

# Universal Grammar Theory and Language Acquisition: Evidence from the Null Subject Parameter

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## Abstract

This article introduces the Universal-Grammar-based (UG) theory of language acquisition. It focuses on parameters, both as a theoretical construct and in relation to first-language acquisition (L1A). The null subject parameter is used to illustrate how languages vary and explain how a child's grammar develops into adult grammar over time. The article is structured as follows: the first section outlines crucial ideas that are relevant to language acquisition in generative linguistics, such as the notions of competence, performance, critical period, and language faculty. Section two introduces and discusses the content of language faculty from the perspectives of the Principles and Parameters Theory and the Minimalist Program for Linguistic Theory. This section also briefly describes the contrast among languages in regard to whether or not they allow empty categories in subject position in finite clauses. The third section first discusses how children are hypothesised to acquire their native language (L1). Then, in light of findings from the early null subject phenomenon, this section empirically examines the content of grammars that are developed by children at various developmental stages until they acquire the appropriate value for the null subject parameter. The final section highlights the important role of UG theory to L1A.

**Keywords:** Universal Grammar, first language acquisition, language faculty, critical period, null-subject, the Principles and Parameters Theory, The Minimalist Program

## 1. UG and Child Language Acquisition

The field of linguistics has been developing very rapidly. During the last century, several theories have emerged. One which has opened new perspectives in our understanding of both language structure and language acquisition is the theory of Universal Grammar initially proposed by Chomsky in 1957. Chomsky (1975: 29) defines this notion as “a system of principles, conditions, and rules that are elements or properties of all human languages”. The idea is that these principles, conditions, and rules are found in all languages because they are a property of the human mind. With its ultimate aim of integrating “grammar, mind and language at every moment” (Cook and Newson, 2007, p. 11), the primary goal is to “understand the mechanisms which underlie the human ability to build mental grammars” (Hawkins, 2001, p. 1). However, understanding the nature of these internally operating mechanisms “is inseparable from the problem of how it [language] is acquired” (Cook and Newson, 2001, p. 2). (Note 1) Hence, linguists, in order to describe properly such an abstract mental grammatical system need to answer the question: how do children so masterfully acquire the complex knowledge of their native language?

Following the idea which regards language “as a natural phenomenon” (Lenneberg, 1967, p. vii) which should be studied as an “organ of the body” (Chomsky, 2005, p. 133), Chomsky (1957, and much of his subsequent work) proposes what he takes as the most plausible answer to this question, which is that “there is a specific faculty of the mind/brain that is responsible for the use and acquisition of language, a faculty with distinctive characteristics that is apparently unique to the species in essentials and a common endowment of its members, hence a true species property” (Chomsky, 1992, p. 4). (Note 2) This means that children come to the task of language acquisition with prior knowledge as part of genetic endowment that guides them in the course of acquiring their native language. This claim, referred to as the Innateness Hypothesis, is empirically supported in child language acquisition research as pointed out by e.g. Chomsky (1965, 1972, 1981); O’Grady (1997); Lightfoot (1999); Anderson and Lightfoot (2002); Fitch, Hauser and Chomsky (2005) and by the observation that all normal children (1) invariably acquire successfully a remarkably complex grammatical system, and do so (2) at roughly the same pace, (3) following roughly the same developmental process, (4) unconsciously without explicit instruction, (5) despite the fact that the speech input they receive is very often imperfect, in that the speech input they receive is often imperfect, containing false starts, unfinished sentences, and the like, and (6) “do not provide adequate information about complex structures in the language for the child to acquire these on the basis of the input alone” (Lakshmanan, 1994, p. 3). This acquisition phenomenon, where there is a mismatch between the speech input which children are exposed to and their linguistic competence which goes far beyond the impoverished input they receive, is known as the logical problem of language acquisition or the poverty of the stimulus (for further discussion, see Thomas (2002); Sampson (2002); Lasnik and Uriagereka (2002); Scholz and Pullum (2002); Fodor and Crowther (2002) Schwartz and Sprouse 2013).

