Larisa Avram

An Introduction
to Language Acquisition
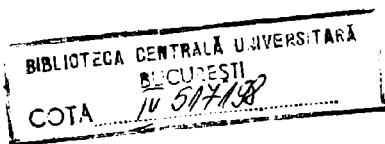# from a Generative Perspective

Gavagai !

Larisa Avram

An Introduction to Language Acquisition
from a Generative Perspective

LARISA AVRAM

AN INTRODUCTION
TO LANGUAGE-ACQUISITION
FROM A GENERATIVE PERSPECTIVE

1032/02

Tehnoredactare computerizată: Victoria Iacob

CONTENTS

PREFACE

The aim of this textbook is to provide an introduction to language acquisition from a strictly linguistic perspective. The theoretical framework I have chosen is that of generative linguistics for at least two reasons. Firstly, because one cannot present facts in a theoretical vacuum nor can one switch from one perspective to another with the excuse of being eclectic. Such an approach seems impracticable to me and, in many cases, misleading. Secondly, generative linguistics is the first model which clearly states that linguistic theory must meet two requirements: that of descriptive adequacy and that of explanatory adequacy. And also for the first time, it provides strong arguments that human language is part of our biological endowment. I do not know of any other linguistic theory that takes the problem of language learnability that seriously and which, by so doing, turns the study of language, seen as a mirror of the human mind, into one really worth pursuing. It follows then that the present textbook is aimed at students who have some prior knowledge of generative grammar. However, I have tried to provide definitions whenever I thought that might be helpful to someone with no previous training in generative linguistics.

The textbook contains five interrelated but clearly distinct units. Unit I outlines the general framework. It focuses on what makes language knowledge so different from other cognitive skills and it provides a tentative definition of language acquisition.

Unit II is a more theory-oriented version of the first one: it presents the concept of language acquisition and its implications for language learnability theories in the history of generative linguistics, from Noam Chomsky's *Aspects of the Theory of Syntax* to his *Minimalist Program*. The main goal of this unit is to offer the student an insight into generativism from the perspective of acquisition, with a view to showing how "old" the new Minimalist Program actually is.

Unit III deals with morphological development, with a focus on how the dual-mechanism model can explain the overregularization or irregularization of morphological forms in early speech. It also briefly looks into issues related to the acquisition of derivational morphology and the way in which derivational and inflectional morphology intermingle in the child's linguistic development.

Unit IV offers an introduction to the acquisition of syntax. It is actually organized in three parts. In the first part, I summarize the three main views on syntactic development available in the literature. The second and the third part represent illustrations of how one empirical phenomenon can be viewed from the perspective of each of the three models. Each part reviews a selection of studies addressing two specific topics: the optional infinitive stage and early subjects. I have decided on these two topics for several reasons. One of them is that both have been the subject of a huge number of studies in recent years. This is because the analysis of optional infinitives or early subjects inevitably requires tackling other issues as well, such as the acquisition of

functional categories, of movement or of control. This is also the second reason for which I opted for optional infinitives and early subjects.

Unit V addresses the problem of the syntax/semantics interface. It is organized in two parts. The first part deals with lexical development, explaining in what way the acquisition of vocabulary, just like the acquisition of syntax, is guided by some possibly innate constraints. The second part offers an overview of the various hypotheses about the acquisition of tense and aspect. It revisits, from a semantic perspective, the syntactic analysis of the early optional infinitives.

I hope that this textbook will help open up some of the fascinating world of language acquisition and that students will enjoy exploring it.

ACKNOWLEDGEMENTS

I owe a lot to many people, but I will limit myself to mentioning only those persons and institutions that have had a direct impact on the writing of this textbook. I would like to express my gratitude to those who taught me language acquisition and made me believe that this is a domain worth studying, in spite of the scepticism of many: Stephen Crain, David Lightfoot, Susan Powers, Antonella Sorace and Rosalind Thornton. I also want to thank Jürgen Weissenborn for reading parts of this textbook and encouraging me to finish it.

Back home, I owe a lot to many people, but two of them showed a particular interest in my acquisition studies – Alexandra Cornilescu and Florica Băncilă. Thank you!

I am grateful to the Fulbright Foundation for a research fellowship in 1997–1998, at the University of Maryland at College Park, during which I could collect bibliographical material for this textbook. More importantly, it gave me the opportunity to attend the acquisition and learnability classes taught by Rosalind Thornton, Stephen Crain and David Lightfoot. I benefited enormously from their classes and from discussions with them, both in terms of acquisition and in terms of teaching acquisition. I am equally grateful to the Alexander von Humboldt Foundation for a research fellowship in 1999–2000 at the University of Potsdam, where several chapters of this textbook were written.

Valuable and encouraging feedback came from students who attended the acquisition classes I have taught in recent years. I thank them all for their interest, for their challenging questions as well as for their puzzled faces or lack of interest when some topics were addressed.

Finally, thank you Andrei and Andrei, for always being with me. And I do wish I could thank someone else, though she is no longer here...

1

ON THE NATURE OF LANGUAGE ACQUISITION

ON THE NATURE OF LANGUAGE ACQUISITION

Language acquisition seems much like the growth of organs generally; it is something that happens to a child, not that a child does. And while the environment plainly matters, the general course of development and the basic features of what emerges are predetermined by the initial state [which is] a common human possession. (Noam Chomsky - *New Horizons in the Study of Language*, MIT class lecture, 1997)

KEY POINTS:
In this chapter you will learn about:
- the innateness hypothesis
- the role of the linguistic input in the process of acquisition
- the relationship between language acquisition and general cognitive development
- the modularity of mind and language
- the critical period hypothesis

1. Introduction

How does a baby's babbling turn into words? How does a child begin to utter strings of words and then more and more complex sentences? Why do very young children choose to utter words instead of chirping or barking, even when they hear a pet chirp or bark every day? Why are humans the only creatures that possess this skill called language? What does this skill tell us about our mind, about the properties of our brain? Is it one more cognitive skill, similar to all the others? Why can we simply grow up speaking but still have trouble when, later in life, we want to learn a second or a third language?

Linguists, psychologists and neurobiologists have been trying to find an answer – from different perspectives – to these eternally fascinating questions (and to many related ones) in an attempt at gaining a better understanding of the relation(s) between brain-mind-language. In what follows, the focus will be on what linguistic theory can tell us about the acquisition of language, though results from other fields, which can provide support in favour/against the hypotheses put forward by linguistic theory, may be occasionally invoked.

The general perspective will be the one provided by generative linguistics; behaviour and its products will be seen as "data that may provide evidence about the inner mechanisms of mind and the ways these mechanisms operate in executing actions and interpreting experience" (Chomsky 1997, MIT class lecture). Within such a perspective, the goal of the linguist is not only to describe language but also to account for the origin of language knowledge and for the process which leads to knowledge of one particular language; equally important, one has to explain how "different learners converge on similar mental representations on the basis of dissimilar environments" (Crain 1991:597), i.e. one has to account for the fact that the process of acquisition is fairly uniform across speakers.

> Language analysis can help us understand the inner mechanisms of the human mind.

Analysis of child speech can help us better understand what is universal and how the system of language is organised.

2. Input and acquisition

2.1 The question

The study of language acquisition reveals that, at a very early age, the child is acquiring words and structures at a very high rate. Markman (1994) reports data from other studies about the speed at which a child can acquire vocabulary. It seems that by the age of six children already know 9,000–14,000 words, which means that they learn approximately 9 words a day from about 18 months on. It is also beyond doubt that the child can create and understand strings of words, which he/she did not hear in the input. By the age of 5, he/she has (almost) adult-like knowledge of the grammar of the target language. Complex sentences and complex structures are used and understood in an adult-like fashion.

