposed to PNSLs. Studies with children acquiring BP and Estonian demonstrate that they produce generic null subjects at a young age: before the age of 3;00. Experimental data additionally suggest that children acquiring BP correctly reject the definite interpretation of null subjects in impersonal constructions Bertolino (2020). Since generic null subjects are the defining property of PNSLs, I argue that children acquiring Estonian and BP know they are acquiring a PNSL in their early years. Section 7 concludes the paper.

2. Null Subject Parameter(s)

2.1. Empirical Problems

Although the classical Null Subject Parameter Rizzi (1982) provides a solution to the logical problem of language acquisition (Plato's Problem) Chomsky (1980), it was criticized by Gilligan (1989) for failing to account for the linguistic typology of null subjects. Gilligan (1989) tested the Chomsky-Rizzi cluster (3) against a sample of 100 languages and found only the associations in (4) from those entailed by the cluster (5). Notice that the associations found by Gilligan are one-way and, with the exception of (4b), which is merely a statistical association, they are all characteristics that, when manifested, cause the presence of null expletives. As observed by Newmeyer (2004), that is likely to be a consequence of the "virtual non-existence" of languages with overt non-thematic subjects.

(4)   a. Free inversion → expletive null subjects;
       b. Free inversion → complementizer-trace violations (statistical association);
       c. Referential null subjects → expletive null subjects;
       d. Complementizer-trace violation → expletive null subjects.

(Gilligan 1989, p. 147)

(5)   a. Null subjects ↔ rich agreement;
       b. Null subjects ↔ free inversion;
       c. Null subjects ↔ complementizer-trace violations;
       d. Rich agreement ↔ free inversion;
       e. Rich agreement ↔ complementizer-trace violations;
       f. Free inversion ↔ complementizer-trace violations.

The association between rich agreement and referential null subjects has been assumed by a number of authors Chomsky (1981, 1986); Jaeggli and Safir (1989); Rizzi (1982, 1986). For example, according to Jaeggli and Safir (1989), languages with *uniform* inflectional paradigms license null subjects (i.e., languages with full inflection distinction in the verbal paradigm (e.g., Italian) or with no distinction at all):

(6)   a. Null subjects are permitted in all and only languages with morphologically uniform inflectional paradigms.

b. An inflectional paradigm P in a language L is morphologically uniform iff P has either only underived inflectional forms or only derived inflectional forms.

(Jaeggli and Safir 1989, pp. 29–30)

As is shown in Table 2, although consistent null-subject languages necessarily have rich agreement, richness of agreement does not ensure that a language allows (consistent) pro-drop (as can be seen from Finnish, Table 3). Neither is it true that a language completely lacking agreement on the verb necessarily allows pro-drop (as can be seen from Kriyol, Table 4). In other words, the hypothesis that morphological uniformity will necessarily license null subjects put forward by Jaeggli and Safir (1989) does not hold.

Table 2. The verb 'talk' in radical and consistent null-subject languages.

| | Radical pro-drop | | Consistent null-subject | |
| | *Chinese* | *Italian* | *EP* | *Spanish* |
	tánlùn	parlare	falar	hablar
1SG	tánlùn	parlo	falo	hablo
2SG	tánlùn	parli	falas	habla
3SG	tánlùn	parla	fala	hablas
1PL	tánlùn	parliamo	falamos	hablamos
2PL	tánlùn	parlate	falam [1]	habláis
3PL	tánlùn	parlano	falam	hablan

[1] The second person plural pronoun vós with the verbal inflection -is (falais) is hardly used in spoken language. Vocês is used in spoken language instead of vós with the verbal inflection -m (falam).

Table 3. The verb 'talk' in partial null-subject languages.

| | Partial null-subject | |
| | *Brazilian Portuguese* | *Finnish* |
	falar	puhua
1SG	falo	puhun
2SG	fala	puhut
3SG	fala	puhuu
1PL	fala	puhutaan
2PL	falam	puhutte
3PL	falam	puhuu

Table 4. The verb 'talk' in non-null-subject and semi-null-subject languages.

| | Non-null-subject | | Semi-null-subject | |
| | *English* | *French)* | *Icelandic (4 distinctions)* | *Kriyol* |
	talk	parler [1]	tala	fala
1SG	talk	paʁl	tala	fala
2SG	talk	paʁl	talar	fala
3SG	talks	paʁl	talar	fala
1PL	talk	paʁlɔ̃	tölum	fala
2PL	talk	parle	talið	fala
3PL	talk	paʁl	tala	fala

[1] The phonological transcription was given for French, since the inflections seen in the written language (i.e., parle, parles, parle, parlons, parlez, parlent) are different from what is heard in the spoken language.

2.2. Conceptual Problems

In addition to the empirical problems just pointed out, parameters, as originally conceived, are conceptually incompatible with the minimalist architecture. First, the classical parametrical view states that children are born with a rich UG, containing already this and other parameters. The child's task would be to set the parameter values to positive or negative, depending on their input. The incompatibility stems from the fact that the minimalist architecture is based on the "economy principle" to reduce UG constraints and content. Thus, ideally, UG should not contain parameter schemata and grammatical options already specified, but only elements and operations that cannot be attributed to general cognitive factors Chomsky (2005).

If the traditional view of the Null Subject Parameter has to be abandoned due to conceptual and empirical issues, we must also abandon the solution it offered to the Plato's Problem. In other words, we cannot rely on the Chomsky-Rizzi cluster to explain how children acquire inaccessible grammatical restrictions (e.g., complementizer-trace violations). However, it is not necessary to fully give up the benefits of the classical Null Subject Parameter.

2.3. Reshaping the Classical View

Considering a null subject typology that assumes the presence of more than two types of (non-)null-subject languages (Table 1), Roberts (2019) argues that Gilligan's analysis and conclusions can be called into question: Gilligan (1989) classified the languages in his sample into two types: "null-subject languages" and "non-null-subject languages". Only CNSLs seem to conform to the Chomsky-Rizzi cluster, and as in those days that was not known, Gilligan included in his sample languages such as Finnish (PNSL) and Vietnamese (RNSL) which are not exactly like the canonical null-subject languages. Gilligan's mixed sample appears to have resulted in the hasty conclusion that "null-subject languages" do not fit into the Chomsky-Rizzi cluster.

Considering that only CNSLs seem to adhere to the cluster of properties associated with null subjects, Roberts (2010b, 2019) develops a minimalist analysis of null subjects that captures the Chomsky-Rizzi cluster. Before we go into the details of this analysis, let us look at the theory behind it.

Relying on the notion of incorporation, Holmberg (2010), Roberts (2010b, 2010a), assume that null subjects are clitic-like elements that incorporate into T^0. When the subject is a defective goal in relation to the probe T^0, it incorporates into T^0 and suffers chain-reduction, becoming then a null subject. In other words, when the features of D^0 are a subset of the features of T^0, D^0 is considered to be defective in relation to T^0, and thus D^0 is going to suffer incorporation.

CNSLs, such as the typical Romance languages, have a high level of agreement. Most of them also have a rich determiner system, in the sense that there is overt manifestation of phi-features on third-person determiners and an overt distinction between definite and indefinite articles/affixes Roberts (2019). Some Slavic languages, such as Polish, Czech and Serbo-Croatian, are an exception since they lack articles. They do, however, have a rich system of clitics, particularly, second-position clitics, which work as "autonomous definite Ds" (Roberts 2019, p. 252). As a result, it is reasonable to assume that Slavic languages have a rich determiner system as well.

In (7), we have the derivation of a definite null subject in CNSLs. In the structure in (7), pro is fully specified for phi-features and has a D-feature. According to Cardinaletti and Starke (1999), Roberts (2010b, 2010a), pro is a weak pronoun and, as such, it lacks Case. The head T^0, like pro, is fully specified for phi-features and includes a D-feature. Because T^0 has a T- and V-feature, which D^0 does not have, the features of D^0 are a proper subset of the features of T^0. Consequently, D^0 is going to be incorporated into T^0 and will suffer chain reduction, becoming a silent pronoun. The null pronoun is going to have a definite interpretation, due to the presence of D-features.

(7) T[ϕ, D] ... pro [ϕ, D].   Definite null subjects (CNSLs)

In PNSLs, third-person null pronouns in main clauses have an indefinite interpretation. Those languages do not always have rich agreement, and even when they do, agreement cannot license definite null subjects. As a result, PNSLs lack a D-feature on T^0. PNSLs also have a poor determiner system: Russian and Finnish, both PNSLs, lack articles, and Hebrew does not have a full article system (it only has definite articles). Although BP has articles to distinguish between definiteness and indefiniteness, the D projection is not mandatory, as shown by the fact that BP allows bare singular count nouns in subject position (9), largely productive in the language. Roberts (2019) takes these typological observations as evidence that PNSLs have a deficient determiner system. In PNSLs, both T^0 and D^0 lack a D-feature.

Taking these factors into account, there is incorporation of D^0 into T^0 in PNSLs, but the interpretation of pro is going to be generic, given the absence of D-features in D^0 (8). In (10), the internal structure of pronouns is further articulated.

(8) $T[\phi]$ ... pro $[\phi]$ Generic null subjects (PNSLs)

(9) Criança(s) gosta(m) de bolacha(s).   Brazilian Portuguese
     Child-3(PL) like-3(PL) of cookie-(PL)
     'Children like cookies'.

(10)   a. **RNSLs:** $T...[_{DP} \varnothing[-\phi] ...[_{NP} e]]$;
       b. **PNSLs:** $T[\phi] ... [_{DP} (D)[\phi] ...[_{NP} e]]$;
       c. **CNSLs:** $T[\phi,D] ...[_{DP} D[\phi] ...[_{NP} e]]$;
       d. **NNSLs:** $T[\phi] ...[_{DP} D[\phi] ...[_{NP} e]]$.

                                       (Roberts 2019, pp. 237, 241)

T^0 does not have a D-feature in NNSLs, because NNSLs have weak verbal agreement in general. However, D^0 has a D-feature in NNSLs since these languages have rich determiner systems that explicitly denote definiteness and indefiniteness. NNSLs, except for English and Afrikaans, overtly mark number and gender in determiners[5]. As a result, the following structure emerges:

(11) $T[\phi]$ ... pro $[\phi, D]$.   Overt definite subject (NNSLs)

In NNSLs, D^0 is fully specified for phi-features and also has a D-feature. T^0, on the other hand, lacks a D-feature. That being the case, the pronoun cannot incorporate to T^0 because the features of D^0 are not a subset of T^0's features. A null subject will not be allowed; instead, an overt pronoun with a definite interpretation shall be used. We can see that in this approach, null subjects will have the same structure as overt pronouns, with the only difference being that the absence of D in T^0 combined with the presence of D in D^0 will prevent incorporation, and thus D^0 will be spelled out as an overt pronoun.

Radical null subject languages (RNSLs) simply lack agreement inflection. Japanese, for example, lacks pronominal clitics and agreement. RNSLs do not have phi-features, thus null pronouns cannot be derived through incorporation. According to Tomioka (2003), RNSLs allow bare NP arguments in a pervasive way. Null pronouns in these languages would be the result of NP ellipsis. As the topic of NP ellipsis in RNSLs would result in a long discussion for our limited space, I refer the reader to the work of Tomioka (2003) and Saito (2007, 2016) for more details.

Roberts (2019) does not discuss semi-null-subject languages (SNSLs), which differ from NNSLs solely in that they allow non-argument or quasi-argumental null subjects:

(12) Gisteren werd (er) door het hele dorp gedanst.   Dutch
     Yesterday was there by the whole village danced
     'Yesterday, there was dancing by the whole village'.

                                         (Gilligan 1989, 80)

However, Roberts believes that this difference stems from the way the EPP operates in each language. Similarly, Biberauer (2010, 2018) argues that null subjects in SNSLs are not the result of parametric variations related to null subjects, but the reflex of the lack of EPP effect. For the purpose of this article, we will treat SNSLs in the same way as NNSLs, as they have the same underlying structure shown in (10).

Returning to the Chomsky-Rizzi cluster, we can observe that the properties (13a,d) associated with CNSLs follow from the parameters just presented. Additionally, we use Chomsky's labeling approach to account for (13b,c) Roberts (2019).

(13)   a. The possibility of a silent, referential, definite subject of finite clauses;
       b. 'Free' subject inversion;

> c. The apparent absence of complementizer-trace effects;
>
> d. Rich agreement inflection on finite verbs.

Adopting Roberts (2019), the property in (13a) follows from the internal structure of DPs and from the features of T^0. As CNSLs have a "positive" setting of the parameter defining whether T^0 has a D-feature or not (14), T^0 will have a D-feature, which in combination with a D-feature on D^0 will generate referential null subjects in finite clauses.

(14)   Does finite T^0 have a D-feature?