That a good deal of any native speaker’s daily speech is not perfectly grammatical led Chomsky (1965) to distinguish between competence and performance. While competence is “the speaker/hearer’s knowledge of his language”, performance is “the actual use of

language in concrete situation” (Chomsky, 1965, p. 4). Because of the errors caused by performance factors, such as slips of the tongue, misinterpretations and processing difficulties due to limited working memory, performance is not on all occasions a perfect reflection of competence. (Note 3) This distinction, therefore, is crucial for the theory that “is concerned with what a speaker knows about language as an internal property of human mind rather than something external [the produced utterances]” (Chomsky, 1988, p. 36). So, UG is relevant to competence rather than performance. Chomsky (1986, p. 22) terms this internalised linguistic system (the grammatical competence) as the system of human “I-language”.

Further support for the claim that at least some aspects of language originate in the child’s genetic endowment comes from the idea that “there is a limited developmental period during which it is possible to acquire a language, be it L1 or L2, to normal, native-like levels” (Birdsong, 1999, p. 1). (Note 4) Studies of child language acquisition lend empirical support to this critical period during brain growth, referred to as the Critical Period Hypothesis (e.g. Lenneberg, 1967; Hurford, 1991; Smith, 2004). The best known example that supports the hypothesis in child language acquisition comes from a child called ‘Genie’ who was totally isolated until age 13. Even after extensive exposure to linguistic input, her subsequent language development was not normal; although she was quite successful in acquiring a large vocabulary, her syntax and morphosyntax never developed beyond a basic level (see Curtiss, 1977). Genie’s syntactic deficits suggest that the critical period for acquiring a native language “holds for the acquisition of grammatical abilities, but not necessarily for all aspects of language” (Fromkin, Rodman and Hyams, 2013, p. 479). The following section will discuss the hypothesised nature of the language faculty.

## **2. The Nature of the Language Faculty: Principles and Parameters Theory and the Minimalist Program for Linguistic Theory**

Children’s built-in language faculty places “limitations on grammars, constraining their form (the inventory of possible grammatical categories, in the broadest sense, i.e., syntactic, semantic, phonological), as well as how they operate (the computational system, principles that the grammar is subject to)” (White, 2008, p. 20). On the other hand there is obviously much variation among the languages of the world as regards the lexicon, phonology, morphology as well as in syntax. The need to resolve the conflict between the conclusion that I-language must be highly constrained and the fact that there is variation across languages gave rise to the Principles and Parameters Theory that was first developed in Chomsky (1981). The central claim of this theory is that the language faculty includes a set of innate universal grammatical principles which define how grammatical operations work. Some of these principles are invariant across languages, while others vary, accounting for the systematic syntactic variation found cross-linguistically. Such variant principles are known as parameters, usually with binary values that were viewed, according to the theory, as predetermined by UG and for which children have to set the value appropriate to the language they are exposed to, based on the linguistic input they encounter.

However, this view of variation has changed since the introduction of the Minimalist approach to UG by Chomsky in (1995), particularly in more recent years: see Chomsky

(2005). It has become clear that the notion of a richly specified UG as part of the human genome is unrealistic (Chomsky 2005; Berwick and Chomsky 2011). As a consequence, there is now a more concerted effort to distinguish between universal properties of language that are the result of extragrammatical factors and those that are the result of UG proper. This approach reduces, therefore, the role of UG, compared to how it was viewed in the eighties and early nineties. (Note 5)

To make the discussion clearer, consider the model of the human language design put forward by Chomsky (2005). This model is referred to as the ‘three factors model’, illustrated as follows:

**Factor 1:** The genetic endowment (UG), which includes all the universal properties shared by all human languages that need not be learned and cannot be explained by any extralinguistic factors.

**Factor 2:** Experience (the linguistic data), which leads to variation across languages; the acquirer’s task is to learn, based on the linguistic input he or she receives, which settings are appropriate for the language being acquired for each variant grammatical property.