The obvious question is how this is possible. The linguistic input which children receive is deficient: it does not always consist of complete grammatical sentences and it is limited. How can human beings who are exposed to an environmental linguistic stimulus, which is "impoverished, unstructured and fairly random" (Hornstein and Lightfoot 1981:13) acquire a rich system of knowledge which is structured and, by all means, non-random? This problem has been known in the literature as *the logical problem of language acquisition* (Baker and McCarthy 1981, Hornstein and Lightfoot 1981), as *the poverty of the stimulus* or as *Plato's problem*[1] (Chomsky 1986, 1988).

Besides this question, there is also the so-called *developmental problem* (Felix 1984) which is related to the question of "why natural languages are acquired the way they are, i.e. how can the regularities that have been observed in real-time acquisition processes be explained? " (Felix 1984:133).

One classical explanation is that children acquiring language can overgeneralise, use analogy, are good imitators and are constantly corrected by their elders, who provide the right type of input for acquisition to take place.

A different type of explanation is that the child's linguistic development is fully determined by genetic properties. The claim is that human beings are endowed with the language faculty, one component of the human mind, which consists of innate, genetically determined principles. On this view, the process of language acquisition is constrained by some specific linguistic knowledge.

In what follows these two main hypotheses will be discussed.

2.2 General learning strategies

2.2.1 ... and why they cannot explain it all

One traditional explanation of how children acquire language maintains that the ability to form and interpret novel strings of words is based on domain-general

---

[1] In Plato's *The Meno* Socrates leads, through questions, an uneducated boy to the discovery of theorems of geometry. The assumption is that the boy, who had never been taught any mathematics at all, could discover theorems of geometry because he had some previous knowledge (from an earlier existence) which was reawakened in his mind through the questions Socrates asked. This problem was later rephrased by Bertrand Russell:"How comes it that human beings, whose contacts with the world are brief and personal and limited, are able to know as much as they do know?" One can easily see that the same problem arises in the case of language acquisition. (Chomsky 1988).

14

procedures that are at the core of other types of learning. In order to learn how to speak, the child would have to resort to general-domain procedures, such as analogy, abstraction, connection between categories, detection of novelty, which are operative in any other domain of cognition. The process of language development is said to be constrained by the children's inherent cognitive capabilities and/or the social environment. Such a view is rooted in the behaviourist tradition, which defines human behaviour as a mere reaction to present and past stimuli, leaving no room for linguistic knowledge abstracted away from stimulus/response behaviour. The role of social and cognitive factors is emphasised.

> Language is more than a mere mapping between cognitive/ social categories and linguistic patterns.

One well-known linguist who applied the behaviourist theory to the study of language was Leonard Bloomfield, who argued that "a regular analogy permits a speaker to utter speech-forms which he has not heard" (1933:275).

Though one cannot deny the role of social interaction or of general learning mechanisms in the acquisition of language, one cannot ignore the overwhelming evidence which shows that "language growth", especially syntactic development, cannot reduce to analogy, connections, abstraction or social interaction. The relation which exists between the primary linguistic data (PLD) to which the child is exposed and the output grammar may rely on principles which are not operative in other kinds of learning and which can account for the huge amount of creativity in language development as well as for the speed with which children acquire language. Language is much more than a mere mapping between cognition/social categories and linguistic patterns.

2.2.2 Structure dependence

One main assumption of generative linguistics is that sentences have hierarchical structure and hence syntactic operations are stated in terms of hierarchical operations which are dependent on structure and not on linear ordering, i.e. operations cannot rely on relations such as "first", "second", "closest", etc. This is the so-called Structure-Dependence Constraint, defined as 'an innate schematism applied by the mind to the data of experience' (Chomsky 1971).

An interesting area for investigating whether children rely on structure-independent hypotheses or on deeper principles in the process of language acquisition is the area of YES/NO questions because they seem to be consistent with both structure-dependent and structure-independent rules. Let us consider the following pairs of sentences:

(1)   a. *Bob is clever. / Is Bob clever?*
      b. *You are hungry. / Are you hungry?*
      c. *You can follow me. / Can you follow me?*

At first sight, the examples in (1) above may lead to the conclusion that YES/NO question formation in English relies on linear ordering. In order to create a YES/NO question, one has to apply the rule stated in (2):

(2)   Front the first or the leftmost verbal element (*is/can/have/*etc.) in the sentence.

This will produce the correct interrogative sentence in the case of a-c in (1) above where indeed the first verbal element has been fronted with grammatical results:

(3)   *Bob is clever.*

15

You are hungry.

You can follow me.

However, if one wants to form a YES/NO sentence whose declarative counterpart is (4a) below the structure-independent rule stated in (2) would no longer apply; (4b) is ungrammatical:

(4)   a. *The boy who is passing by is my brother.*
       b.*Is the boy who -- passing by is my brother?*

The ungrammaticality of (4b) points to the fact that Subject-Auxiliary Inversion (SAI) is not a structure-independent rule. The subject in (4a) is "the boy who is passing by" and the first verbal element is the auxiliary *is* in *is passing*. If rule (2) applies the result is ungrammatical:

(5)   *The boy who is passing by is my brother.*

The ungrammaticality in (4b) shows that if the first verbal element is in a Relative Clause it cannot be fronted. The structure-independent hypothesis cannot yield the desired result; a structure-independent rule cannot apply in complex sentences.

As the hypothesis which relies on linear order is computationally simpler and since questions of the type in (1) are probably more often present in the input which a very young child receives one might imagine that children start with a structure-independent rule. However, from the point of view of learnability, such an assumption cannot account for how children manage to get rid of this rule and come to know that (4b) is incorrect, i.e. it cannot explain how the child gets rid of the structure-independent hypothesis and adopts the structure-dependent one. Chomsky (1971) argues that children always apply structure-dependent hypotheses in the process of language acquisition.

Crain and Nakayama (1987) designed two experiments which tested precisely this claim, pointing out that children do not overgeneralise from cases like the ones illustrated in (1) to cases like the ones illustrated in (4). The first experiment elicited productions of YES/NO questions from 30 children of mean age 4; 7. Each child had to ask a doll named Jabba particular questions about a set of pictures. The experimenter told the child: *Ask Jabba if* .... For example, *Ask Jabba if the boy who is watching Mickey Mouse is happy.* 60% of the questions which the children produced were correct, which proves that the children applied the structure-dependent hypothesis.

The second experiment focused on the explanation of the errors made by the children in the first experiment. None of the mistakes the children made was caused by the application of the structure-independent hypothesis. The results lend support to the claim that children use structure-dependent hypotheses in the process of language acquisition.

YES/NO question formation is a structure-dependent transformation.

There is experimental evidence that children rely on structure-dependency in early YES/NO question formation.