The property in (13b) is a consequence of the strength of T^0 in CNSLs, in the terms of Chomsky (2013); Chomsky et al. (2015). If T^0 is strong enough, T^0 can label when it merges with vP and an overt external argument will not be required to raise to Spec,TP. Free inversion happens as a result of this. For Chomsky, the strength of T^0 is related to rich agreement, thus while CNSLs have a strong T^0, NNSLs have a weak T^0. If a language has a weak T^0, T^0 will be unable to label the constituent on its own and an external argument must raise to Spec,TP. This explains the lack of free inversion in NNSLs. The parameter in (14) also relates to the property in (13d), since T^0 can only have a D-feature if it has rich agreement.

In the account just described, free inversion is closely linked to the complementizer-trace effect. Following the notion of phases Chomsky (2005); Chomsky and Kenstowicz (1999), a sentence like (15) is impossible in English due to the weakness of T^0. CP is a phase and the external argument can only move from Spec, TP if T^0 is able to label the constituent. As T^0 is weak in NNSLs, TP cannot be labeled, and the subject cannot move from Spec, TP. This gives rise to the complementizer-trace effect.

(15)   Who do you think (*that) met John?

CP ceases to be a phase in the absence of a complementizer and TP becomes a phase. To spell it out, it is assumed that, when the complementizer is null, C^0 is deleted Chomsky (2013); Chomsky et al. (2015). The properties of C^0 are inherited by T^0, including phasehood. The subject then can remain in TP. Because CNSLs have a strong T^0, TP always can be labeled and moved from Spec, TP. Thus, (13a) and (13b) can be accounted for under a proposal that includes labeling and phases.

"Rich agreement" is linked to all the traits discussed above: (i) a D-feature on T^0 implies rich agreement (13a); (ii) rich agreement is related to the degree of strength of T^0 in Chomsky et al. (2015); (ii) free-inversion and lack of complementizer-trace effect in CNSLs is related to the strength of T^0, and hence to agreement (13c,d).

Other than CNSLs, the cluster above does not apply to any other sort of null subject language. For example, Brazilian Portuguese (BP), a PNSL, allows complementizer-trace violations, yet has been losing free inversion: subject inversion is now permissible only with intransitive verbs Menuzzi (2000), though in restricted circumstances. The following problem arises in accounting for BP: if the strength of T^0 is all that matters, and BP lacks both rich agreement and a D-feature (i.e., the verbal paradigm, depending on the variety, only has up to three distinctions), the language should exhibit a complementizer-trace effect, just like English. I will not go into great detail about this, but I want to point out that there are many components of a grammar that should be considered before we decide whether an association holds or not. Null expletive subjects, for example, are able to neutralize complementizer-trace effects in languages in which postverbal subjects are banned. This is the case of BP and several creoles Nicolis (2008).

In a nutshell, the Chomsky-Rizzi cluster is compatible with the BCC-view of the Null Subject Parameter. With minor changes, it adequately captures the general contrasts between CNSLs and NNSLs. This is a favorable outcome, since the cluster explains how children exposed to NNSLs acquire inaccessible phenomena. If the morphology indicates that T^0 is weak, operations violating the complementizer-trace restriction will be blocked, because they are incompatible with the feature make-up of T^0.

In the next section, I will discuss in more details how the theory just presented may be applied to the acquisition of null subjects.

3. Null Subject Parameter Setting under the BCC-Account

I am assuming that UG only states that there are underspecified FFs in lexical entries, and that these may or may not be optional Biberauer (2018, 2019); Biberauer and Roberts (2016); Holmberg and Roberts (2010). That is to say, there is no parameter representation at UG, in the sense that there is no parameter associated with grammatical modules, such as Case and Binding. Instead, it is assumed that parameters are located in the Lexicon. PF would be responsible for externalizing the parameters Berwick and Chomsky (2011). This significantly differs from the classic model where UG was richly specified with an inbuilt set of parameters (16a). These parameters were set as positive or negative depending on the cues provided by the input, also called Primary Linguistic Data (PLD) (16b). The final product of the interaction between UG and PLD was the acquisition of a full grammar (16c):

(16)   a.   Universal Grammar (UG) +;
      b.   Primary Linguistic Data (PLD); →
      c.   Adult Grammar.

Chomsky (2005) adds to (16) what he called "third factors" (17) to reduce the content of UG. They include general cognitive principles, learning biases and data analysis principles, defined as resources used by children to acquire language.

(17)   a.   Universal Grammar (UG) +
      b.   Third Factors Principles +
      c.   Primary Linguistic Data (PLD) →
      d.   Adult Grammar

Given that the model in (17) does not assume innate parametric specifications guiding language acquisition, learnability become an evident challenge: how does the child build grammar from the input if UG does not contain a pre-given template? Biberauer (2018, 2019), in what she calls a neo-emergentist view of language acquisition, defends that acquiring a grammar is a task requiring sensibility to "departures from the Saussurean arbitrariness", that is, cases in which there is more than a one-to-one form and meaning relation (i.e., more than a simple mapping between phonological and semantic features).

This view promotes that UG's purpose is to supply the operations Merge and Agree, what prompts the child to expect recursivity in the input. UG also tells the acquirer that the grammar is structured on the basis of features. However, in Biberauer's proposal, the specific nature of features is absent in the initial state: UG only says that there are interpretable [iF] and uninterpretable features [uF]. In other words, FFs are no longer pre-given in this proposal: there is simply a [iF]/[uF] template and the precise list of FFs will emerge as the child progresses through the learning path.

To postulate FFs, children will pay attention to phenomena that indicate a deviation from the arbitrary Saussurean form-meaning map Biberauer and Roberts (2016). One of these phenomena is doubling, where there are two or more forms representing just one meaning, as in the case of concord and agreement (e.g., 'une belle actrice', with multiple forms indicating feminine/singular). In contexts with agreement, the child realizes that semantic features such as number and person have a formal counterpart ([iFs] and [uFs]) distributed in the grammar in a constrained way.

The most important departure from arbitrariness, for us, is systematic silence, the existence of meaning on the one hand and systematic absence of a form on the other. This is the case of null subjects, which have meaning associated with empty forms. In this scenario, alternations between overt and empty pronouns give the child a cue about the need to postulate formal features, such as [person] and [number], rather than just semantic ones. Another example of a phenomenon that drives the child to assume the presence of FFs is

movement Chomsky (1998). As movement is constrained and limited to certain classes, FFs facilitate the task of classifying those classes.

If acquirers are free to postulate FFs, some mechanism has to specify how the input is parsed and how the learning task is optimized. Biberauer (2018, 2019); Biberauer and Roberts (2016) propose the notion of Maximize Minimal Means (MMM), a cognitive bias responsible for interpreting the input, and optimizing and constraining the grammar:

(18)   a. Feature Economy (FE): postulate as few features as possible to account for the systematic regularities in the input.

   b. Input Generalization (IG): maximize the use that is made of the feature postulates.

(Biberauer and Roberts 2016, p. 11)

MMM will have the effect of generalizing FFs whenever possible. In order to satisfy Feature Economy (FE), the child will only postulate FFs when encountering departures from Saussurean arbitrariness. If there is no evidence of FFs in a certain category, the child will not postulate any of them. Therefore, here the child is seen as a conservative learner, who only generates a type of grammar when the input provides enough evidence for its existence Snyder (2002, 2007, 2011). Notice that, when there is no emergence of FFs, Input Generalization (IG) is also satisfied along with FE, because the lack of FFs in one head will be generalized to all the others in the domain. When the child finds evidence in the input supporting the existence of an FF, he/she maximizes the use of this FF and concludes that all relevant heads bear the FF. This satisfies IG, which forces the acquirer to generalize a feature once it is discovered, but not FE (the input is preferred over FE when there is evidence to postulate features). Last, when the child detects that a class of heads does not bear the relevant FF, the generalization is overwritten, and he/she comes to the conclusion that only some heads bear this FF. Therefore, the acquirer follows a three-step learning patch: NO > ALL > SOME. First, NO FF is postulated in a domain of heads. Second, the child postulates FFs to ALL relevant heads. Last, he/she retreats from his/her decision by concluding that only SOME heads bear the FF. It is worth to point out that this learning path does not violate the Subset Principle Berwick (1985); Manzini and Wexler (1987), because, although the child retreats from a larger grammar type (ALL) to a smaller one (SOME), this decision is made based on positive evidence Roberts (2019).

The acquisition model for null subjects in Figure 1 illustrates how children learn different null subject patterns:

Figure 1 shows how the child makes decisions about the kind of null subject language he/she has based on the presence of ϕ-features in his/her language, especially person features. Following this model, the child starts out by assuming that there are no ϕ-features in his/her language (the NONE, default option). This renders a radical null subject language (RNSL) and the child should allow all kind of null arguments. If the child detects ϕ-features associated with the nullness of an argument, he/she will suppose the presence of ϕ-features in all heads (the ALL option). This renders pronominal-argument, or polysynthetic languages, like Basque, which exhibit null subjects, null objects, and subject-object-verb agreement. Pronominal-argument languages can be said to have a D-feature in v^0, D^0, T^0 for ϕ-features are fully specified in these languages. Next, if the child detects that a head does not contain a morphological exponent or does not produce the same phenomenon as another, he/she will change his/her initial hypothesis and conclude that only some heads have the relevant feature (the SOME option).
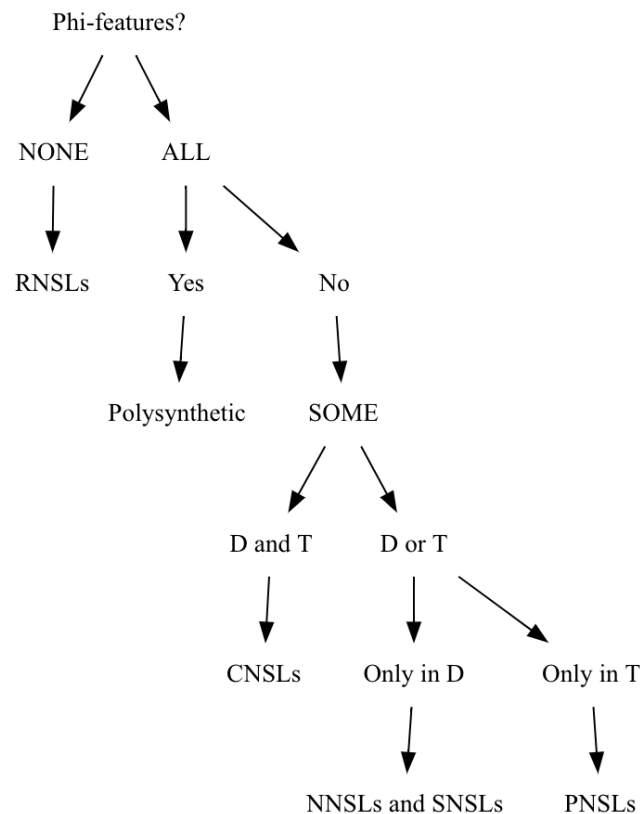
Figure 1. Learning Path for the Acquisition of Null Subjects, adapted from Roberts (2019).

A child acquiring a CNSL like Italian has to match null subjects with T's uninterpretable features, a requirement of the [iF]/[uF] template in the UG, while also noticing that there is no such a matching for him/her to allow null objects. When the child realizes that there are no uninterpretable features in v^0 to be matched to null objects, he/she no longer will assume that his/her language has fully specified ϕ-features in v^0 (and an uninterpretable D-feature), then entering the SOME stage.

Similarly, children learning PNSLs will observe phenomena that do not justify the postulation of D-features in D^0, such as bare singular count nouns and the absence of articles. A D-feature on T^0 is likewise expected to be banned by the child's grammar. "Rich agreement" will be meaningless for children learning PNSLs, as even PNSLs with full agreement marking, such as Finnish, do not allow definite null subjects. In other words, as in PNSLs, rich agreement does not result in null subjects, rich agreement cannot be a morphological exponent for a D-feature on T^0. In the proposal presented here, UG does not say anything about what agreement means to the syntax, instead; this meaning is created by the child when he/she matches morphology to the systematic lack of null subjects in his/her language. In the absence of null subjects, rich agreement, a PF matter, will not be associated with any syntactic phenomenon. Also, notice that children acquiring PNSLs are predicted to allow generic null subjects in the same moment they will block definite null subjects, as this will be a consequence of the incorporation of pro in an environment lacking D-features, as illustrated in (8).

Children exposed to NNSLs and SNSLs could never match agreement with definite null subjects in the model described here, as not only are definite null subjects absent in their input, but also is rich agreement. However, children acquiring NNSLs and SNSLs should postulate a D-feature on D^0, as these languages systematically distinguish definiteness and indefiniteness.