**Factor 3:** Principles not specific to the language faculty; these include general properties of computation and general properties of cognition, including learning strategies such as generalising from particular instances to whole categories.

However, there are still parameters, in the sense that languages vary with respect to a limited number of options. But, unlike classical Principle and Parameter theory, the options are not specified by UG. Instead options arise when UG does not specify a value. Variation occurs because UG is underspecified with respect to various properties (Roberts and Holmberg 2010). The number of options may still be strictly limited, maybe just two, but this is determined by extragrammatical factors. For example, a category may be overt or covert or absent. These are the only logically possible options. If UG requires that the category be present, then the only logically possible options are overt or covert. The language learner has to decide based on primary data which is the option taken in the language being acquired.

A plausible example of a universal property of human language is the principle which says that every theta role that a predicate can assign must be assigned to one and only one argument (Chomsky 1981). For example, if a predicate can assign an Agent role there must be a determiner phrase (DP) merged with the predicate which can receive this role. Due to principles which are also universal (a universal theta hierarchy; see Baker 1997), this DP will be a subject. However, languages vary with regard to whether or not this subject has to be overtly realised. In particular, languages vary with regard to whether it must be realised in finite/tensed clauses, i.e. whether null subjects are permitted or not. (Note 6) Consider the following contrast between Arabic and English, as in (1) and (2) respectively:

- (1) Atakallamu   ʔal-'arabi:ya           [Arabic]  
      speak-1sg    Arabic  
      ‘‘I speak Arabic’’.

(2) \*Speak English.

[English]

These examples show that certain sentences that are allowed in Arabic such as in (1) are ungrammatical in English as in (2); the verb *atakallamu* in Arabic, for example, can exist without an overt subject, but its English counterpart *speak* requires an explicit referential pronominal or lexical subject. This linguistic variation across languages is known as the Null Subject Parameter (Chomsky, 1982). Thus, English, among many other languages like French and Swedish, is a non-null subject language (henceforth, non-NSL), whereas Arabic, among many other languages like Spanish and Italian, is null subject language (henceforth, NSL).

In relation to child language acquisition, this language-specific grammatical property is learned as a result of Factor 2 (the linguistic input). The following section discusses in details the issue of how this variation is acquired by child language learners.

### 3. Null Subjects in First Language Acquisition

Having theorised that all normal children are born with an in-built language faculty with a set of finite universal principles, it is assumed that these principles constitute the starting point of language acquisition ( $G_0$ ) for all children. In other words, these principles form “the initial state of the language learner, hence the basis on which knowledge of language develops” (Chomsky 1988, p. 69). Therefore, it is expected that children at the  $G_0$  stage start to learn the variant grammatical properties in a largely uniform way.