2.2.3 Wanna *contraction*

Speakers of American English tend to contract *want to* in ordinary speech. However, the contraction is not permitted in all contexts. As the examples in (6) and (7) illustrate, contraction is licit when the embedded direct object is extracted (6b) but illicit when the embedded subject is extracted (7b):

16

(6)   a.*Who_i do you want to see t_i?*
       b.*Who_i do you wanna see t_i ?*
(7)   a.*Who_i do you want t_i to kiss you?*
       b.**Who_i do you wanna t_i kiss you?*

Sentences like (7b) are not used in adult language. Their ungrammaticality derives from principles of grammar, which are not transparent in the input. Let us have a look at the representations which result after movement from object position has applied (8)–(9) and after movement from subject position has applied (9)–(10):

(8)

wh- **object movement**

17

(9)

```
                              CP
                          /        \
                       who_i        C'
                                /        \
                             C⁰           IP
                           tense_j      /      \
                            do       DP         I'
                                    you      /      \
                                           I⁰        VP
                                           t_j     /      \
                                                  V'
                                               /      \
                                             V⁰        CP
                                            want    /      \
intermediate trace  ———————————————→   ┌─────┐        C'
                                        │ t_i │     /      \
                                        └─────┘   C⁰        IP
                                                         /      \
                                                        I'
                                                     /      \
                                                   I⁰        VP
                                                   to     /      \
                                                         V'
                                                      /      \
                                                    V⁰        DP [WH]
                                                   see       /‾‾‾\
                                                            t_i
```

18

(10)

CP
  C'
    C⁰   IP
         DP   I'
         you
              I⁰   VP
              {present}
                       V'
                       -
                         V⁰   CP
                         want
                                 C'
                                    C⁰   IP
                                          who   I'
                                                  I⁰   VP
                                                  to
                                                         V'
                                                           V⁰   DP
                                                           .
                                                          kiss *you*

wh- **subject movement**

19

(11)

CP

who$_i$ C'

C^0 IP
{present}$_j$
do   DP   I'
        you
              I^0 VP
              t$_j$
                    V'

                    V^0 CP
                    want
                          C'

                          C^0 IP

original trace → t$_i$ I' **contraction is blocked**

I^0 VP
to
                          V'

                          V^0 DP
                          kiss   you

There is experimental evidence that children know that *wanna* contraction is illicit when the embedded subject is extracted.
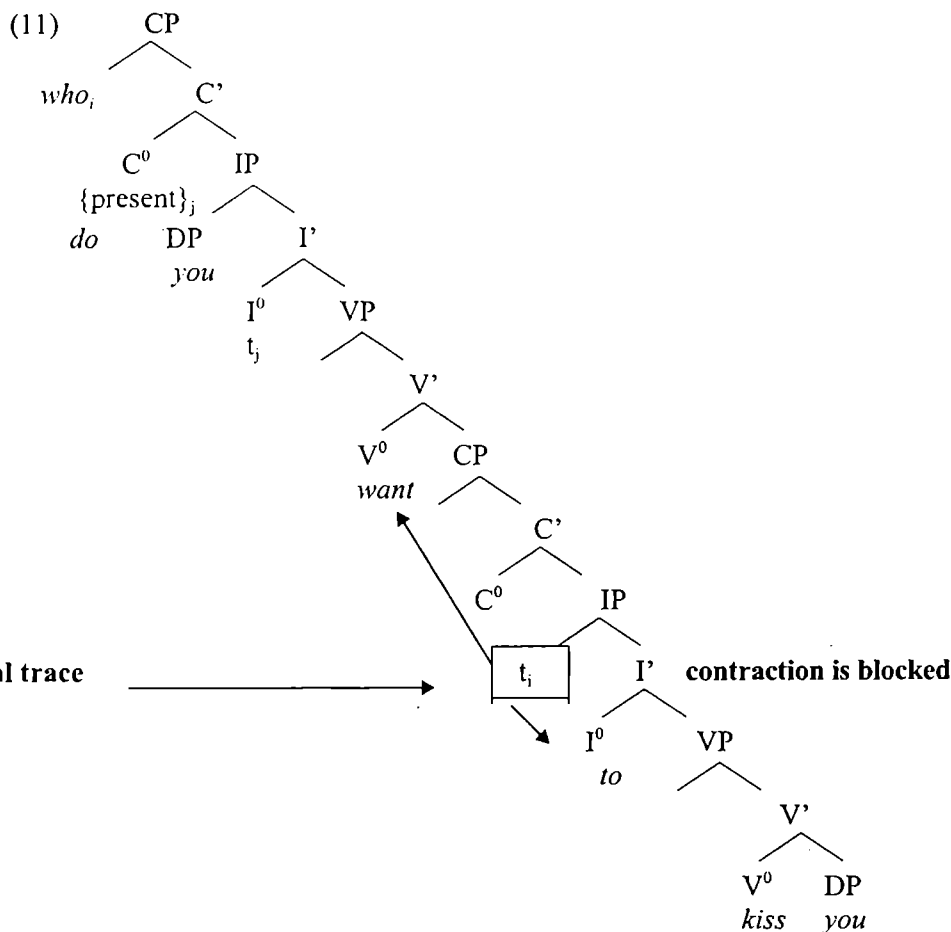
In (11) the original trace intervenes between *want* and *to*, blocking contraction.

Assuming that the young learners appeal to analogy and that the PLD contain (only) possible pairs of sentences, we would expect a child's grammar to create subject sentences like (7b). But there is evidence that such sentences do not occur in early speech production.

Crain and Thornton (1991) tested for the early emergence of knowledge of this restriction. They elicited long-distance *wh*-questions (both subject and object extraction questions) from 21 children who ranged in age from 2; 10 to 5; 5. The results clearly pointed out that at very early age children know this restriction: they do not contract when extracting the subject. Children's production of subject-extraction questions with an illicit contraction was practically insignificant (4% of the time), in spite of their clear preference to contract when asking object *wh*-questions and when they contracted 59% of the time.

2.2.4 Backward anaphora

Crain and Thornton (1998) provide further evidence that children do not apply the usual learning-theoretic strategies in the acquisition of language. This time evidence comes from the area of meaning.

In adult language, a sentence like (12a) can only be interpreted as in (12b); (12c) is deviant:

(12)　　a. *He danced while the Ninja Turtle ate pizza.*
　　　　b. *He$_i$ danced while the Ninja Turtle$_j$ ate pizza.*

20

c. *He_i danced while the Ninja Turtle_i ate pizza. [2]

At first sight, one may reach the conclusion that (12c) is impossible because the pronoun precedes the noun with which it is co-indexed. However, this "linear" explanation cannot account for those cases when the temporal clause precedes the matrix and when the restriction no longer applies. (13a) below is ambiguous: it can be interpreted either as in (13b), where *he* and *the Ninja Turtle* refer to different individuals, i.e. they do not have the same referent, or as in (13c), where *he* and *the Ninja Turtle* have the same referent.

(13)   a. *While he danced the Ninja Turtle ate pizza.*
       b. *While he_i danced the Ninja Turtle_j ate pizza.*
       c. *While he_i danced the Ninja Turtle_i ate pizza.*
                   (Crain and Thornton 1998:25)

This means that in spite of the fact that the pronoun precedes the noun, they can be co-indexed. Linear order is irrelevant. Deeper principles should be looked for. (12c) is impossible because the pronoun c-commands the co-indexed nominal:

(14)
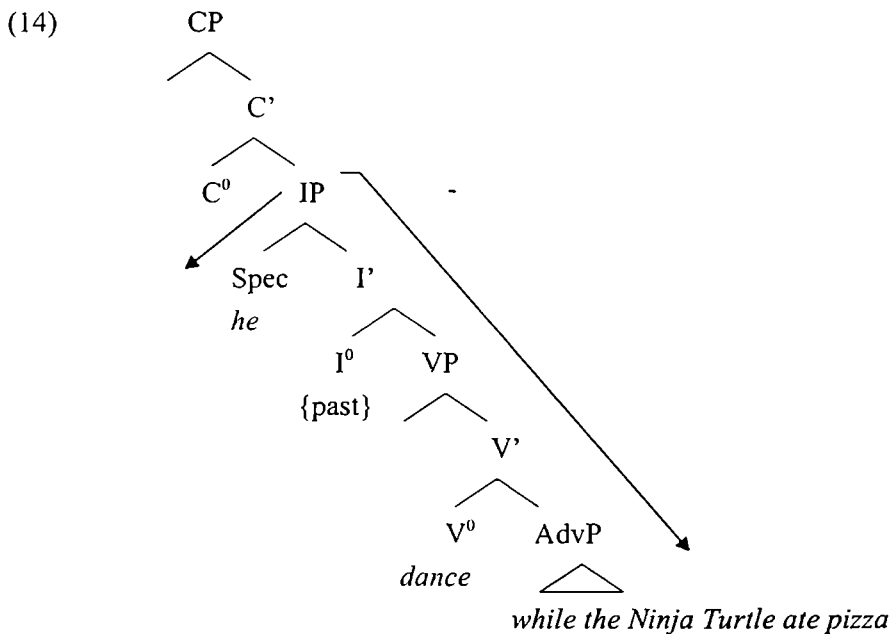
> Children have knowledge of binding principles at an early stage; in particular, they know that a pronoun cannot be co-indexed with a noun which it c-commands.

while the Ninja Turtle ate pizza

In (14) the pronoun *he* c-commands the nominal *the Ninja Turtle* because IP, the constituent immediately dominating *he,* also dominates *the Ninja Turtle.*

If children relied (only) on general learning mechanisms (such as analogy, over-generalisation and the like), we would expect them to find both (12a) and (13a) ambiguous, i.e. to believe that (12c) is a possible interpretation of (12a).

Crain and McKee (1985) used the Truth-Value Judgement Task[3] to test 62 children (mean age 4; 2) for knowledge of the restriction which applies in (12) but not in

---

[2] This interpretation represents a violation of what has been called Principle C of Binding Theory: If a pronoun precedes a referential NP (i.e. an R-expression), then they cannot both refer to the same object if the pronoun c-commands the NP. C-command is defined as follows: A c-commands B if the constituent immediately dominating A also dominates B. For a more detailed explanation of Binding Principles, see for example Cornilescu (1995), Haegeman (1991/ 1997), Cook (1988) or Radford (1988).

[3] The Truth-Value Judgement task is a comprehension technique used to investigate children's understanding of the meaning of sentences. "The Truth Value Judgment task can be used to tell if sentences are ambiguous or unambiguous for children and adults. The distinction between unambiguous and ambiguous sentences proves to be crucial in demonstrating children's adherence to certain linguistic principles, known as constraints." (Thornton and Crain 1998:2)

(13). It was found that children rejected interpretations of the type in (12c) (i.e. co-reference between the pronoun and the NP) 84% of the time but they were willing to assign the interpretation in (13c) to (13a) (i.e. the pronoun and the NP can refer to the same "individual" when the pronoun does not c-command the NP).

2.2.5 Baker's Paradox[4]

One often-invoked argument against analogy or generalisation comes from the Dative Alternation/ Construction in English. Verbs like *give, tell, send* can enter either the structure in (15a) /(16a)/ (17a) or in (15b)/(16b)/(17b) in the pairs of sentences below:

(15)   a. *John gave a book to Mary.*
        b. *John gave Mary a book.*
(16)   a. *John told a story to Mary.*
        b. *John told Mary a story.*
(17)   a. *John sent a letter to Mary.*
        b. *John sent Mary a letter.*

Suppose now that a child receives an input which contains sentence pairs of the type in (15)–(17) above. The generalisation which follows is that any verb with an argument structure of the type: **NP1–NP2 to NP3** (as in the a examples) can also have the argument structure **NP1–NP3 NP2** (as in the b examples). However, there are verbs like *donate, whisper* or *report* which, though allowing the former structure, are incompatible with the latter:

(18)   a. *John donated a book to the library.*
        b. **John donated the library a book.*
(19)   a. *John reported the incident to Mary.*
        b. **John reported Mary the incident.*

If language acquisition reduced to general learning mechanisms, we would expect children to believe that (18b) and (19b) are possible, generalising the Dative alternation property to these verbs as well. How do children avoid structures like the one in (18b) and in (19b) with verbs such as *donate*, for example? The question is more intriguing than it might seem at first sight. The analysis of corpora of child English (CHILDES[5], MacWhinney and Snow 1985, 1990) reveals that children learn the double object dative several months before they learn the *to*-construction, i.e. during these months, the child can only use the double object construction which is not possible with the verbs mentioned above (Snyder and Stromswold 1997). However, no mistakes of the type illustrated in 18b or 19b have been found.

One should note, though, that the argument is rather weak. The authors of the study do not mention if in the corpora they have analysed the children did use (in any structure) any of the verbs which are incompatible with double object constructions.

One of the "influential" solutions to the so-called Baker's paradox is the one put forward by Pinker (1989) and by Grimshaw (1989): there are semantic and morphophonemic constraints which apply in the case of the verbs compatible with the double object construction and children seem to be sensitive to these constraints. But if the constraints are semantic, they seem to be primarily linked to lexical learning and hence they may be arrived at via mechanisms which are not necessarily language

> Children seem to be sensitive to the semantic and morpho-phonemic constraints which apply in the case of the double object construction verbs.

---

[4] Baker was the first one to discuss the phenomenon in detail in an influential paper in 1979; hence the label of "Baker's Paradox".

[5] CHILDES = The Child Language Data Exchange System, a database of transcripts, programs for computer analysis of transcripts, methods for linguistic coding, and systems for linking transcripts to digitised audio and video.

22

specific. Moreover, the verbs which cannot undergo Dative Shift are verbs which are acquired rather late. Baker's Paradox does not seem to be a very strong argument against a learning-theoretic account of language acquisition.

Pinker (1989) examines other English constructions which create a similar learning problem and which fall, according to him, under the same paradox. For example, he notices that (20a) below has a passive counterpart, whereas (21a) does not, in spite of the similarity of structure evinced by the a sentences:

(20)   a. *John touched Fred.*
        b. *Fred was touched by John.*
(21)   a. *John resembled Fred.*
        b. **Fred was resembled by John.* (Pinker 1989:8)

These examples, as well as the so-called "causative alternation" (illustrated in 22-24 below) and the "locative alternation" (illustrated in 24–25) point to the fact that analogy cannot always explain linguistic facts.

Children cannot rely on general learning mechanisms alone in the process of language acquisition.

(22)   a. *The ball rolled.*
        b. *John rolled the ball.*
(23)   a. *The baby cried.*
        b. **John cried the baby.* (Pinker 1989:8)
(24)   a. *Irv loaded eggs into the basket.*
        b. *Irv loaded the basket with eggs.*
(25)   a. *Irv poured water into the glass.*
        b. **Irv poured the glass with water.* (Pinker 1989:8)

In light of the arguments above we can conclude that the linguistic input is not informative enough with respect to some constraints which encode language knowledge, it is not always transparent with respect to certain rules. It does not provide information that some sentences are ungrammatical or that some interpretations are disallowed. Or, in Hornstein and Lightfoot's (1981:10) terms:

> *Children are not systematically informed that some hypothetical sentences are in fact ungrammatical, that a given sentence is ambiguous, or that certain sets of sentences are paraphrases of each other, and many legitimate and acceptable sentence-types may never occur in a child's linguistic experience.*

However, children come to know facts about language for which there is no clear evidence or no evidence at all in the input.

The second conclusion we can reach is that the strategy/ies children use when acquiring language on the basis of this deficient input cannot rely (solely) on learning mechanisms which they use in other domains of cognition. A different explanation should be looked for.