This account predicts that acquirers will converge on the adult grammar quickly, since they only need to look at the morphological representation of ϕ-features to incorporate them into their grammar. Several studies have shown that children are attentive to functional

elements even before their first word Dye et al. (2019). Shi and Lepage (2008) and Shi et al. (2006) found that 8- to 11-month-old infants acquiring French and English exhibit sensitivity to determiners, which would be a prerequisite in this learning model. When presented with a novel noun preceded by determiners, a novel noun in isolation and a novel noun preceded by a nonsense syllable, infants prefer novel nouns with the determiner. Kim and Sundara (2021) show that 8-month-old children can segment nonce words with the verbal suffixes -s, -ing and -ed. According to the authors, even 6-month-olds can process the suffixes -ed and -s.

Early access to morphology is a bootstrap to the acquisition of pronominal patterns in a language. Other levels of grammar work together in its development: most likely, prosody. For the very first distinction children need to draw between functional words and content words, they rely on prosodic cues Morgan (1996). The acquirer can also postulate FFs to account for the prosodic contrast between overt and null pronouns: subject overt pronouns in CNSLs are always contrastively stressed.

The model, together with data demonstrating early sensitivity to functional elements, predicts how infants would act when producing overt and empty subjects: they should not make errors, only producing null subjects when the language drives the acquirer to assume FFs permitting those. If the idea is correct, we should find that children's early production and comprehension of null subjects is perfectly consistent with the target adult grammar or that children's deviant grammar has a convincing, non-parametric explanation.

These are the most important assumptions of the model we assume:

1. The child has a template in which uninterpretable features are matched to interpretable features. This will be important, for example, for the child to match null subjects to T's uninterpretable features;
2. FFs are not pre-given in the grammar: the child postulates them according to the input;
3. There are mechanisms used to parse the input and optimize the learning task. Those are: Feature Economy (FE) and Input Generalization (IG);[6]
4. This account assumes that children can infer morphological paradigms early, incorporating phi-features into their grammar.

In what follows, I review studies on the production and comprehension of null subjects in different null subject languages. My review will be limited to the literature on the setting of the Null Subject Parameter[7]. There are several theories of the acquisition of null subjects, most of which emerged in response to the subject drop phenomenon in child English. These are not only parametric theories, but approaches trying to explain the phenomenon resorting to (i) *performance limitation* Bloom (1990); Valian (1991), (ii) *extra-syntactic effects*, such as the prosodic template in the language Gerken (1991, 1994) and the phonological complexity of syllables Demuth (1994), (iii) *delay in other aspects of the child's syntax*, such as the notion that children truncate phrase nodes Radford (1990); Rizzi (1994, 2005), among others.

In discussing the subject drop phenomenon in child English, we will see that there are null subject types that are out of scope of the BCC-approach (i.e., the production of null subjects that is limited to sentence-initial position has no connection to the presence or absence of D-features in heads). These null subject types are those found in finite clauses, exclusively in root context (sentence initially), and null subjects in root infinitives (RIs). As we will see, null subjects produced by children acquiring NNSLs that are sentence initially and occur in finite clauses are a PF phenomenon, which is triggered by pragmatics. RIs might arise from a difficulty connecting syntax and morphology during language use (and possibly during comprehension tasks).

4. Missing Subjects in Children Acquiring NNSLs

English, French, and Danish are examples of languages in which the subject cannot be null in adult grammar. However, children acquiring these languages are known to drop subjects between the ages of 20 and 25 months (Hyams 1986, p. 86), although the age at which this stage lasts varies from child to child, with some children producing null

subjects for much longer. The null subject is optional at this stage, that is to say, children also produce sentences with overt subjects. The following examples from English are taken from Hyams (1986, pp. 65–66) quoting Bloom et al. (1975).[8] There is even the presence of minimal pairs, such as (19a) and (19b), (20a) and (20b)

(19) a. Put that on.
   b. Andrew put that on.

(20) a. Take a nap.
   b. Mamma take a nap.

To account for children's early production of null subjects, Hyams (1986) proposes that children initially set the Null Subject Parameter (in its classical version) to *yes* (null subjects are allowed). This would explain the occurrence of null subjects in NNSLs. In other words, in Hyams (1986), all children start out speaking a consistent null-subject language and later they reset the parameter to *no* (null subjects are not allowed), if the positive evidence in the language forces the child to do so.

There could be two triggers to reset the Null Subject Parameter according to Hyams: (i) expletives, which occur only in NNSLs[9]; and (ii) sentences in which a definite subject pronoun appears in an infelicitous circumstance if the child were acquiring a null-subject language. The trigger in (ii) is related to the Avoid Pronoun Principle. This principle states that overt subject pronouns will be avoided in null-subject languages unless they are required for emphasis and contrast. At some point, the child should reach the conclusion that overt pronouns in English are required for grammatical reasons, not for emphasis and contrast.

Hyams' seminal work was of an extensive value for the field, since it integrated language acquisition to the Principles and Parameters framework. However, her proposal faced empirical issues. She predicts that expletives will not be produced by English-speaking children while they are dropping subjects. This prediction is inconsistent with Valian's (1991) findings showing that English-speaking children produce expletives while still dropping definite subjects. The environments in which null subjects are produced by English-speaking children are also distinct from the environments where null subjects are produced by Italian-speaking children: children acquiring English do not produce null subjects in subordinate clauses and after wh-elements Valian (1991), which is not true for children acquiring Italian Guasti (1996).

Hyams (1991) proposes a reanalysis of the subject omission. She claims that acquirers exposed to languages with limited verbal morphology start out with a Chinese-like grammar, whereas children acquiring languages with rich verbal morphology have an Italian-like grammar. Hyams based her proposal on Jaeggli and Safir (1989), according to whom languages with uniform inflectional paradigms license null subjects, as saw in (6).

According to Hyams (1991), at the stage when English-speaking children are producing null subjects, they have not realized that English has a nonuniform system. Once children acquire agreement and understand that English has a mixed system, they should stop producing null subjects.

Since Hyams predicts that children start out by speaking a radical pro-drop language, her proposal leads to the expectation that English-speaking children should produce null objects. However, in the data reviewed by Hyams, null objects do not occur in the child's speech. She explains the absence of null objects in the early grammar of English-speaking children by claiming that by the age children are dropping subjects, they have not acquired variables (following Huang 1984, who claims that null objects are variables instead of null pronominals).

Hyams' analysis is challenged by Wang et al. (1992). They compared how English- and Chinese-speaking children produced null subjects and null objects. If children have not yet acquired variables during the stage where they drop subjects, we expect that neither English- nor Chinese-speaking children will produce null objects. This is because, at

this stage, children have not acquired variables, no matter what is their target language. However, Wang et al. found that Chinese-speaking children produce both null subjects and null objects, whereas English-speaking children only produce null subjects. The authors also report that the development of variables is not correlated with the end of the null subject stage: even after English-speaking children have developed variables, as evidenced by their production of wh-questions, they still produce sentences without a subject.

It is unlikely that the missing subject phenomenon is caused by the missetting of a parameter, and this is also true under the theory outlined in the preceding sections[10]. Even if it takes several months for children to acquire mixed-morphology verbal paradigms (which does not appear to be the case, given that even English-speaking children show early sensitivity to functional elements), we would expect subject dropping to be not restricted to certain syntactic contexts.

4.1. The Diary Drop Hypothesis

Regarding missing subjects[11] in finite clauses, they do not arise from parameter missetting. As missing subjects in finite clauses produced by children acquiring NNSLs occur only sentence initially, they are most likely derived from subject ellipsis, a PF phenomenon akin to subject drop in casual speech or abbreviated NNSL registers Haegeman and Ihsane (2001), known as *diary drop* (21). There is no parametric option that allows definite null subjects only sentence initially, making the assumption that children are missetting the Null Subject Parameter implausible. Several scholars have already employed some version of the *diary drop* hypothesis to explain missing subjects in finite clauses in the speech of children acquiring NNSLs, either as a whole or partial explanation Bromberg and Wexler (1995); Rizzi (1994).

(21)   (I) should've known better.   (Nariyama 2004, pp. 246–47)

Subject drop in adult registers occurs not only in English, but in others non-null and semi null-subject languages, in which children are reported to drop subjects: Swedish Brandtler (2004), French Haegeman (1990, 1997); Haegeman and Ihsane (2001), Danish, German and Dutch Haegeman (1990). *Diary drop* is common in abbreviated registers, such as diaries, postcards, and text messages.

According to Nariyama (2004), subject ellipsis is also frequently found in casual spoken English. It occurs when the subject's reference is recoverable in the context or in a previous sentence. Subject ellipsis in finite clauses in adult English is confined to the sentence initial position and coordinate structures, like subjectless sentences in child English. That is, subjectless sentences do not occur in the following environments, in both child and adult speech:

(22)   a. After wh-elements;
        b. In subordinate clauses;
        c. After a fronted XP other than the subject.   Guasti (2016)

Nariyama (2004) conducted a corpus analysis to investigate syntactic, semantic and pragmatic properties of subject ellipsis in English (Australian English). The author found that the majority of the subject ellipses occur with the first person, but they also are found with other persons, mainly when triggered by anaphora and common idioms (e.g, "could be", "looks great"). Nariyama analyzed TV drama transcriptions, spoken conversation and three casual letters. Because she did not quantify the proportion of subjectless sentences in relation to the total number of utterances, the data cannot be utilized to compare with the child data or to determine the frequency of subjectless phrases in adult English. Nonetheless, the findings suggest that subjectless sentences are not uncommon in spoken English, since the author found null subjects throughout all the corpora analyzed: 53 subjectless utterances were found in *TV dramas*, 49 were found in *spoken conversation* and 20 in *casual letters*.

According to Nariyama, subject ellipses are pragmatically triggered when the speaker believes, consciously or not, that the addressee can infer the intended identity of the null subject. Linguistic contexts favoring identity recovering are:

(23) i.   Anaphor;
    ii. Deixis;
    iii. Dummy subjects;
    iv. Conventional expressions.

The parallelism between early null subjects in finite clauses and adult subject ellipsis stems from the fact that they occur in the same syntactic context. This leads to the hypothesis that missing subjects are instances of subject ellipsis, which is allowed by adult grammar. However, adults use null subjects to a lesser extent than children do. In the speech of children acquiring English, the frequency of overt subjects increases over time. In Valian (1991), English-speaking children with the lowest MLU (1.77) produced a percentage of overt subjects of 27%. As shown in Table 5, the percentage of overt subjects increases as the MLU increases:

Table 5. Overt subjects and average MLU in English-speaking children.

Average MLU	Overt Subjects
1.77	27%
2.49	52%
3.39	70%
4.22	79%

Adapted from Valian (2016).

How can we explain the decreased usage of null subjects over time if English-speaking children have the same syntax as adults? One possibility is that children need to learn the pragmatic context in which subject ellipsis is used (given in 23). Another possible explanation is that children know the pragmatic context for the use of null subjects, but as their language is tied to the *here and now* (i.e., children usually talk about what is happening at the moment, and not about the past or future) Clark and Clark (1979); Piaget (1952), there are many null subjects recoverable by deixis and that is a pragmatic context that favors subject ellipsis. This second hypothesis will be brought back in Section 6: as we will see, Simões (1999) reached the same conclusion when noticing the high frequency of null subjects in *here and now* contexts in the speech of a Brazilian child.

If pragmatics explains the high incidence of subject omission, we would expect children in all languages to overproduce null subjects. A pragmatic deficit or tendency to tie the speech to the *here and now* is not language specific and should result in the overproduction of null subjects in all languages. This assumption is difficult to verify because, as will be mentioned further below, children exposed to CNSLs produce almost as many null subjects as adults. Recall that, in CNSLs, null subjects occur in all syntactic contexts and more frequently than overt subjects, making quantitative studies unlikely to reveal children's "overproduction" of null subjects. That is, children acquiring CNSLs presumably also have pragmatic deficits or have their speech tied to the immediate context. However, because most utterances in their target language should have null subjects, it is likely that null subjects produced by children learning these languages are normally expected in adult grammar, making the numerical difference between null subjects produced by children and adults appear roughly the same.

4.2. Root Infinitives

Null subjects in nonfinite clauses, known as Root Infinitives, RIs (24), cannot be considered to come from *diary drop*, because they occur in a different environment than missing subjects in finite clauses produced by children acquiring NNSLs.

(24)   Want to nap.
     He wants to nap.

English-speaking children produce null subjects with nonfinite verbs in wh-questions, but not with finite ones Bromberg and Wexler (1995); Roeper and Rohrbacher (2000)[12].