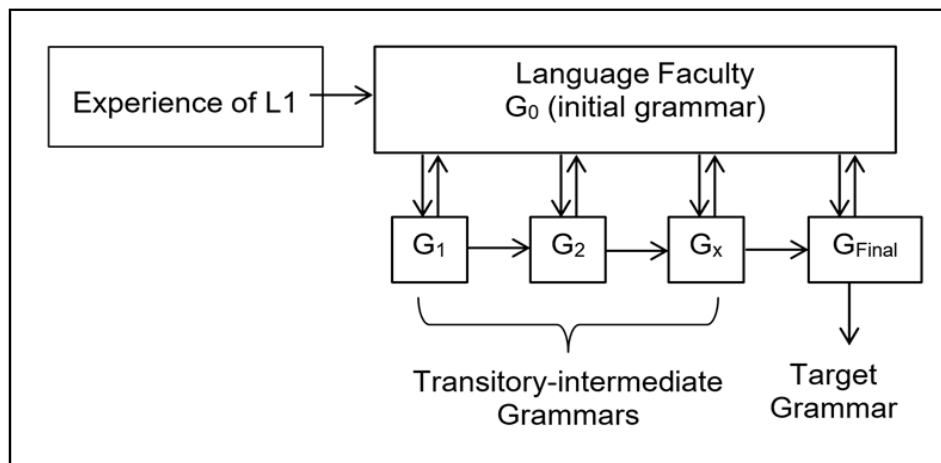


Figure 1. Model of child L1 acquisition

To illustrate this uniformity notion in children’s cross-linguistic language development, let’s look at the early null subjects in L1 acquisition. It has been widely observed that children, regardless of whether their target language is a NSL or not, pass through certain transitory stages in their grammatical development where they initially produce finite sentences with no overt subjects (see R. Brown, 1973; L. Bloom, Lightbown and Hood, 1975; Valian, 1991; Wang, Lillo-Martin, Best and Levitt, 1992; Pierce, 1994; Rizzi, 1994; Rasetti, 2000; Valian and Eisenberg, 1996; Hamann and Plunkett 1998; Hamann, Rizzi and Frauenfelder 1996, and the references cited below). The following examples in (3) illustrate these early null subjects.

Note that the relevant adult languages fall into different groups in terms of licensing null subjects: English, French and Danish are non-NSLs; Italian and Japanese are NSLs; and Hebrew is a partial NSL, in which null subjects are optional in some contexts and excluded in other contexts (e.g., if the pronoun is focused or there is a shifted topic, or if it is 3<sup>rd</sup> person and is not locally controlled). (Note 7)

(3)

- |   |  |
|---|--|
| <p>a. English<br/>Want more apples<br/>*(I) want more apples.<br/>(Hyams 1986, after L. Bloom, 1970)</p>                                    | <p>b. French<br/>Oter tout ta.<br/>empty all that<br/>*(I) empty all that.<br/>(Hamann and Plunkett, 1998)</p> |
| <p>c. Danish<br/>Ikke køre traktor.<br/>Not drive tractor.<br/>*(I, you, he) doesn't drive the tractor.<br/>(Hamann and Plunkett, 1998)</p> | <p>d. Italian<br/>Butta via.<br/>(he) throws away<br/>(Serratrice, 2005)</p>                                   |
| <p>e. Hebrew<br/>Shata.<br/>drank/3msg DirObj this<br/>*(He) drank this.<br/>(Levy and Vainikka, 1999)</p>                                  | <p>f. Japanese<br/>Hamu taberu.<br/>ham eat<br/>'I'll eat ham.<br/>(Hirakawa, 1993)</p>                        |

However, despite this apparent similarity in the initially developed grammar, it has been noticed that the actual percentage of subject drop produced by children, as they pass from the initial state ( $G_0$ ) through the multiple transitory mental grammatical states ( $G_1$ ,  $G_2$ ,  $G_X$ ), varies considerably based on a number of factors: the target language (the input), age of the acquirer and the produced syntactic construction (Valian, 1991, and Aronoff, 2003). Table 1 below illustrates the large differences in rate of null subjects across child languages where the age ranges of the children are similar.

Table 1. Percentages of Null Subjects across Child Languages

Child L1	Age	Subject drop rates	Source
English	2;03 - 2;08	15%	Hyams and Wexler (1993: 426)
French	2;03 - 2;07	38%	Jakubowicz, Milller, Riemer and Rigaut (1997, p. 335)
Japanese	2;03 - 2;06	79%	Hirakawa (1993:43)
Chinese	2;00 - 2;05	56%	Wang et al. (1992:238)
Spanish	2;5	66.3%	Bel (2003: 9)

Note the children acquiring null subject languages (Japanese, Chinese, Spanish) produce finite sentences with no overt subjects with much greater frequency compared to their

counterparts acquiring non-null subject languages (English, French) during approximately the same age. Such differences could be attributed to the different properties of the input the children receive; the former group of languages is known to make massive use of null pronouns, while the latter prohibit null subjects.