2.3 The Innateness Hypothesis

A different explanation arose in the 1950s, in the context of what has been called "the cognitive revolution", when scientists turned their attention to the inner mechanisms which enter into thought and action. The view of language as an independent, unique cognitive system, which involves innate, faculty-specific mechanisms, replaces the view that language is response and stimulus. The idea that there is a mental basis of language is put forward. On such a view, language cannot be accounted for (only) by social or pragmatically based approaches. Within such a general approach, Plato's problem can be solved in a different way, which can explain that, in spite of the deficiency of the PLD to which children are exposed,

The cognitive revolution of the 1950s put forth the idea that there is a mental basis for language.

they are able, in the end, to deal with an infinite range of language structures. If the linguistic input cannot be fully responsible for the acquisition of this skill, it means that children somehow "know", independently of experience, the principles which govern the linguistic constructs, that they have some innate "knowledge" of the constraints (of form and meaning) which are at work. The input which they receive is filtered by a special device, by a special faculty, specific to humans and which can explain the paradox of acquisition:

INPUT $\longrightarrow$ DEVICE $\longrightarrow$ OUTPUT

Language is an independent, unique, species-specific cognitive system, which involves specific mechanisms.

The output grammar is the result of the interplay between the PLD and this filtering device called "the language acquisition device" (LAD). Or, in Chomsky's (1997) terms, 'each language is the result of the interplay of two factors: the initial state and the course of experience'. We do not have any direct evidence of what exactly is inside this LAD. But we have direct access to the PLD and to the output grammar. Their study can obviously tell us a lot about the mechanisms which are part of the LAD and which allow language acquisition to take place. And, if children have some a priori knowledge of constraints, independent of the input which they receive, it might be the case that some aspects of our knowledge are innate, that they are part of our biological endowment. The child approaches the task of acquisition with a system of assumptions about the structure of language. The process of acquisition reflects a cognitive capacity which is biologically determined[6]. The crucial part of this species-specific property is defined by Chomsky (1980:33-34) as:

> *Were it not for this highly specific innate endowment, each individual would grow into some kind of amoebic creature, merely reflecting external contingencies, one individual quite unlike another, each utterly impoverished and lacking the intricate special structures that make possible a human existence and that differentiate one species from another.*

The process of language acquisition reflects a cognitive capacity which is biologically determined; some aspects of language knowledge are innate.

Within a cognitive approach, language has been defined as a psychological faculty, a mental organ, a computational module, an instinct. Pinker (1994), who prefers the term instinct, argues that language is part of our biological birthright, 'an evolutionary adaptation, like the eye, its major parts designed to carry out important functions', a specialised skill 'which develops in the child spontaneously, without conscious effort or formal instruction, is deployed without awareness of its underlying logic, is qualitatively the same for every individual, and is distinct from more general abilities to process information or behave intelligently'[7].

That children are biologically preset to acquire language is supported by studies which show that infants can make a distinction between linguistically-relevant and non-linguistic signs (Mehler & Bertoncini 1983), they are able to distinguish their mother tongue from other languages (Mehler et al. 1986), are sensitive to word-boundaries well before they can actually speak (Gleitman et al. 1988), as well as to linguistic stress, vowel

---

[6] For arguments against the domain-specificity of language acquisition, see, for example, Bates & MacWhinney (1987) or MacWhinney and Bates (1989) according to whom: *The universal properties of grammar are only indirectly innate, being based on interactions among innate categories and processes that are not specific to language. In other words, we believe in the innateness of language, but we are skeptical about the degree of domain-specificity that is required to account for the structure and acquisition of natural language [...] We suggest that more general principles of pattern detection and distributional learning are sufficient for the task* (MacWhinney and Bates 1989:10, 26).

[7] As Pinker (1994) acknowledges, the conception of language as a kind of instinct goes back to Darwin who, as early as 1871, in "The Descent of Man" advanced the idea that *Language is like an art, like brewing or baking...It certainly is not a true instinct, for every language has to be learned. It differs, however, widely from all ordinary arts, for man has an instinctive tendency to speak, as we see in the babble of our children; while no child has an instinctive tendency to brew, bake or write [...], [it is] an instinctive tendency to acquire an art.*

24

duration, rising and falling intonation. As will be shown in the following chapters, the idea that there is a biological programme for language acquisition is also supported by facts about language development: there is an orderly progression of stages, i.e. children acquire structures in a distinct sequence, there is a critical age beyond which our ability to acquire language is significantly impaired or, at least, significantly reduced, it has also been assumed that parameters are subject to maturation. All these facts make language development analogous to other biologically triggered phenomena.

However, one should also be aware that the language faculty is based on properties which are unusual among biological systems, among which the property of discrete infinity. We can construct an infinity of expressions which reflect our thoughts, feelings, etc. from a finite number of sounds; and we somehow "know" that linguistic units are discrete units, that there are three or four word sentences but not three-and-a-half word sentences (Chomsky 1997).

It should be clearly stated at this point that arguing in favour of the view that language is part of our biological endowment does not mean denying the role of the environment nor does it mean that language development is completely independent of cognition in a general sense. The child does extract information from the input and reacts to it in accordance with the constraints provided by the LAD. The child does extract information from the input and reacts to it in accordance with some innate constraints. In this sense, the input is important and there is "learning". However, language development facts suggest that there is more to language acquisition than input and "learning".

> Knowledge of language develops in the child without conscious effort or formal instruction, it is the same for every individual and it is distinct from more general cognitive abilities.

> The language faculty is analogous to other biological systems; but it also has properties which are unusual among biological systems.

2.4 The Role of the Linguistic Input

2.4.1 The questions

So far it has been pointed out that language would be extremely difficult if not impossible to acquire if the child were not innately equipped with knowledge of constraints which is part of the LAD, the device that filters a deficient input which does not provide any clue that some sentences are illicit or that some particular interpretations are disallowed, i.e. an input which provides no negative evidence. Such a view raises, however, two questions:

(i)   is there indeed no negative evidence, of any type, in the input?
(ii) if language acquisition is defined as a process which relies on some inner mechanisms which exist in the LAD, which is the role of the input, deficient as it might be? .

Let us tackle the two questions one by one.

2.4.2 On negative evidence

More often than not, when linguists refer to "negative evidence" they mean that the input which the child receives does not contain any explicit or direct information with respect to ungrammatical forms or illicit interpretations (i.e. the child only receives positive evidence that a particular structure does exist in the language, with one particular interpretation).

A second argument often invoked in favour of the "no negative evidence" hypothesis comes from the area of corrective feedback; parents only rarely provide corrective feedback with respect to ungrammatical forms. Brown and Hanlon (1970), among many others, point out that parents respond to the truth value of their children's sentences but do not correct ungrammatical forms. They examined adults' responses to the

> The input which the child receives does not contain any explicit or direct information with respect to ungrammatical forms or illicit interpretations.

25

utterances of three English-speaking children. The three corpora provide evidence that parents do not react to their children's ill-formed utterances. They are more likely to express disapproval when the sentence is not 'true' and to occasionally correct phonological errors.

Morgan and Travis (1989) also argue that corrective responses do not occur with sufficient frequency or regularity in the input to be considered essential for learning. Very often, correction may not help at all. The literature provides some anecdotal examples of how oblivious to correction children can be:

<div style="margin-left: 2em;">

(26)   Child: *Want other one spoon, daddy.*
          Father: *You mean, you want the other spoon.*
          Child: *Yes, I want other one spoon, please Daddy.*
          Father: *Can you say "the other spoon"?*
          Child: *other...one... spoon.*
          Father: *Say "other".*
          Child: *Other.*
          Father: *"Spoon".*
          Child: *Spoon.*
          Father: *"Other spoon".*
          Child: *other...spoon. Now give me other one spoon.* (Braine 1971:161)

(27)   Child: *Nobody don't like me.*
          Mother: *No, say "nobody likes me".*
          Child: *Nobody don't like me.*

          ...