Moreover, null subjects in nonfinite clauses exhibit a different developmental course than null subjects in finite clauses, with null subjects in finite clauses persisting for longer than RIs (Guasti 2016, p. 116). The claim that null subjects in finite clauses decrease at the same rate as RIs is not supported by the data reported by Boster (1997) who found no correlation between the two phenomena for English-speaking children. Rasetti (2000, 2003) found interpretative differences between RIs and missing subjects in French. Another finding that suggests a dissociation between RIs and null subjects in finite clauses is that children overwhelmingly produce more null subjects in nonfinite clauses than in finite ones, as shown by Hoekstra and Hyams (1998); Rasetti (2000, 2003). This numeric difference is summarized in Figure 2. The numeric disparity can only be explained if children know the difference between finite and nonfinite verbs and that, to some extent, they are avoiding null subjects in finite clauses.[13]
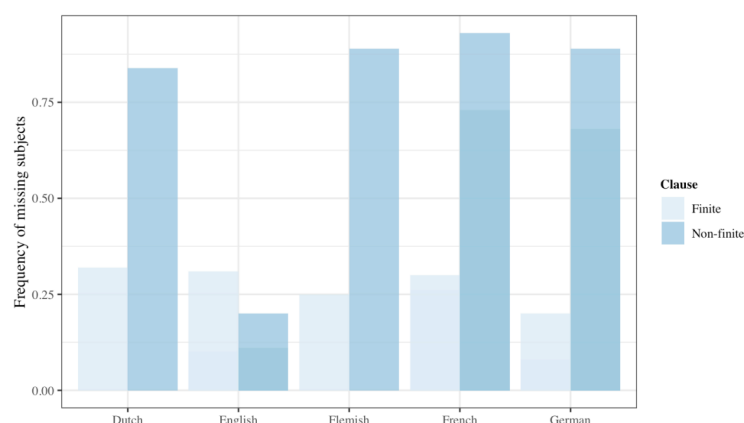

Figure 2. Missing subjects in semi- and non-null-subject languages. Summarized data from Hoekstra and Hyams (1998).

According to Bromberg and Wexler (1995), null subjects co-occurring with nonfinite verbs are an instance of PRO, thus they are not restricted to the initial position of the sentence, differently than missing subjects resulting from subject ellipsis. The Optional Infinitive (OI) stage is characterized as (25). The literature has accumulated a variety of models for the OI stage, but most of them presuppose an underspecification in the grammar of the child (25).

(25) **Optional Infinitive Stage**
  a. Finite sentences are sometimes used;
  b. Nonfinite sentences are sometimes used;
  c. Finite and nonfinite verbs show up in the appropriate positions;
  d. Case and finiteness properties follow from the ATOM;[14]
  e. NS/OI holds, that is, ATOM does not hold for null-subject languages (children acquiring NSLs do not go through an OI stage).

(26) **Models explaining the Optional Infinitive Stage**
  a. Underspecification of TNS Wexler (1992);
  b. Omission of functional layers Rizzi (1994);
  c. Underspecification of AGR/TNS Schütze and Wexler (1996);
  d. Underspecification of number Hoekstra et al. (1996).

As discussed in Section 3, children acquire verbal morphology relatively early in their development, and therefore RIs cannot be explained by functional morphology underspecification. Likewise, optional infinitives do not have anything to do with parameter fixation, since parameters are set as soon as children become sensitive to the functional

elements in their language, which for verbal morphology and determiners, occurs before children reach the age of 1 year Dye et al. (2019). It is also worth noticing that RIs are not a phonological omission of morphemes, since RIs have the syntax of infinitives: for example, in RIs produced by French-speaking children, the verb follows the negative element rather than preceding it (27a), as a true infinitive, but when the child correctly produces a finite verb, the verb precedes the negation, respecting the syntax of finite clauses.

(27) a. Pas tomber bébé.   French
          Not fall   baby
          'The baby does not fall.'

      b. Veux pas lolo.
          Want not pacifier
          '(I) don't want the pacifier.'   *Nathalie, 2;00*

Children at the OI stage clearly know the difference between finite and nonfinite verbs. They can establish a relationship between infinitive morphology and syntax: whenever they choose to "simplify" the verbal morphology, they know it will have implications in the syntax. This means that verbal morphology has already been acquired. This is further supported by the fact that children in the OI stage seldom make mistakes when they use inflections Phillips (1996); Snyder (2007). For example, Clahsen et al. (1993) found that agreement was used in obligatory contexts about 80% of the time in Simone (1;07-2;08), a child acquiring German, and there was virtually no commission errors in the data, in which Simone used the incorrect verbal inflection (only 2% of the time the inflection -*t* (3SG) was used outside the required context).

If children have already acquired verbal morphology during the OI stage, what explains their failure in producing consistent finite morphology? Phillips (1996) proposes that children's syntactic trees and verbal morphology are intact, but the derivational step combining verb and inflection is missing. In other words, RIs arise from a failure to combine the inflection in T and the verb in V through Move/Agree. As verb and the inflection are not syntactically joined, a verbal default form is used, which happens to be the infinitive in many languages, including English. The author argues that although the child does not have a particular morphological or syntactic deficit, he/she has difficulties connecting his/her morphological knowledge with his/her syntactic knowledge.

In Phillips' proposal, agreement is necessary when movement is an absolute requirement (e.g., when V-raising is required for Nominative licensing), but unnecessary when there is no movement involved. He argues that V-to-T movement is a violable syntactic requirement, as suggested by the fact that some languages have what is known as *anti-agreement* effect, which prevents subject-predicate agreement when there is subject extraction. For example, in Berber, Breton, and Turkish, agreement is not required when there is no need for V-raising, but it is required when the verb should raise. In the example below from Berber, when subject extraction takes place, subject-predicate agreement is suppressed (28a) and even becomes ungrammatical (28b):

(28) a. Man   tamghart ay   uzrin   Mohand?   *Berber*
          Which woman   COMP see-PTCP Mohand
          'Which woman saw Mohand?'

      b. *Man   tamghartay ay   t-zra   Mohand?
          Which woman   COMP 3SG.F-see Mohand
          'Which woman saw Mohand?'   Ouhalla (1993)

Phillips defends that morphological and syntactic knowledge are not integrated in the child's mind, but I would rather say that children have trouble connecting their morphological and syntactic knowledge *during language use*. If these two components were disintegrated in the child's grammar, we would expect a random use of inflections with no association to a particular syntactic construction. In the parametric model here adopted, the lack of connection between morphology and syntax would mean that children, in

assessing whether their language has a rich T^0 or a rich D^0, would be unable to assign FFs to the constituent parts of a sentence, leading to the prediction that they would make commission errors (e.g., a third-person affix would be used with a second-person subject pronoun). Assuming that the child has difficulty accessing his/her knowledge about the connection between syntax and morphology, we predict that the problem will mainly arise in languages in which agreement is less rich, as it could take longer for the child to access, within the set of ambiguous forms, the one with the desirable features. Take English as an example: suppose that the child wants to access the affix for 3SG. It might be difficult to remember the form of the 3SG inflection when most of the verbs are bare forms. On the other hand, children acquiring languages with rich agreement systems are well "trained" to use inflections, for they have more opportunities to access the connection between verbal inflection and syntax, since agreement is a core feature of their language.

An important finding is that children acquiring English accept declarative sentences with null subjects, and this correlates with age, with younger children accepting null subjects more often than older ones, as reported by Orfitelli and Hyams (2012). The authors conducted a Truth-value judgement task (TVJT) Crain and McKee (1985) to see whether English-speaking children interpreted sentences with null subjects as imperatives (like adults) or as declaratives. The age range of the three tested groups was 2;06-2;11, 3;00-3;06 and 3;06-3;09[15]. The youngest group provided 40% imperative (adult) interpretations, followed by the middle group (64%) and by the oldest group, which achieved above 80% of adult responses. Considering that these results refer to comprehension rather than production, we must conclude that pure performance accounts based on production cannot explain null subjects in English-speaking children. This, however, does not suggest in any way that there is a parametric difference between the grammar of adults and children.

While we are still debating which model best explains the OI phase and the omission of subjects, there is no doubt that the phenomena cannot be due to parameter missetting of any theoretically conceivable form. There is no known parametric option that structurally corresponds to null subjects produced by children acquiring SNSLs and NNSLs. There appear to be nothing wrong with the parametric choice made by children exposed to S/NNSLs. The fact that the acquirer is not seen to make the wrong parametric choice leads to the conclusion that the postulation of FFs and parametric fixation occurs very early in the child's development.

5. The Acquisition of Radical Null Subject Languages

As we have seen, null subjects cannot be generated by D-to-T incorporation in RNSLs. Instead, subjects are dropped due to contextual information. Null subjects in RNSLs can be inferred by the previous discourse, from the conversational context or by shared knowledge.

Kim (2000) studied the spontaneous speech of five children acquiring Korean as their first language, aged 1;04 to 2;06. The author observed that Korean-speaking children drop arguments early on, but that the rate of subject drop in children (0.40) is somehow higher than the rate of subject drop in adults (0.31).

Wang et al. (1992), studying data from nine Chinese-speaking children, aged 2;00 to 4;06, observed that the mean overt subject rate produced by Chinese children (0.53) is much lower than that of American children (0.85), and lower than in Chinese adults (0.64).

In both Korean and Chinese, children initially produce more null subjects than adults. The same pattern is seen in CNSLs, PNSLs and NNSLs. As will be discussed, we can understand these findings as related to children's difficulty in establishing whether the reference of the pronoun is a shared knowledge or not, or we can say that the child's speech favors more the use of null subjects than the adult's speech. These hypotheses will be discussed in more detail in the next sections.

The important finding is that children acquiring RNSLs know that their grammar allows a more generalized drop of subjects than, for example, English. Therefore, they do not deviate from their target grammar.[16]

6. The Acquisition of Partial and Consistent Null-Subject Languages

Recall that the core difference between PNSLs and CNSLs is the availability of third-person definite null subjects[17] in matrix clauses, which is only possible in CNSLs, and the availability of generic null subjects, which is only conceivable in PNSLs.

In what follows, I review studies on the acquisition of null subjects by children acquiring PNSLs and CNSLs.

6.1. Definite Null Subjects in PNSLs

Simões (1999) conducted a longitudinal case study with André, age 2;04-3;00, who was acquiring BP. Simões' study focuses on the production of definite null subjects. She shows that André's usage of null subjects remains fairly steady over time. The author also compares and contrasts the usage of null subjects by André and Adam, an English-speaking child, during two time periods (Adam's data were taken from Hyams and Wexler (1993)). The contrasted periods were 2;05 and 3;00 for Adam and 2;04 and 3;00 for André. While there was a decline of null subjects between 2;04 and 3;00 in Adam's speech (from more than 50% to less than 30%), the same was not true for André, who showed little change in the percentage of null subjects over time.

Simões also observes that the percentage of null subjects used by André is very different from the percentage of null subjects used by children acquiring CNSLs, such as European Portuguese (EP) and Italian. According to Simões, the average of null subjects produced by André, from the age of 2;4 to 3;0, is comparable to the average of missing subjects in the speech of children acquiring NSLs within the same age range, with the difference that there is a decrease in missing subjects in children acquiring NNSLs, which was not found in André's speech. The graph below compares the percentage of null subjects by André and children acquiring five other languages within the same age range.[18]

Simões compared the percentage of definite null subjects in André's speech with the percentage of definite null subjects found for BP-speaking adults, as reported by Duarte (1995). Duarte studied the speech of 13 adults from Rio de Janeiro, Brazil. In her data, there was a percentage of 29% definite null subjects, compared with 55.5% in André's speech.

Although André produced a higher percentage of definite null subjects than adults, Simões argues that the distribution of null subjects in the child follows the adult pattern. Particularly, definite null subjects occur in embedded clauses when controlled by an argument in a higher clause; as second and first-person subjects in matrix clauses; and as third-person subjects in matrix clauses when the antecedent can be easily identified by a referent presented in the pragmatic context, as the example (29) shows. Simões points out that cases like (29) are marked in BP, as the sentence must be inserted in a "here and now" context for the null subject's reference to be recoverable.
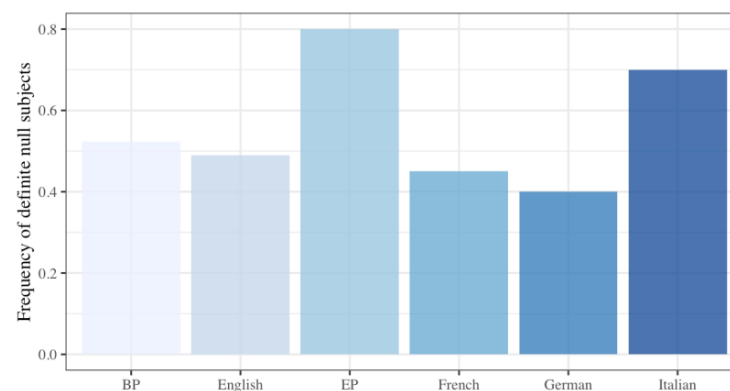

Figure 3. Production of definite null subjects in children. Italian: Valian (1991), EP: Faria (1993), French: Pierce (1992), English: Hyams and Wexler (1993), German: Clahsen (1989). Adapted from Simões (1999, p. 110).