It should be mentioned at this point that it has been observed that English-speaking children and Inuktitut-speaking children at this stage omit 1<sup>st</sup> and 2<sup>nd</sup> person pronouns more frequently than the 3<sup>rd</sup> person (see Valian and Eisenberg 1990, Hughes and Allen, 2006). (Note 8) Prévost (2009, p. 135) finds in case of French children that the first pronouns to “emerge are third person singular pronouns, such as *il, elle*”. However, over the course of time, and only on the basis of positive evidence, this divergent transitory intermediate grammar starts to converge on the target-adult grammar. Approximately at age three, children arrive at the appropriate value for the given grammatical property; that is, children learning a language like English acquire the [-null-subject], children learning a language like Arabic acquire [+null-subject] in order to construct the target core grammar.

An important question to be raised on the basis of the above discussion is: what is the nature of these early null subjects? The phenomenon of child null subjects has been accounted for under two approaches: a competence-based approach and a performance-based approach. Within each approach, different accounts have been offered (see, among others, P. Bloom, 1990; Hyams, 1986, 1992; Rizzi, 1994, 2000; Valian, 1990, 1991; Valian and Eisenberg, 1996; Bromberg and Wexler, 1995; Orfitelli and Hyams 2008). However, the exact nature of these early null subjects is still subject to debate among linguists. (Note 9)

Hyams (1986) originally proposed that children’s early null subjects are pro, licensed by the same mechanism that licenses null subjects in Arabic-type-languages. (Note 10) She argued in case of children acquiring non-NSLs, such as English, that once they discover the impoverished agreement system, null subjects are blocked. Many researchers, including Rizzi (1998) and Roeper and Rohrbacher (2000), argued following Hyams (1986) that children set the value of the null subject parameter once they acquire the agreement morphology. In a later article and in order to deal with the flaws of her pro-drop model, Hyams (1992) assumes that child null subjects are topic-drop, licensed via T (T=tense) and identified by a discourse topic chain. (Note 11) In this way, the early null subjects in child grammar of English (or Arabic, etc.) resemble that of null subjects in topic-drop languages like Chinese (see J. Huang, 1989). If this is the case, then it would be expected that null subjects in child English have the same distribution as in adult Chinese. However, Hughes and Allen (2008) observed that children omit null subjects even in cases when the referent cannot be identified from the discourse. Moreover, Rizzi (1994, p. 155) observed that the children’s null subjects are structurally “limited to the initial position, the specifier of the root”. Therefore, Rizzi (1994, 2005a,b) proposed a truncation analysis for such an empty antecedentless category, assuming that early subject drop is root subject drop in that children during the null subject phase, for syntactic developmental reasons, produce incomplete tree structures where the specifier of the root is not merged.

The alternative approach to accounting for the early null subjects is that there are

performance-deficit explanations for the phenomenon. For example, P. Bloom (1990) and Aronoff (2003) argue that the child's grammar is similar to that of the adults; however, for processing difficulties, caused by the child's limited working memory or syntactic complexity, omissions occur in the child's production. Accordingly, Bloom claims that children tend to omit subjects from longer and complex utterances more often than from shorter ones; this is referred to as the VP length analysis to early null subjects (see also Valian, 1990, 1991 for a similar claim). Similarly, Allen and Schroeder (2003), Clancy (1993), Gürkanli, Nakupoglu and Özyürek (2007) and Guerriero, Cooper, Oshima-Takane and Kuriyama (2001) found that children show a higher null subject rate when verbs are transitive compared to intransitive; this is because transitive verbs are associated with given information and therefore are in longer sentences. This account is supported empirically by data showing that children drop other constituents in their speech, in addition to null subjects, such as auxiliaries and modals (see, P. Bloom, 1990). However, a counterargument is that children frequently also omit subjects in very simple utterances such as: want daddy (see Radford, 1986, 1990). According to the performance-limitation explanation, children are predicted to overtly spell out the subjects in such simple clauses, yet, Rizzi (2000) specifically argues that this early null subject phenomenon is not attested in embedded clauses, simply because such complex structures emerge later at a stage (at age three) when children have arrived at the appropriate setting for this grammatical property.

#### **4. The Role of Generative Grammar in the Study of First Language Acquisition: Concluding Remarks**

The UG-based theory of language acquisition provides an account of how the child's first language development proceeds. It provides linguists with a way to understand the question of how children acquire the grammar of their native language in such a rapid and uniform fashion, based on the impoverished input they are exposed to.