          (eight repetitions of this dialogue)

          ...

          Mother: *No, now listen carefully; say "nobody likes me".*
          Child: *Oh! Nobody don't likes me.*
                 (McNeill 1966, reported in Jackendoff 1994:22)

</div>

> Corrective feedback, when present, does not seem to be very helpful for the process of acquisition.

Corrective responses do not seem to prevent the child from persisting in making mistakes.[8]

Saxton (1997), on the other hand, provides evidence that the child's immediate responses to negative input are often consistent with its corrective function:

<div style="margin-left: 2em;">

(28)   Child: *It's even gooder than anything.* (repeated 4 times)
          Adult: *Yes, it's better.*
          Child: *Better, yeah.*

(29)   Child: *That policeman falled all the way down to the tiger.*
          Adult: *He fell down.*
          Child: *Yes, he did. He fell down 'caus he likes that tiger.*
                           (Saxton 1997:146)

</div>

He reaches the conclusion that 'naturalistic data reveal that children sometimes shift from erroneous to correct versions of particular structures following the intervention of negative evidence' (p.147) and he puts forward a "Contrast Theory of Negative Input" according to which negative evidence is more effective than positive input.

---

[8] For a different point of view, see Hirsch-Pasek et al. (1984) or O'Grady (1997). The latter shows that a closer look at the data presented by the above authors actually reveal that 'parents are in fact responding inconsistently to well-formedness - sometimes repeating a grammatical sentence and ignoring an ungrammatical sentence, and vice versa.'(p. 257)

26

A few remarks are in order here. What Saxton actually means by "negative evidence", or "negative input" is 'any kind of adult response, contingent on child grammatical errors, which embodies information conducive to the realignment of an overgeneralised grammar', i.e. closer to what has been called "implicit negative evidence" than to "negative feedback" or "correction". He explicitly says that negative input may or may not contribute to the process of acquisition. Importantly, providing evidence that children respond positively to "negative evidence" does not automatically provide evidence that the effects of correction are long-term ones.

While it is true that the input only rarely provides direct negative evidence and that, even when it does, the effects of correction are far from relevant for the process of acquisition, one cannot deny that it provides what has been called in the literature "indirect negative evidence", defined as follows:

> *A not unreasonable acquisition system can be devised with the operative principle that if certain structures or rules fail to be exemplified in relatively simple expressions, where they would be expected to be found, then a (possibly marked) option is selected excluding them in the grammar, so that a kind of "negative evidence" can be available even without corrections, adverse reactions, etc.* (Chomsky 1981)

One example of the child's resorting to this type of evidence is associated with the acquisition of the null subject parameter which distinguishes between languages like Italian, Romanian, Spanish or Chinese (which allow sentences with null subjects) and languages like English, German or French where the subject must always be overtly expressed. Let us assume that the target language is English, which has the negative value for this parameter. It seems that the child mistakenly hypothesises, during early stages, that the value for this parameter is positive in English and will come up with sentences like the one in (30), which do not exist in adult grammar:

Correction is not essential for the process of acquisition.

(30) *Eat apples.*

In this case the hypothesised target language contains structures which do not exist in the adult language. But the child will not hear such structures in the input, which will provide indirect evidence that such a structure does not exist in English. On the basis of this indirect evidence, the child will correctly (re)set the parameter and drop null subject sentences out of his/her grammar.

One more distinction which one should take into account when discussing correction is the one between correction which is/is not essential for the acquisition of language and correction which is/is not helpful. The study of Morgan and Travis (1989), where the relation between corrective feedback (to inflectional overgeneralizations, such as 'teached' instead of 'taught', or 'mans' instead of 'men', etc. and to *wh*-question auxiliary-verb omission errors) and "corrected" output in the sets of transcripts from Adam, Eve and Sarah (the Brown 1973 corpus, CHILDES) is examined, argues that parental responses do not occur with sufficient frequency, are not distinctive enough to be reasonably recognisable and they do not continue to occur as long as the mistakes persist. At the same time, one cannot deny that certain types of feedback may help the learner and may account (to a certain extent) for the different speed with which individuals acquire particular structures or lexical items. What empirical data show is that, while negative correction does exist in the linguistic input to which a child is exposed, its presence/absence is not essential for the process of language acquisition. When present, it might facilitate the learning process, but its absence will not lead to lack of acquisition or to an ever-ungrammatical output. Children who do not receive parental correction will fare through the course of language acquisition just as those who receive negative feedback.

Parental correction is neither frequent nor distinctive enough.

So far it has been shown that the PLD only rarely contain explicit negative evidence. It also seems that even negative feedback is not frequent or distinctive enough to

guarantee acquisition. This raises the obvious question: what is the role of the input? What has been said so far may lead to the conclusion that the PLD as such are not relevant in any way in the process of language acquisition. But the question itself is misleading. It is one thing to say that the input does not provide all the necessary information one needs in order to acquire language and that, by all means, the child must have some a priori "knowledge" which should help the child at least to parse the input. The child should be somehow 'prepared' to detect certain properties of the strings of sounds:

> *Preparedness to detect certain aspects of the signal might therefore amount to an internal specification of input to learning[...] input is not solely external to the learner ('out there' in the objectively describable world) but rather part of a complex specification of the internal representation capacities and possible mental states of a learner* (Carroll 1999:39).

But it is quite another thing to say that the input is irrelevant in the child's linguistic development. Because one simply cannot deny the role of the input, be it for the mere reason that a child who is exposed to English will speak English, a child who grows up in a bilingual environment will end up speaking both languages which are present in the PLD to which he/she is exposed. Acquisition of lexical items is extremely sensitive to input. Some restrictions on lexical alternations may be established on the basis of exposure to the PLD. It has also been shown that a certain type of input may speed the acquisition of particular aspects of the lexicon or of grammar (Snow and Ferguson 1977).

2.4.3 Motherese

The idea that input is important in language acquisition has been associated with the concept of motherese. Gleitman, Newport, and Gleitman (1984) discuss the view that 'the special properties of caregiver speech are required for language acquisition to occur' (p.45). This claim is rooted in the belief that mothers' speech (hence the name of 'motherese') or caretakers' speech to children evinces properties which set it apart from the · speech to adults or to older children and which facilitate the process of acquisition.[9] Some of these properties are given in Table 1, taken from O'Grady (1997:250):

Table I

Main Properties of Motherese

Paralinguistic
Slower speech with longer pauses between utterances and after content words
Higher overall pitch; greater pitch range
Exaggerated intonation and stress
More varied loudness pattern
Fewer disfluencies (1 disfluency per 1000 words vs. 4.5 per 1000 for adult-to-adult speech)
Fewer words per minute
Lexical
More restricted vocabulary
Three times as much paraphrasing
More reference to the here and now
Semantic
More limited range of semantic functions
More contextual support
Syntactic
Fewer broken or run-on sentences
Shorter, less complex utterances (approx. 50% are single words or short declaratives)
More well-formed and intelligible sentences
Fewer complex utterances
More imperatives and questions (approx. 60% of total)

[9] It has also been noticed that infants seem to prefer motherese to ordinary speech (probably because of the prosodic properties of the former).