(29) [**Context:** two friends are talking in the kitchen while cooking]
 Ih, queimou!   BP
 Uh burned
 'The food burned.'

Although contexts such as (29) may be argued to be not particularly numerous in the speech of adults, who are frequently talking about non-immediate situations (i.e., adults often talk about the past and future), they are common in the speech of children. As discussed in Section 4.1, children talk about the "here and now" and the fact that this is a common context for André explains, at least in part, his higher percentage of null subjects compared with adults Simões (1999).

Simões concludes that André shows no signs of parametric missetting: all instances in which the child uses null subjects are grammatical for BP-speaking adults.[19]

Simões' conclusion is based upon the data of a single child, but Magalhães (2006) reached the same conclusion in her analysis of the speech of other two Brazilian children. Magalhães (2006) conducted a longitudinal study with two children acquiring BP, Raquel (ages 1;9 to 3;0) and Ana (2;4 to 2;10). She also studied two Portuguese children, João (EP) (2;0 to 2;7) and Raquel (EP) (1;10 to 2;11), and compared the results of children acquiring the two languages. The graph below shows the different percentages of definite null subjects in the speech of Brazilian and Portuguese children. Percentages refer to the *last* session analyzed for each child. As can be seen in Figure 4, EP-speaking children produce more definite null subjects than BP-speaking children.
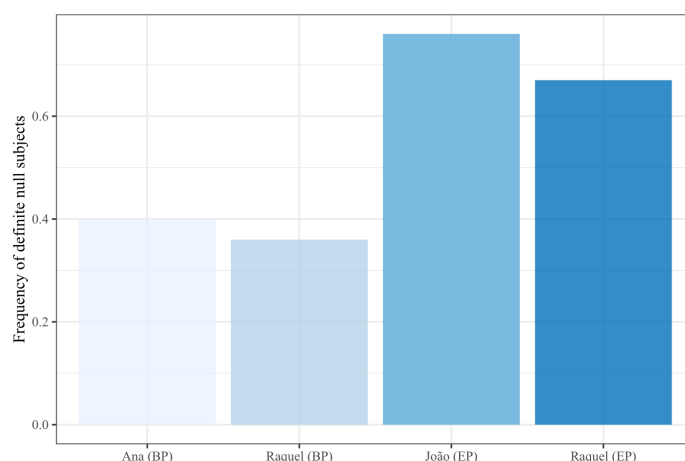

Figure 4. Definite null subjects in children acquiring BP and EP. Adapted from (Magalhães 2006, p. 71).

According to Magalhães (2006), definite null subjects in the speech of Brazilian children occur in two primary predicted contexts: subjectless replies (30), and subjects identified by the physical presence of referents (29). In the speech of Portuguese children, null subjects are also adult-like.

(30) a. Que o homem está fazendo?   [Mother]
    What the man is doing
    'What is the man doing?'

   b. Está catando.   *Raquel (BP) 3;00*
    Is picking up
    'He is picking it up.'

According to Magalhães (2006), the definite null subject in (30) is identified by the topic of the sentence. This is a topic, as described by Kiss (1995): an expression denoting an individual or a group, already established in the discourse. When the referent is deictic (29), the physical presence of the referent in the context identifies the null subject.

I summarize below the important conclusions that can be extracted from Magalhães (2006) and Simões (1999):

(31) a. There is no indication that children acquiring BP misset the Null Subject Parameter: all instances in which the child uses definite null subjects are grammatical in adult speech;

b. Children acquiring BP use fewer null subjects than children acquiring EP, a CNSL;

c. Third-person definite null subjects in matrix clauses are of three types in the grammar of both adults and children acquiring BP:

i. Subjectless replies;

ii. Null subjects recovered by the physical presence of the referent;

iii. Embedded null subjects controlled by an element in the higher clause.

It is important to recognize the limited evidence provided by these two studies, as they only include data from a total of three BP-speaking children.

6.2. Definite Null Subjects in CNSLs

Children acquiring CNSLs produce a similar proportion of null subjects as adults. Lorusso et al. (2005) analyzed a longitudinal corpus of four Italian children (1;06 to 3;00) and adults interacting with them Cipriani et al. (1989). The percentage of null subjects is very similar for adults and children, as can be seen in Table 6.

Regarding the structural environment where subjects are omitted by Italian acquirers, it corresponds to the target language, namely, declarative sentences, wh-questions Guasti (1996); Rizzi (1994) and subordinate clauses Valian (1991). Also, children acquiring Italian Guasti (1993), Spanish, Catalan Torrens (1995) and European Portuguese Bertolino (2016) very rarely produce RIs.

Table 6. Null subjects for children and adults in Italian (longitudinal study).

Child	Null Subjects
Diana	73%
Martina	67%
Raffaello	79%
Rosa	77%
Children	**75%**
Adults	**74%**

Adapted from Lorusso et al. (2005).

Lorusso et al. (2005) also conducted a cross-sectional study with 59 children between 1;10 to 2;09. Children were grouped according to their MLU computed in words (MLU-w): G1 (MLU-w from 1.0–1.5), G2 (1.5 to 2.0), G3 (2.0 to 3.1). Children with greater MLU-w produced less null subjects than the ones with lower MLU-w (Kruskal-Wallis, $\chi^2 = 9.750$, $p = 0.008$), see Table 7.

Table 7. Null subjects in Italian: cross-sectional study with children and adults.

Age Group	N = Participants	Percentage
G1	14	90.7%
G2	18	73.5%
G3	25	75.5%
Children	**57**	**78.5%**
Adults	**9**	**63.7%**

Adapted from Lorusso et al. (2005).

In Spanish, acquirers take longer to reach an adult-like proportion of overt subjects Austin et al. (1997); Grinstead (2004); Shin and Cairns (2012); Villa-García (2011), excessively

producing null subjects. However, the amount of null and overt subjects produced by children (if in the expected syntactic context) is not an indicator of parametric missetting, since parameters only specify whether a form is possible or not in a language: they do not say anything about the proportions in which children use the form. The late usage of overt subjects by children acquiring CNSLs is related to the discursive context in which the overt subject is favored over the null one. To avoid ambiguity in switch-reference scenarios, an overt subject is favored over a null one in CNSLs. In a study conducted by Shin and Cairns (2012) with Spanish-speaking children and adolescents aged 6 to 15, 14–15 year olds still exhibited a degree of infelicity in their use of null subjects in switch-reference contexts. The pragmatic deficit that leads to the overuse of null subjects is taken to be related to children's difficulties considering the interlocutor's point of view, or to a regression to an egocentric state when they are faced with a large process demand during speech Shin and Cairns (2012). The fact that children acquiring NNSLs exhibit an analogous behavior in switch-reference contexts involving articles and pronouns is an argument in favor of an exclusive pragmatic account. When a new referent is introduced in the discourse, one is expected to use the indefinite article and a full NP, but children use definite articles and overt pronouns in switch-reference contexts Karmiloff-Smith (1986); Maratsos (1976); Modyanova and Wexler (2007); Piaget (1959).

I conclude that young children exposed to CNSLs show no evidence of Null Subject Parameter missetting, at any stage of their development. Their production of null subjects and correct verbal inflection identifying the subject reference occurs in their initial multiword production Guasti (2016).

6.3. Generic Null Subjects in PNSLs

So far, I have reviewed studies on the acquisition of definite null subjects, and now I turn to the acquisition of impersonal structures with generic null subjects. Recall that the presence of generic null subjects and the absence of definite null subjects are the core properties used to distinguish CNSLs and PNSLs. I start by discussing spontaneous production data from BP-speaking children. Next, I turn to the acquisition of impersonal structures in Estonian and BP. Last, I discuss an experiment with BP-speaking children that tested whether they assign the generic or referential interpretation to a third-person null subject pronoun Bertolino (2020).

6.3.1. Spontaneous Production

I discussed the studies conducted by Simões (1999) and Magalhães (2006), which focus on the production of definite null subjects. The occurrence of generic null subjects was not quantified by the authors, however, they do mention that the children studied produced null subjects of this sort. There is one caveat though, as all examples found by the authors involve the same kind of structure, with the wh-expression *como (é) que* (how does one). For the child, *como (é) que* might be a unanalyzed expression, without a generic null subject.

(32)   a. Como é que tira?   *André 2;10*
              How   is that take.off.3SG
              'How does one take this off?'

          b. Como é que faz?   *André 3;00*
              How   is that do.3SG
              'How does one do it?'

          c. Como é que entra   agora?   *André 3;00*
              How   is that enter.3SG now
              'Now, how does one get in?'

                                                         (Simões 1999, p. 126)

(33)   a. Como é que abre   esse negocinho aqui?   *Raquel 3;00*
              how   is that open.3SG this little.thing here
              'How does one open this little thing here?'

    b. Como faz   isso?   *Ana 2;10*
       how   do.3SG this
       'How does one do this?'

(Magalhães 2006, p. 137)

Bertolino (2024) studied the spontaneous production of generic null subjects by five children acquiring BP: Túlio (TU) (1;01-4;03, number of transcripts = 77), Maria Eliza (ME) (1;03-4;04, number of transcripts = 13) Nino (NI) (1;02-2;10, number of transcripts = 50), Gustavo (GU) (1;06-2;10, number of transcripts = 17) and Elias (EL) (1;04-2;10, number of transcripts = 20). Table 8 below shows the number of generic null subjects produced by each child and their age of emergence (i.e., the age generic null subjects appeared for the first time in the transcripts):

Table 8. Generic null subjects and their age of emergence.

Child	Generic Null Subjects	Age of Emergence
Maria Eliza	34	3;4
Túlio	42	1;9
Elias	1	2;7
Nino	9	1;8
Gustavo	0	after 2;10

The following are some instances of generic null subjects produced by children.

(34)   Não, tem que   passa(r) pro   amigo.
       No   have-3SG pass-INF to the friend
       'No, one should pass (the ball) to a friend.'   *ME, 3;04*

(35)   Mamãe, eu tô lavando tudo.   [Child]
       Mommy I   am washing everything
       'Mommy, I am washing everything.'

       É, meu amorzinho?   [Mother]
       Is my   little love
       'Isn't my love?'

       Tem   que pôr   mais água.   [Child] *NI, 1;10*
       Have-3SG that pour-INF more water
       'One has to pour more water.'

(36)   Não pode   comer   talher.
       Not can-3SG eat-INF cutlery
       'One should not eat-INF the kitchen cutlery'   *TU, 2;00*

Generic null subjects emerge as early as 1;08, a finding compatible with the BCC-view, which predicts early parameter settings. Generic null subjects occur in a small number; however, this is likely to be due to discursive factors. The discourse environment in which generic null subjects appear is often incompatible with the child's early conversational topics, which are focused on the 'here and now' and their own needs. Generic null subjects are employed to refer to rules, inclinations, habits, and patterns that apply to *people as a whole* rather than to specific individuals. The use of generic null subjects increases as the children's vocabulary and conversational topics become richer and less focused on themselves Bertolino (2024).

Estonian is another PNSL, at least in its spoken form (Holmberg 2017, p. 366). Torn-Leesik and Vija (2012) investigated the production of impersonals in the speech of one child, Andreas, age 1;07 to 3;01 (CHILDES database) MacWhinney (2014). Estonian impersonals are often regarded as a basic voice construction Viitso (1997). They can be formed with either transitive, intransitive, unaccusative or modal verbs Torn-Leesik and Vija (2012). Notice in the example below that Estonian impersonal sentences have no overt subject (37).

We can question whether there is syntactic subjecthood in this kind of structure, as the verb has a specialized impersonal form. According to Vihman (2004, p. iii), impersonal structures in Estonian do have a non-overt subject-argument which is "present for both semantic interpretation and such syntactic purposes as anaphoric reference and control". For this reason, we assume that Estonian impersonal sentences have a third-person generic null subject.

> (37) Loetakse raamatuid. Estonian
> Read-IMPRS books-PTV
> 'One read books.'
>
> (Torn-Leesik and Vija 2012, p. 252)

The interpretation of impersonal null subjects in Estonian can be generic (equivalent to "one"), but as Torn-Leesik and Vija (2012, p. 553) describe, it can also refer "to an indefinite actor whose identity is unknown or is left unspecified for consideration of relevance or politeness". Additionally, the impersonal can be used "to express stylistic nuances".

Studies on the comprehension of impersonal structures in Estonian show that children comprehend these structures by the age of four Vija et al. (2009). Similarly, in 6.3.2, I show that by the age of four, children exposed to BP know that the null subject in impersonal constructions has a generic reading Bertolino (2020).