The view that the child's grammatical learning is constrained by invariant principles simplifies the task of acquisition by reducing the syntactic learning required from the child. Since the innately endowed principles do not have to be learned, the child's only grammatical learning is to arrive at the appropriate value for each variant grammatical property in the language being acquired. (Note 12) These conclusions still stand, even in the light of recent developments in generative linguistics. The role of UG may be reduced, in favour of extragrammatical factors, but acquisition of syntax is still largely a matter of choosing between options provided by an underspecified UG.

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## Notes

Note 1. Although UG guides and constrains child-language acquisition, “it is not, of itself, a theory of acquisition” (White, 1998, p.2). However, “study of what child learners bring to the task of language learning provides insight into the contents of Universal Grammar” (Thomas, 2004, p. 3). This is because the ability to acquire a native language reflects to a great extent some properties of the mind.

Note 2. In later work, Hauser, Chomsky and Fitch (2002) divide the language faculty into two subtypes: faculty of language in the broad sense (FLB) and faculty of language in the narrow sense (FLN). FLB is an inclusive system which includes all language and communication components some of which are not necessarily unique to humans such as vocalization and communicative behaviour. FLN is a restricted and narrow part of FLB; however, its finite set of elements is unique to humans. Hauser et al. (2002, p. 1571) assume that the “key component of FLN is a computational system (narrow syntax) that generates internal representations and maps them into the sensory-motor interface by the phonological system, and into the conceptual-intentional interface by the (formal) semantic system”. See also Fitch, Hauser, and Chomsky (2005).

Note 3. When this happens – producing ungrammatical sentences that may violate some principles of UG - this does not mean that the speaker does not know his or her native language. If grammar were not constrained by the principles of UG, then native speakers of any language would be expected to treat grammatical and ungrammatical sentences alike, “since the principle ruling out the ungrammatical sentences would not be available” (White, 2003, p. 29) and they do not. For more extensive discussion, see Grimshaw and Rosen (1990) and White (2003).

Note 4. Such critical periods apply to various other living organisms’ innate behaviours that are triggered by specific input (see Bolhuis and Everaert, 2013).

Note 5. For detailed discussion about the Minimalist approach to UG, see Chomsky (1995, 1998, 2000, 2005); Sciullo and Boeckx (2011) and Boeckx, Horno-Cháziz and Mendívil-Giró (2012).

Note 6. Furthermore, languages not only vary with regard to whether or not the subject of a tensed clause must be overtly realised, but also languages that permit null subjects vary with regard to the conditions under which null subjects are allowed. For more detailed discussion about the differences in the distribution of null subjects among languages that permit them and about the several proposals have been offered to explain the syntactic mechanisms by

which a null subject is licensed in such languages, see among many others Biberauer, Holmberg, Roberts and Sheehan (2010); Fassi Fehri (1993, 2009); Holmberg (2005); J. Huang (1984, 1989); Y. Huang (2000) and Rizzi (1982, 1986).

Note 7. For detailed discussion about the typology of NSLs, see among many others Biberauer, Holmberg, Roberts and Sheehan (2010), Holmberg (2005), Holmberg, Nayudu and Sheehan (2009), J. Huang (1984, 1989), Y. Huang (2000), Rizzi (1982, 1986), Shlonsky (2009) and Vainikka and Levy (1999).

Note 8. Inuktitut is primarily spoken in native populations in Canada.

Note 9. The interested reader is referred to Guasti (2002) and to Hyams (2011) for an historical review.

Note 10. *Pro* is a null nominative-case pronoun which represents the understood null subject of a finite clause.

Note 11. For reasons of space, these problems will not be presented here; however, for detailed criticism, see Haegeman, 1990; Rizzi, 1994; Valian, 1990).

Note 12. Language acquisition also involves lexical learning. Chomsky (1995, P. 28) defines the process of language acquisition as “the acquisition of lexical items, fixing of parameters, and perhaps maturation of principles”.

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