Conversational
Fewer utterances per conversation
More repetitions (approx. 16% of utterances repeated within 3 turns)

The existence of 'motherese', also called baby talk, caretaker speech or parental speech, described as 'well formed and finely tuned to the child's psycholinguistic capacity' (Snow and Ferguson 1977), has been widely taken as an argument against the nativist position; on such a view, children can acquire syntax so fast because of the features of their elders' speech, and the role of innate language-learning devices should not be emphasised. But it is obvious that the presence of short, clear, high-pitched forms in the input cannot solve the problems raised by the deficiency of the PLD. Nothing in motherese is more informative with respect to which sentence is ungrammatical or which meaning is disallowed. There are often mismatches between early child language and their elders' speech. For example, the latter very often contains more questions and imperatives, while declaratives are used more rarely than in ordinary speech (see Table 1). One would then expect children to use many questions and directives in early speech, which they do not. It seems that there is no correlation in this respect between the existence of motherese and the acquisition process. Studies of patterns of developmental change in children's use of verbs have also pointed out that these patterns could not be detected in the input provided by the parents.

> Motherese has been analysed as finely tuned to the child's psycholinguistic capacity.

Moreover, it has been shown that motherese is associated with certain social classes whereas it might be totally absent with others (Pinker 1994a). It may also differ from one ethnic group to another. For example, it has been observed that Japanese mothers and fathers do not change their intonation when they address their little children (de Boysson-Bardies 1999). Since children from all classes and of all nationalities are able to acquire language, regardless of whether they have been exposed to motherese the only conclusion that seems common-sensical is that the use of this special type of linguistic input is not critical to the acquisition process.

> Motherese may be helpful, but it is not crucial for the process of language acquisition.

On the other hand, one cannot deny that the input is helpful, that it may facilitate the process of language acquisition. For example, there is evidence that the frequent use of YES/NO questions in motherese leads to the early acquisition of auxiliaries (Newport, Gleitman and Gleitman 1977). Also, some properties of the linguistic input clearly facilitate the process of segmentation of the linguistic stream at early stages of development. Shady and Gerken (1995) argue that 2 year olds are sensitive to pitch changes and use prosodic cues to locate linguistic boundaries and to assign linguistic structure. Their conclusion is that 'both language-internal and caregiver cues appear to be helpful in early sentence comprehension' (p. 101), and that the existence of one type of cue does not decrease the role of the other.

Input can also provide a "friendly" environment which facilitates communication. But, in spite of its obvious role of facilitator, motherese is not essential for the child's linguistic development. As Newport, Gleitman and Gleitman (1977) put it: 'the finding that Motherese exists cannot by itself show that it influences language growth, or even that this special style is necessary to acquisition – despite frequent interpretations to this effect that have appeared in the literature. After all, Motherese is as likely an effect on the mother by the child as an effect on the child by the mother' (p. 112).

One could even question the fact that such a simplified input is really finely tuned to the child's psychological capacity. Even if we assume that parents present the child with finely tuned utterances, they also present them with other utterances, less finely tuned and thus beyond the child's level of comprehension (Pine 1994). As Wexler and Culicover (1980) point out, there is no justification for the claim that a simplified input enhances or speeds language learning. If less is provided by input, more formal

> Each language is the result of the interplay between innate knowledge and environment.

constraints will be needed. 'Limiting input will make a stronger nativist case, rather than a weak one' (Wexler and Culicover 1980:68).

Studies in second language acquisition may shed new light on the properties of the PLD. Krashen (1985) regards the notion of "comprehensible input" as crucial in second language learning. Though he does not define "comprehensible input" very clearly (it is assumed it is input that is understood by the hearer), it seems somehow clearer what it means in second language learning of lexical items. It is, however, more difficult to see what it means in the case of the learning of functional categories. O'Grady (1997) suggests that we could extend the notion to first language acquisition. In this case, comprehensible input would be an input which expresses 'identifiable meaning, independently determined', which can be inferred by reference to an understanding of the context in which they are uttered or by resorting to lexical meanings already known. Parents could thus provide support that guides the child in solving a certain task and also in helping him/her to learn how to deal with similar tasks in the future. This is indeed obvious in the learning of word meaning, where parents can provide a finely tuned input and they can help their child to succeed in vocabulary learning. The kind of linguistic input the elders provide may be more important in the acquisition of vocabulary than in the acquisition of grammar.

So far, we have seen that the input does play a part in the linguistic growth of a child. We have also seen that language acquisition would not be possible if the child were not equipped with 'knowledge' of constraints. Does it mean that one of the most important questions to be asked is: 'Which is the important one: environment or innate knowledge?'. Pinker (1994b) points out that trying to establish whether behaviour is caused either by environment or heredity is 'just incoherent' (p. 407). He proposes the following model, which can account for the part both input/ environment and heredity/ innateness can play in the process of language acquisition:
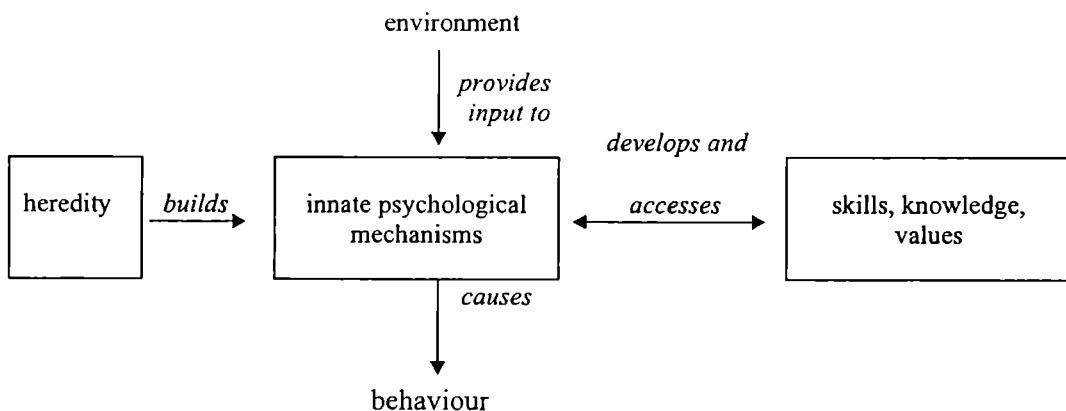
It is the Language Acquisition Device, a component of the mind/brain, genetically determined, which, through interaction with the environment, turns our language faculty into an articulated system, into behaviour.

3. Acquisition and general cognitive development

3.1 Preliminary remarks

In this subsection the question of whether language acquisition is a process associated with a cognitive system derived from general human intelligence or whether it is specific to a genetically determined autonomous system, independent of general human intelligence will be addressed. The question is far from trivial and the answer to it should be taken with a grain of salt and with a lot of caution. A proper answer is still a

30

prospect for further inquiry. However, we have reasons to believe that language is something we are endowed with (cases of severe language impairment are obviously excluded): we all end up speaking at least one language. We have also seen that general mechanisms of learning, such as analogy, cannot account for the process of language acquisition, and that, assuming that the input is not helpful enough, the child has some a priori "knowledge" of language constraints. That language faculty is a true species property, which marks the distinction between man and animal, is an idea which cannot be denied. The fact that the attempts to teach language to other primates failed points out once again that the human brain seems to be suited for the acquisition of language in a way in which no other species is. Such facts could also lead to the idea that language is an index of human intelligence and hence a cognitive system derived from more general human intelligence. However, there is evidence (from neurology, neurobiology, and linguistics) that language or some part of language is independent of general cognitive abilities. Adopting the view that language is a separate "organ", an "autonomous" system does not imply that it does not interact with general cognitive principles.

> Language acquisition is (largely) independent of other cognitive abilities.

Let us then address two questions which have a direct bearing on a possible answer to the general question we have set to answer:

(i) is language acquisition dependent on cognitive development ?
(ii) how autonomous is the language faculty?