Torn-Leesik and Vija (2012) found that the first impersonal forms emerged in Andreas' speech by the age of 2;00, but most of these forms were imitations from the input, and they did not fit into a coherent conversation, suggesting that the child was unaware of the contexts in which impersonal forms are used. That might be for semantic/pragmatic reasons, as proper usage of generic pronouns requires not only syntactic knowledge, but also an understanding of what generalizations, conventions, and rules are. But during this period, Andreas also makes correct use of impersonals in (38), which does not seem to be a direct repetition of the input. At the age of 2;00, Andreas' father tells him to not pour milk into the sink, without using an impersonal structure (the negative indicative is used instead), and Andreas replies using the impersonal form *kallatakse* ('one pours').

> (38) Ei kalla kraanikaussi piima. [Father]
> 'No pouring of milk into the sink!'
>
> Piimma kallakase. [Child] *Andreas 2;00*
> Milk-PTV pour-IMPRS
> 'One pours milk.'
>
> Piima kallatakse suhu ja snust läheb kõhtu. [Father]
> 'One pours milk into the mouth and from the mouth it goes to the stomach.
>
> (Torn-Leesik and Vija 2012, p. 259)

According to the authors, Andreas' usage of impersonal forms advanced to a great extent, from the age of 2;03. Impersonals become productive, and they are used correctly, in a way that is coherent with the context. The authors report that impersonals used by Andreas are of general character. They describe how people usually behave and state conventional rules or habits. For our purposes, it is crucial to notice that this usage of impersonal constructions is *generic*. Andreas' ability to use impersonals effectively at the age of 2;03 indicates that generic null subjects are acquired early on. But, more studies with children acquiring Estonian would be necessary to reach solid conclusions.

6.3.2. Comprehension

I conducted an experiment with BP-speaking children aged to 4;00 to 7;00, which is detailed in Bertolino (2020). The experiment was designed to test whether Brazilian children understand that the null subject in this language has the generic reading instead of the referential one. The methodology employed was the TVJT Crain and McKee (1985).

Recall that in PNSLs, the third-person null subject in a structure like (39) can only be understood as generic: at the location specified by the fronted adverb *in this school*, one is

forbidden to brush one's teeth after eating. In EP, a CNSL, the same sentence only allows for the definite reading of the null pronoun (the pronoun is understood as 'she' or 'he') (40a). In order to express the generic reading of the null subject, EP uses the impersonal pronoun *se* (40b).

(39) Nessa escola não pode   escovar os dentes depois de comer.   BP
      In.this school not can.3SG brush   the teeth   after   to eat
      'In this school one cannot brush one's teeth after eating.'   [in view of the laws]

(40) a. Nessa escola não pode   escovar os dentes depois de comer.   EP
          In.this school not can.3SG brush   the teeth   after   to eat
          'In this school he cannot brush his teeth after eating.'

      b. Nessa escola não se   pode   escovar os dentes depois de comer.
          In.this school not IMPRS can-3SG brush   the teeth   after   to eat
          'In this school one cannot brush one's teeth after eating.'   [in view of the laws]

The experiment's premise is that if children reject the null subject as definite and interpret it as generic, we can assume that they know they are acquiring a partial null-subject language.[20]

Children were asked to listen to a sequence of narratives about a school with strange rules and decide, at the end of the story, whether the character Elmo was stating anything that happened in the story (true) or not (false). Below, we have the English translation of one of the stories with a FALSE item from the experiment. PowerPoint's animations were used to present the stories to the children (for more details about the experiment, see Bertolino (2020)).

> As you already noticed, this school is very weird. One of the rules is that just one of the students, Joaquim, has to eat dessert during lunch time instead of regular food.
> Look at Bruno! He brought a salad to eat for lunch. Look, he is eating the salad now!
> Mariana brought cheese balls to eat for lunch. Look she is eating cheese balls!
> Look at Lucas! He is eating pasta!
> At first Joaquim put a sandwich in his lunchbox, but then he remembered the rule that he had to bring dessert for lunch. So he brought a brigadeiro instead. Look, he is eating a brigadeiro.[21]
> Now Elmo is going to tell us a part of the story. Let's see whether he paid attention or not.
> **Elmo:**

(41) Nessa escola tem   que comer doce   na   hora do   almoço.
      In this school have-3SG to   eat   dessert at the time of the lunch
      'In this school one has to eat dessert for lunch.'

The results, summarized in Figure 5[22] show that children acquiring BP correctly interpreted null subjects in impersonal sentences, accepting the generic reading of the null subject and rejecting its referential reading. There was no difference between groups. Children also showed sensitivity to the adult grammar, as there is a significant difference between correct and incorrect answers in each age group, with the correct answer being much more frequent than the incorrect one.

This study shows that, by the age of 4, BP-speaking children know that in their language the null subject is generic, and that only under special conditions can it be definite.
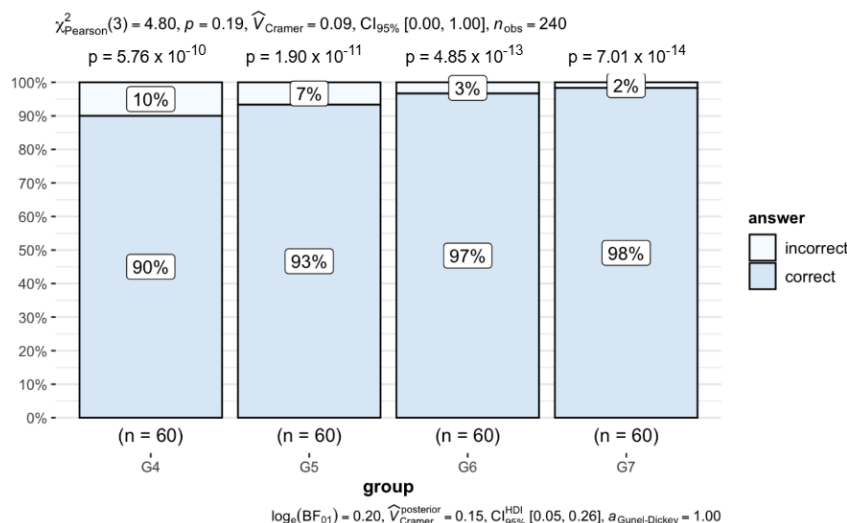
$\chi^2_{Pearson}(3) = 4.80, p = 0.19, \widehat{V}_{Cramer} = 0.09, CI_{95\%} [0.00, 1.00], n_{obs} = 240$

Figure 5. Children's generic interpretation of null pronouns in BP.

Although the results obtained in the experiment are consistent with the BCC-view of the Null Subject Parameter, they are insufficient to support it. The children tested by Bertolino (2020) were too old. Four-year-olds already have acquired a large amount of grammar. Future research should look at comprehension of generic null subjects in younger children.

7. Conclusions

In this paper, I argued in favor of the BCC-view of the Null Subject Parameter, which holds that features on functional heads define whether a language has null subjects or not. A language with no ϕ-features will be an RNSL and any type of null argument will be licensed. A language with ϕ-features and a full specified rich T^0 and D^0 will be a CNSL and will license referential null subjects. Languages with ϕ-features in T^0, but not necessarily rich agreement, and a poor determiner system, will be PNSLs, licensing generic null subjects, but not referential ones. On the other hand, languages with rich D^0 and poor T^0 will not license any null subject (NNSLs).

In a search for evidence to support or refute the BCC-hypothesis, I reviewed studies on the acquisition of (non-)null-subject languages. Because infants exhibit an early sensitivity to functional categories Dye et al. (2019), the BCC-hypothesis predicts that children will rapidly figure out the combination of FFs responsible for the licensing of null arguments in their language. That is, the BCC-account predicts no delay in the setting of the Null Subject Parameter(s).

For a long time, missing subjects in English and other NNSLs have caught the interest of researchers as potential evidence for parameter missetting. I adopted the view that missing subjects in finite clauses produced by children acquiring NNSLs result from subject ellipsis, a grammatical structure available to adults. The initial high proportion of subjectless sentences in the child's speech can be explained by two hypotheses: (i) the child needs to learn in which pragmatic contexts subject ellipsis is, and is not, allowed in his/her language (and until this happens, the child allows subject ellipsis everywhere)[23] (ii) the child produces a high number of null subjects that are recovered by the presence of the referent in the immediate context, a situation where subject ellipsis is possible in adult language, albeit not common, as adult speech is not tied to the "here and now". As for null subjects in root infinitive contexts, I assume that they occur when children struggle to connect their morphological and syntactic knowledge during language use.

Whatever hypothesis we use to explain missing subjects in NNSLs, they are very likely not the consequence of parameter missetting, given the fact they appear only sentence initially, a context which is not the reflex of any known parametric option.

Early on, children acquiring CNSLs and RNSLs produce null subjects in the target language structural settings, showing no sign of parameter missetting. Studies on the acquisition of PNSLs are scarce, but so far they suggest that children as young as 3-year-olds produce generic null subjects, and definite null subjects are correctly produced only in the restricted syntactic context expected in PNSLs. Regarding comprehension, the lack of research is even more apparent; however, it has been shown that 4-year-old BP-speaking children understand that third-person null subjects have a generic reading, and they properly block the definite reading of null subjects.

We must assume that children are cautious when it comes to setting parameters. That is because what appears to be a morphological exponent very often does not have an external syntactic expression. We saw that there are languages with rich agreement but no definite null subject (e.g., Finnish and Icelandic). As a result, we cannot assume that the presence of rich agreement will lead the child to the conclusion that his/her language has definite null subjects. A morphological exponent will only be translated into an FF licensing a syntactic construction *if* this exponent can be consistently associated with a syntactic construction present in the input. Matching a syntactic phenomenon to an exponent to build a set of FFs will enable the child to acquire less accessible constructions, such as structures with a complementizer-trace restriction.

Institutional Review Board Statement: Not applicable.

Data Availability Statement: The data from Brazilian-speaking children used by Bertolino (2024) were taken from the corpus SANTANA SANTOS, organized by Dr. Raquel Santana Santos, at the University of São Paulo. The corpus is not shareable at this moment, due to privacy restrictions.

Conflicts of Interest: The author declares no conflicts of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

Notes

[1]   Glossing abbreviations: 3 = third person, acc = accusative, comp = complementizer, f = feminine, imprs = impersonal, inf = infinitive, nom = nominative, pl = plural, ptcp = participle, ptv = partitive, sg = singular.

[2]   Here, "generic null subject" refers specifically to 3SG environments. As noted by an anonymous reviewer, CNSLs may well allow generic null subjects with a 2SG or 3PL verb, and/or with impersonal or mediopassive constructions. For present purposes, however, the key point is that CNSLs generally disallow 3SG generic null subjects (which will be analyzed as resulting from D-to-T incorporation).

[3]   The typology here described is not exhaustive. There are microvariations not covered by Table 1. Roberts (2019) gives as example the Northern Italo-Romance dialects, which do not quite behave as CNSLs, having a more restricted pattern of definite null subjects (which he attributes to their clitic system).

[4]   As noted by a reviewer, indirect evidence is not the only way children could figure out whether their language allows complementizer-trace effects violations or not: they could start with the assumption that their language does not have complementizer-trace violations and then wait for possible counterevidence in the input. However, indirect learning might be the most viable mechanism in which children acquire complementizer-trace proprieties. As shown by Chacón et al. (2015), instances of complementizer-trace effects violations are rare in the input in Spanish and Italian, contrasting with instances of postverbal subjects (a property which could lead the learner to infer that their language allows complementizer-trace violations), which are much more common in the input. If frequency is a relevant factor in language acquisition, the learner is more likely to use indirect evidence in this case.

[5]   An anonymous reviewer pointed out that Afrikaans and English should be a problem for the idea that NNSLs have D in D^0, as these languages do not mark gender and number in determiners. However, what seems crucial to Roberts (2019) is that all NNSLs, including English and Afrikaans, have definite and indefinite determiners, which makes all them to have D in D^0.

[6]   An anonymous reviewer was concerned with how the child would be able to parse a sentence despite having the 'wrong' parameter value. The concern alludes to Valian (1990) and the canonical Null Subject Parameter model. In the canonical model, the child is born with an English-like grammar or with an Italian-like grammar. Based on the Subset Principle, he/she should have an English-like grammar. The problem, according to Valian (1990), is that a child learning Italian, if born with an English-like grammar, will be unable to parse strings without subjects, because his/her parse is fed by an English-like grammar which is blind

to null subjects. I believe this problem does not arise in the model I assume here, because the child is not born with a particular grammar. Children will be looking for ways to fullfill the [iF]/[uF] template, for example, by matching verbal agreement with null subjects when they are found in the input, or by not doing it when they are not found.

7   The review on the the literature about the Null Subject Parameter is not by any means complete. There is, for example, the work of Yang (2002) which will not be discussed.

8   For French, see Rasetti (2000), for Danish, see Hamann and Plunkett (1998).

9   That is not entirely true. Finnish is not a NNSL, but a PNSL, and yet it has an overt expletive: *sitä* a partitive form of the pronoun *se*, classified as a there-type, pure expletive Holmberg and Nikanne (2002).

10 Under the BCC-view, 'setting the null subject parameter' is best translated as 'learning the right feature values'. However, for simplicity, I will use the shorthand phrase 'setting' (or 'missetting') the null subject parameter.

11 A portion of this section was previously published in Bertolino (2020).

12 However, examples of RIs occurring in wh-questions have been restricted to English.

13 Observe that for English, the percentage of missing subjects with finite verbs is higher than with nonfinite ones, which is markedly different from other languages. The English-speaking children represented in the graph are Eve and Adam. Eve produces very few missing subjects, both in finite and nonfinite clauses. Adam produces more null subjects in finite clauses than in nonfinite ones, but the difference is just 9%. For English, only third-person singular verbs were counted because other verbal forms lack inflection, and so do not inform whether the child produced a RI or not. This might have had an effect on the overall count, since what maybe was an RIs in second-, first-person or third-person plural were left aside. For more discussion, see Hoekstra and Hyams (1998).

14 ATOM stands for "AGR/TNS omission model". Schütze and Wexler (1996) assume that AGR and/or TNS may be deleted by the child. If AGR is deleted, subjects get default case. In English, the default case is ACC, but in some languages, like German/Dutch, the default case is NOM.

15 Even though the children were very young, they were able to pass the control items, hence the performance was not affected by their cognitive stage.

16 An anonymous reviewer worries that the statement that children acquiring RNSLs know their target grammar is too strong, due to the fact that the evidence comes from production, and production is sensitive to a number of factor, such as discourse context. I agree that a comprehension study would yield more compelling data, however the fact that children acquiring RNSLs produce a higher rate of null subjects than children acquiring English already suggests that the grammar of the two groups differs.

17 Some languages classified as PNSLs license null subjects in contexts quite different from the ones described here. For example, in Shipibo third-person pronouns are optionally null, whereas second and first-person subjects are obligatory overt Camacho (2013). We can question whether PNSL is an adequate classification for these languages, or if the variation could be regarded as a microparameter (in the terms of Roberts (2019)).

18 An anonymous reviewer raised an important point: Figure 3 aggregates children's production of null subjects across several months. In their words, maybe the aggregation disguises a parameter missetting. If we looked at narrow time frames, we might find evidence of missetting at certain points in time. I think the reviewer is correct in their observation. All we can say is that for a certain age group, there was no evidence of parameter missetting.

19 According to Simões, two other factors contributed to the number of null subjects found in André's speech: what the author calls "ritualized repetitions" and André's frequent use of the statement "I don't know" (*não sei*) which is usually uttered with a null subject in BP even in the speech of adults. Adults, differently than children, are unlikely to constantly respond to a question with "I don't know".

20 Generic null subjects are also attested in RNSLs, such as Chinese and Thai, since RNLs lack ϕ-features. If we consider only this fact, without taking into account the knowledge BP-speaking children have about agreement, it is not possible to say, by this experiment, whether BP-speaking children know they are acquiring a PNSL: they could have a grammar of an RNSL. As illustrated in the sentence below, the subject in the impersonal sentence below in Mandarin only has the generic interpretation:

(42) Zai zhe-ge xuexiao chi fan yihou bu neng shua ya.   Mandarin
      At this-CL school eat meal after not can brush teeth
      'In this school one cannot brush one's teeth after eating.'

However, BP-speaking children exhibit stable knowledge of agreement at least by the age of 3;00 Magalhães (2006). Agreement is not present in RNSLs, but it is in PNSLs. The known facts about the acquisition of agreement in BP in conjunction with children's interpretation of null subjects can reveal whether BP-speaking children are aware they are acquiring a PNSL.

21 *Brigadeiro* is a popular Brazilian dessert.

22 For the statistics and graph creation, the R R Core Team (2021) package `gstatsplot` Patil (2021) was used. In the x-axis, n = 60 refers to the number of sentences judged by each age group. Each age group was composed by 10 children. G4 = 4-year-olds, G5 = 5-year-olds, G6 = 6-year-olds, G7 = 7-year-olds.

23   A reviewer mentioned that hypothesis (i) directly conflicts with the proposal that children are grammatically conservative Snyder (2002, 2007, 2011). In principle, it would be possible to assume that children are conservative when acquiring syntactic aspects of their language, while assuming that the same does not hold in acquiring pragmatics. However, this assumption needs to be further investigated.

References

Austin, Jennifer, María Blume, David Parkinson, Zelmira Núñez del Prado, and Barbara Lust. 1997. The status of pro-drop in the initial state: Results from new analyses of Spanish. *Contemporary Perspectives on the Acquisition of Spanish* 1: 37–54.

Baker, Mark. 2008. *The Macroparameter in a Microparametric World*. Amsterdam: Benjamins.

Bertolino, Karina. 2024. The acquisition of generic null subjects under the Borer-Chomsky Conjecture. In *Language Acquisition in Romance Languages*. Amsterdam: Benjamins, vol. 1, pp. 58–85.

Bertolino, Karina. 2016. Modals and Impersonal Null Subjects in Brazilian Portuguese. Master's thesis, University of Connecticut, Storrs, CT, USA.

Bertolino, Karina. 2020. An Experimental Study on the Acquisition of Impersonals in Brazilian Portuguese. Ph.D. thesis, University of Connecticut, Storrs, CT, USA.

Berwick, Robert. 1985. *The Acquisition of Syntactic Knowledge*. Cambridge, MA: MIT Press, vol. 16.

Berwick, Robert, and Noam Chomsky. 2011. The Biolinguistic Program: The current state of its development. In *The Biolinguistic Enterprise: New Perspectives on the Evolution and Nature of the Human Language Faculty*. Oxford: Oxford University Press, pp. 19–41.

Biberauer, Theresa. 2010. Semi null-subject languages, expletives and expletive pro reconsidered. In *Parametric Variation: Null Subjects in Minimalist Theory*. Cambridge, UK: Cambridge University Press, pp. 153–99.

Biberauer, Theresa. 2018. Pro-drop and Emergent Parameter. In *Null Subjects in Generative Grammar: A Synchronic and Diachronic Perspective*. Oxford: Oxford University Press, p. 94.

Biberauer, Theresa. 2019. Factors 2 and 3: Towards a principled approach. *Catalan Journal of Linguistics Special Issue* 45–88. [CrossRef]

Biberauer, Theresa, and Ian Roberts. 2016. Parameter typology from a diachronic perspective. *Theoretical Approaches to Linguistic Variation* 234: 259–91.

Bloom, Lois, Patsy Lightbown, Lois Hood, Melissa Bowerman, Michael Maratsos, and Michael P Maratsos. 1975. Structure and variation in child language. In *Monographs of the Society for Research in Child Development*. New York: Wiley, pp. 1–97.

Bloom, Paul. 1990. Subjectless sentences in child language. *Linguistic Inquiry* 21: 491–504.

Boster, Carole Tenny. 1997. Processing and Parameter Setting in Language Acquisition: A Computational Approach. Ph.D. thesis, University of Connecticut, Storrs, CT, USA.

Brandtler, Johan. 2004. Subject omission and discourse anchorage in early Swedish child language. In *Working Papers in Scandinavian Syntax*. London: Scandinavian Syntax.

Bromberg, Sara, and Kenneth Wexler. 1995. Null subjects in child wh-questions. *MIT Working Papers in Linguistics* 26: 221–47.

Camacho, José. 2013. *Null Subjects*. Cambridge Studies in Linguistics. Cambridge, MA: Cambridge University Press.

Cardinaletti, Anna, and Michal Starke. 1999. The typology of structural deficiency. In *Clitics in the Languages of Europe*. Vienna: DE Gruyter, pp. 145–233.

Chacón, Dustin Alfonso, Michael Fetters, Margaret Kandel, Eric Pelzl, and Colin Phillips. 2015. Indirect Learning and Language Variation: Reassessing the That-Trace Effect. Master's thesis, College Park & Yale University, University of Maryland, Yale, CT, USA.

Chomsky, Noam. 1980. *On Cognitive Structures and Their Development: A Reply to Piaget*. Cambridge, MA: Harvard University Press.

Chomsky, Noam. 1981. *Lectures on Government and Binding*. Dordrecht: Foris.

Chomsky, Noam. 1986. *Knowledge of Language: Its Nature, Origin, and Use*. Westport: Greenwood Publishing Group.

Chomsky, Noam. 1998. Minimalist Inquiries: The Framework. In *MIT Occasional Papers in Linguistics*. Cambridge, MA: MIT, Department of Linguistics, vol. 15.

Chomsky, Noam. 2005. Three factors in language design. *Linguistic Inquiry* 36: 1–22. [CrossRef]

Chomsky, Noam. 2013. Problems of projection. *Lingua* 130: 33–49. [CrossRef]

Chomsky, Noam. 2015. Problems of projection: Extensions. *Structures, Strategies and Beyond: Studies in Honour of Adriana Belletti* 223: 1–16.

Chomsky, Noam, and Michael Kenstowicz. 1999. Derivation by Phase. In *An Annotated Syntax Reader*. p. 482. Available online: https://as.nyu.edu/content/dam/nyu-as/linguistics/documents/Kayne%20Leu%20Zanuttini%200520%20-2013-proofs%20paper.pdf#page=494 (accessed on 12 January 2024).

Cipriani, Paola, Pietro Pfanner, Anna Chilosi, Lorena Cittadoni, Alessandro Ciuti, Anna Maccari, Natalia Pantanon, L. Pfanner, P. Poli, S. Sarno, and et al. 1989. *Protocolli Diagnostici e Terapeutici Nello Sviluppo e Nella Patologia del Linguaggio*. Pisa: Italian Ministry of Health, Stella Maris Foundation.

Clahsen, Harald. 1989. Creole Genesis, the Lexical Learning Hypothesis and the Problem of Development in Language Acquisition. In *Wheels within Wheels: Papers of the Duisburg Symposium on Pidgin and Creole Languages*. Frankfurt: Peter Lang.

Clahsen, Harald, Martina Penke, and Teresa Parodi. 1993. Functional categories in early child german. *Language Acquisition* 3: 395–429. [CrossRef]

Clark, Herbert, and Eve Clark. 1979. Psychology and language: An introduction to psycholinguistics. *Language* 55: 436.

Crain, Stephen, and Cecile McKee. 1985. Acquisition of structural restrictions on anaphora. *North East Linguistics Society* 16: 8.

Demuth, Katherine. 1994. Minimal words in early acquisition. Paper presented at the 19th Conference on Language, Valletta, Malta, June 14–15; Boston: Development, Boston University.

Duarte, Mel. 1995. Brazilian Portuguese and the null subject parameter: Variation and syntax. Paper presented at Nwave 24, Philadelphia, PA, USA, October 12–15; Philadelphia: University of Philadelphia.

Dye, Cristina, Yarden Kedar, and Barbara Lust. 2019. From lexical to functional categories: New foundations for the study of language development. *First Language* 39: 9–32. [CrossRef]

Faria, Isabel. 1993. A Aquisição da Noção *Agente* e a Produção de Sujeitos Sintáticos por Crianças Portuguesas até aos Dois Anos e Meio *Revista Internacional de Língua Portuguesa* 10: 16–50.

Gerken, LouAnn. 1991. The metrical basis for children's subjectless sentences. *Journal of Memory and Language* 30: 431–51. [CrossRef]

Gerken, LouAnn. 1994. Young children's representation of prosodic phonology: Evidence from English-speakers' weak syllable productions. *Journal of Memory and Language* 33: 19–38. [CrossRef]

Gilligan, Gary Martin. 1989. A Cross-Linguistic Approach to the Pro-Drop Parameter. Ph.D. thesis, University of California Press, Berkeley, CA, USA.

Grinstead, John. 2004. Subjects and interface delay in child Spanish and Catalan. *Language* 80: 40–72. [CrossRef]

Guasti, Maria Teresa. 1993. Verb syntax in Italian child grammar: Finite and nonfinite verbs. *Language Acquisition* 3: 1–40. [CrossRef]

Guasti, Maria Teresa. 1996. Acquisition of Italian interrogatives. In *Generative Perspectives on Language Acquisition*. Amsterdam: John Benjamins.

Guasti, Maria Teresa. 2016. *Language Acquisition: The Growth of Grammar*. Cambridge, MA: The MIT Press.

Haegeman, Liliane. 1990. Non-overt subjects in diary contexts. In *Grammar in Progress, GLOW Essays for Henk van Riemsdijk*. Dordrecht and Providence: Foris Publications, pp. 167–74.

Haegeman, Liliane. 1997. Register variation, truncation, and subject omission in English and in French. *English Language & Linguistics* 1: 233–70.

Haegeman, Liliane, and Tabea Ihsane. 2001. Adult null subjects in the non-pro-drop languages: Two diary dialects. *Language Acquisition* 9: 329–46. [CrossRef]

Hamann, Cornelia, and Kim Plunkett. 1998. Subjectless sentences in child danish. *Cognition* 69: 35–72. [CrossRef]

Hoekstra, Teun, Nina Hyams, and Misha Becker. 1996. The underspecification of number and the licensing of root infinitives. In *BUCLD 21: Proceedings of the 21st Annual Boston University Conference on Language Development*. Somerville: Cascadilla Press, pp. 293–306.

Hoekstra, Teun, and Nina M. Hyams. 1998. Aspects of root infinitives. *Lingua* 106: 81–112. [CrossRef]

Holmberg, Anders. 2010. *Null Subject Parameters*. Cambridge, MA: Cambridge University Press, pp. 88–124.

Holmberg, Anders. 2017. Linguistic typology. In *The Oxford Handbook of Universal Grammar*. Oxford: Oxford University Press.

Holmberg, Anders, and Ian Roberts. 2010. *Introduction: Parameters in Minimalist Theory*. Cambridge, MA: Cambridge University Press, pp. 1–57.

Holmberg, Anders, and Urpo Nikanne. 2002. Expletives, subjects, and topics in Finnish. In *Subjects, Expletives, and the EPP*. Oxford: Oxford University Press, pp. 71–106.

Huang, C.-T. James. 1984. On the distribution and reference of empty pronouns. *Linguistic Inquiry* 15: 531–74.

Hyams, Nina. 1986. *Language Acquisition and the Theory of Parameters*. New York: Springer Science & Business Media, vol. 3.

Hyams, Nina. 1991. A reanalysis of null subjects in child language. In *Theoretical Issues in Language Acquisition*. London: Psychology Press, pp. 259–78.

Hyams, Nina, and Kenneth Wexler. 1993. On the grammatical basis of null subjects in child language. *Linguistic Inquiry* 24: 421–60.

Jaeggli, Osvaldo, and Kenneth J. Safir. 1989. The null subject parameter and parametric theory. In *The Null Subject Parameter*. New York: Springer, pp. 1–44.

Karmiloff-Smith, Annette. 1986. Some fundamental aspects of language development after age 5. In *Language Acquisition Studies in First Language Development*. Cambridge, UK: Cambridge University Press, p. 2.

Kim, Young-Joo. 2000. Subject/object drop in the acquisition of Korean: A cross-linguistic comparison. *Journal of East Asian Linguistics* 9: 325–51. [CrossRef]

Kim, Yun Jung, and Megha Sundara. 2021. 6–month–olds are sensitive to English morphology. *Developmental Science* 24: e13089. [CrossRef] [PubMed]

Kiss, Katalin. 1995. *Discourse Configurational Languages*. Oxford: Oxford University Press.

Lorusso, Paolo, Claudia Caprin, and Maria Teresa Guasti. 2005. Overt subject distribution in early italian children. Paper presented at the 29th Annual Boston University Conference on Language Development-BUCLD 29 Online Proceedings Supplement, Boston, UK, November 5–7; Somerville: Cascadilla Press.

MacWhinney, Brian. 2014. *The CHILDES Project: Tools for Analyzing Talk, Volume II: The Database*. London: Psychology Press.

Magalhães, Telma. 2006. *O Sistema Pronominal Sujeito e Objeto na Aquisição do Português Europeu e do Português Brasileiro*. Ph.D. thesis, Instituto de Estudos da Linguagem, Universidade Estadual de Campinas, Campinas, Brazil.

Manzini, M. Rita, and Kenneth Wexler. 1987. Parameters, Binding Theory, and Learnability. *Linguistic Inquiry* 18: 413–44.

Maratsos, Michael P. 1976. *The Use of Definite and Indefinite Reference in Young Children: An Experimental Study of Semantic Acquisition*. Cambridge, MA: Cambridge University Press.

Menuzzi, Sergio. 2000. That-trace effects in portuguese. *Fórum Linguístico* 2: 13–39.

Modyanova, Nadya, and Ken Wexler. 2007. Semantic and pragmatic language development: Children know 'that' better. Paper presented at the 2nd Conference on Generative Approaches to Language Acquisition North America (GALANA), Montréal, QC, Canada, August 17–19; pp. 297–308.

Morgan, James L. 1996. Prosody and the roots of parsing. *Language and Cognitive Processes* 11: 69–106. [CrossRef]

Nariyama, Shigeko. 2004. Subject ellipsis in english. *Journal of Pragmatics* 36: 237–64. [CrossRef]

Newmeyer, Frederick. 2004. Against a parameter-setting approach to typological variation. *Linguistic Variation Yearbook* 4: 181–234. [CrossRef]

Nicolis, Marco. 2008. The Null Subject Parameter and correlating properties. In *The Limits of Syntactic Variation*. Amsterdam: John Benjamins, pp. 132–271.

Orfitelli, Robyn, and Nina Hyams. 2012. Children's grammar of null subjects: Evidence from comprehension. *Linguistic Inquiry* 43: 563–90. [CrossRef]

Ouhalla, Jamal. 1993. Subject-extraction, negation and the anti-agreement effect. *Natural Language & Linguistic Theory* 11: 477–518.

Patil, Indrajeet. 2021. Visualizations with statistical details: The 'ggstatsplot' approach. *Journal of Open Source Software* 6: 3167. [CrossRef]

Phillips, Colin. 1996. Root infinitives are finite. In *Paper Presented at the 20th Boston University Conference on Language Development*. Somerville: Cascadilla Press, vol. 2, pp. 588–99.

Piaget, Jean. 1952. *The Origins of Intelligence in Children*. Translated by Margaret Cook. New York: Norton & Co.

Piaget, Jean. 1959. *Language and Thought of the Child: Selected Works*. New York: Routledge, vol. 5.

Pierce, Amy. 1992. *Language Acquisition and Syntactic Theory: A Comparative Study of French and English Child Grammars*. Dordrecht: Kluwer.

R Core Team. 2021. *R: A Language and Environment for Statistical Computing*. Vienna: R Foundation for Statistical Computing.

Radford, Andrew. 1990. *Syntactic Theory and the Acquisition of English syntax: The Nature of Early Child Grammars of English*. Hoboken: Wiley-Blackwell.

Rasetti, Lucienne. 2000. Interpretive and formal properties of null subjects in early french. *Generative Grammar in Geneva* 1: 241–74.

Rasetti, Lucienne. 2003. Optional Categories in Early French Syntax: A Developmental Study of Root Infinitives and Null Arguments. Ph.D. thesis, Université de Genève, Geneve, Switzerland.

Rizzi, Luigi. 1982. Negation, wh-movement, and the null subject parameter. In *An Annotated Syntax Reader*. p. 169. Available online: https://search.library.berkeley.edu/discovery/fulldisplay?docid=cdi_wiley_ebooks_10_1002_9781394260140_ch11_ch11&context=PC&vid=01UCS_BER:UCB&lang=en&search_scope=DN_and_CI&adaptor=Primo%20Central&tab=Default_UCLibrarySearch&query=null,,1982,AND&mode=advanced&offset=0 (accessed on 12 January 2024).

Rizzi, Luigi. 1986. Null objects in Italian and the theory of pro. *Linguistic Inquiry* 17: 501–57.

Rizzi, Luigi. 1994. *Syntactic Theory and First Language Acquisition: Cross-Linguistic Perspectives*. Binding, Dependencies, and Learnability, Chapter Early Null Subjects and Root Null Subjects. Mahwah: Lawrence Erlbaum Associates, Inc., vol. 2, pp. 249–72.

Rizzi, Luigi. 2005. Grammatically-Based Target-Inconsistencies in Child Language. Available online: https://www.semanticscholar.org/paper/Grammatically-based-Target-inconsistencies-in-Child-Rizzi/7b3f1546e598d2e9e411ce70ba838c31a7910772 (accessed on 12 January 2024).

Roberts, Ian. 2010a. *Agreement and Head Movement: Clitics, Incorporation, and Defective Goals*. Cambridge, MA: MIT Press, vol. 59.

Roberts, Ian. 2010b. A deletion analysis of null subjects. In *Parametric Variation: Null Subjects in Minimalist Theory*. Cambridge: Cambridge University Press, p. 58.

Roberts, Ian. 2019. *Parameter Hierarchies and Universal Grammar*. Cambridge, MA: Cambridge University Press.

Roeper, Thomas, and Bernhard Rohrbacher. 2000. *Null Subjects in Early Child English and the Theory of Economy of Projection*. Dordrecht: Springer Netherlands, pp. 345–96.

Saito, Mamoru. 2007. Notes on East Asian argument ellipsis. *Language Research* 43: 203–27.

Saito, Mamoru. 2016. (a) case for labeling: Labeling in languages without Φ-feature agreement. *The Linguistic Review* 33: 129–75. [CrossRef]

Schütze, Carlson, and Kenneth Wexler. 1996. Subject case licensing and english root infinitives. In *Paper Presented at the 20th Boston University Conference on Language Development*. Boston: MIT Press, pp. 670–81.

Shi, Rushen, and Melanie Lepage. 2008. The effect of functional morphemes on word segmentation in preverbal infants. *Developmental Science* 11: 407–13. [CrossRef]

Shi, Rushen, Janet F. Werker, and Anne Cutler. 2006. Recognition and Representation of Function Words in English-learning Infants. *Infancy* 10: 187–98. [CrossRef]

Shin, Naomi Lapidus, and Helen Smith Cairns. 2012. The development of NP selection in school-age children: Reference and Spanish subject pronouns. *Language Acquisition* 19: 3–38. [CrossRef]

Simões, Luciene Juliano. 1999. Sujeito nulo na aquisição do Português do Brasil. *Cadernos de Estudos Linguísticos* 36: 105–30.

Snyder, William. 2002. Parameters: The view from child language. In *Proceedings of the Third Tokyo Conference on Psycholinguistics*. Tokyo: Hituzi Shobo, pp. 27–44.

Snyder, William. 2007. *Child Language: The Parametric Approach*. Oxford Applied Linguistics. Oxford: Oxford University Press.

Snyder, William. 2011. Children's grammatical conservatism: Implications for syntactic theory. Paper presented at the 35th Annual Boston University Conference on Language Development, Boston, MA, USA, November 5–7; Somerville: Cascadilla Press, vol. 1, pp. 1–20.

Tomioka, Satoshi. 2003. The semantics of Japanese null pronouns and its cross-linguistic implications. *The Interfaces: Deriving and Interpreting Omitted Structures* 61: 18.

Torn-Leesik, Reeli, and Maigi Vija. 2012. Acquisition of the impersonal voice by an Estonian child. *Journal of Baltic Studies* 43: 251–71. [CrossRef]

Torrens, Vincent. 1995. The acquisition of inflection in Spanish and Catalan. *MIT Working Papers in Linguistics* 26: 451–72.

Valian, Virginia. 1990. Null subjects: A problem for parameter-setting models of language acquisition. *Cognition* 35: 105–22. [CrossRef]

Valian, Virginia. 1991. Syntactic subjects in the early speech of American and Italian children. *Cognition* 40: 21–81. [CrossRef]

Valian, Virginia. 2016. Null Subjects. In *The Oxford Handbook of Developmental Linguistics*. Oxford: Oxford University Press, pp. 386–413.

Vihman, Virve Anneli. 2004. Valency Reduction in Estonian. Ph.D. thesis, University of Edinburgh, Edinburgh, UK.

Viitso, Tiit Rein. 1997. Fennic. In *The Uralic Languages* New York: Routledge, pp. 96–114.

Vija, Maigi, Reeli Torn-Leesik, and Renate Pajusalu. 2009. *Tegumood Eesti Lapsekeeles*. Tallinn: Eesti Keele Sihtasutus, vol. 5, pp. 329–44.

Villa-García, Julio. 2011. On the role of children's deterministic learning in the 'no-overt-subject' stage in the L1 acquisition of Spanish. In *Annual Meeting of the Berkeley Linguistics Society*. vol. 37, pp. 375–388. Available online: https://journals.linguisticsociety.org/proceedings/index.php/BLS/article/view/843 (accessed on 12 January 2024).

Wang, Qi, Diane Lillo-Martin, Catherine T. Best, and Andrea Levitt. 1992. Null subject versus null object: Some evidence from the acquisition of Chinese and English. *Language Acquisition* 2: 221–54. [CrossRef]

Wexler, Kenneth. 1992. *Optional Infinitives, Head Movement and the Economy of Derivation in child Grammar*. *Occasional Paper, 45*. Cambridge, MA: Center for Cognitive Science, MIT.

Yang, Charles. 2002. *Knowledge and Learning in Natural Language*. Oxford: Oxford University Press.