3.2. Language acquisition and general intelligence

3.2.1 Low IQ and normal mastery of language

Evidence for the dissociation of language from other cognitive abilities comes, on the one hand, from studies of individuals who are intellectually handicapped but still show normal mastery of language and, on the other hand, from studies of individuals whose cognitive abilities are normal but whose speech is impaired.

3.2.1.1 Laura

Yamada (1990) reports of a retarded young woman, named Laura, who cannot count, do easy sums, tell the time, give her age or tie her shoes. Her auditory memory span is limited to three units, she does not know her name or the name of the country in which she lives. Her IQ is in the low 40s, but she can detect and correct grammar mistakes. She can use complex sentences (relative clauses, infinitival complements, headless relatives, complements containing participial forms) with multiple embeddings, she uses tense and agreement markers correctly, has good knowledge of (both full and agentless) passive constructions, of temporal adverbials, modifiers and adjectives and she can use elliptical utterances. But there is a discrepancy between her production and her comprehension. Though she produces a wide range of constructions in spontaneous speech, she fails to respond correctly to the same structures on comprehension tests. In conversation, her answers can be factually incorrect. Her vocabulary, measured on the Peabody Vocabulary Test, is that of a 3; 11 year old. Also, she cannot understand counterfactual questions or hypothetical conditions. Her ability to convey a clear message in conversation is diminished and she fails to use forms in a pragmatically appropriate manner.

Laura's case is interesting not only because it supports the view that language is a specialised human ability driven by principles which cannot be found in other cognitive domains. It also shows that various aspects of language (syntax and morphology, on the one hand, and semantics and pragmatics on the other hand) are separable and that they may relate

31

in different ways to non-linguistic abilities. For example, many of Laura's semantic difficulties/errors reflect her conceptual deficiencies (with number and time, for example). Her case also shows that acquisition of syntax and acquisition of lexical semantics may be distinct processes and that mastery of one domain does not result in mastery of the other.

The comparison between her syntactic knowledge and her vocabulary knowledge suggests that syntax does not depend upon semantics and that acquisition of the former is not related to the acquisition of the latter. Yamada (1990:119) states the relevance of this case study as follows: 'Laura's case is an important addition to the small list of studies that give evidence for the dissociation of language from other cognitive abilities. Her performance provides crucial empirical support for a model of language that acknowledges the multidimensional aspects of language. Aspects of language are tied to non-linguistic systems by tethers of different lengths, and some are perhaps untethered, enjoying an independent status. The data presented here strongly indicate that any viable account of language acquisition must incorporate the notion that language is at least in part governed by principles that are unique to it'.

3.2.1.2 Christopher

Smith and Tsimpli (1995) present an equally interesting case, that of Christopher. At the age of 34 he cannot look after himself (he cannot tie his shoes, cannot button his shirt, cut his fingernails or use a vacuum cleaner) but he is a polyglot. His knowledge of English, his first language, is essentially normal and he also knows some 15 foreign languages (ranging from Danish, Dutch or German to Turkish and Welsh). His ability to learn a new language seems exceptional, in spite of his intellectual deficit.

Christopher's case is very interesting because a close examination of his knowledge of language points, just like in the case of Laura, to its lack of "uniformity". On the one hand, the study of his "second" languages reveals that he has an exceptional talent for the acquisition of lexical items and of morphology, whereas his ability to learn some syntactic structures is somehow reduced. On the other hand, one can notice that his conversation is laconic and repetitive, that he cannot deal with disambiguation, metaphors, jokes or metalinguistic negation, i.e. he cannot deal with those phenomena which require an interpretive use of language and which most probably involve the interaction of his (modular) linguistic faculty with central system operations. While his case clearly provides evidence for the domain-specificity of language, it also raises the question whether language may be only partially autonomous. It may be the case that we have reasons to believe that the language faculty involves a module (in the Fodorian sense, see 3.3.) but that, at the same time, there are also facts which point out that language may also involve aspects of the central system. Or, in Smith and Tsimpli's (1995) terms: 'the bald alternative of 'modular/non-modular' is simplistic, indeed false' (p.15).

3.2.1.3 Williams Syndrome

Further evidence for a difference between the ability to acquire language and general cognitive development comes from studies of individuals with Turner's Syndrome and Williams Syndrome. They show a certain form of mental retardation but their language skills are relatively good and their language development is normal for their age.

Williams Syndrome (a neuro-developmental disorder) individuals have an IQ of approximately 50, they cannot tie their shoes, they have difficulties finding their way or telling right from left, they can only acquire rudimentary skills in arithmetic, reading or writing, and their drawing skills are often impaired, but they are very good

> Various case studies provide evidence that language acquisition does not rely (only) on general cognitive abilities.

conversationalists. They are more fluent than normal children of the same age and have a propensity towards low-frequency words and phrases. For example, Bellugi et al. (1993) mention the appropriate use of words such as *surrender, non-toxic, brochure, husk, hoisting, cornea, abrasive, tranquil, syringe*. The words are not used echoic, the children can define them spontaneously. For example, when asked what *commentate* means, one Williams Syndrome child replies: 'I wouldn't want to wrestle. I would like to commentate it. It means that... like all the sportscasters do... they tell who's doing what.' (Bellugi et al. 1993:182). They can understand complex sentences, they can use and understand full passives, conditionals, relative clauses and sentences with multiple embeddings. There is no doubt that their linguistic knowledge outstrips their cognitive abilities in other areas, proving that language and cognitive functions can be dissociated. Interestingly, recent studies show that English speaking Willliams Syndrome children have difficulties with irregular inflection. This dissociation between different areas of linguistic knowledge (in particular of morphological and syntactic knowledge) supports the distinction between a computational system and an associative memory system for language[10].

3.2.2 Normal cognitive abilities and speech impairment

The literature also offers examples of individuals whose cognitive abilities are normal but who suffer from SLI[11] (Specific Language Impairment). They show age-appropriate scores on non-verbal tests of intelligence (performance IQ of 85 or higher), are not neurologically impaired, have no hearing problems, but show a severe deficit in language ability. Very often, the impairment was detected within families (Gopnik 1990, Tallal, Ross, & Curtiss 1989, Tomblin 1989), which points to the possibility that it might have a genetic basis. The linguist Myrna Gopnik and her associates studied a family of 30 members (over three generations) of whom 16 have been diagnosed as specifically language impaired.

The accepted profile of linguistic behaviour associated with this disorder is rather wide: the degree of impairment may differ from one individual to another. But one can notice that in spite of the fact that the degree of impairment varies from one individual to another, all specifically-impaired individuals seem to show a somewhat uniform pattern of impairment: they begin to speak later than normal children (the average age for their first words is approximately 23 months, Leonard 1998:43) and they stop to correct themselves more often than normal children do; more often than not, when they try to correct themselves, the result is a less grammatical utterance. They have problems with morphophonemic rules (Clahsen 1989, 1991, Gopnik 1990) which means that their grammatical profile differs according to the language being learned. For example, SLI children whose target language is English show a deficit in the use of both freestanding morphology and in the use of inflections. Past tense morphemes seem to be absent in their speech[12] (31), they have difficulty in using the -*s* for the 3rd person singular (32), their use of pronouns is incorrect (33), they have difficulty in using the plural morpheme –*s* (34) and grammatical aspect is not always used correctly (35):

(31)   a. *Last time we arrive.*
        b. *Last time I bring one box of doughnuts.*   (Gopnik 1990: 154)
(32)   a. *The ambulance arrive.*
        b. *One machine clean all the two arena.*   (Gopnik 1990: 154)

---

[10] See the chapter dealing with *Morphological Development*.
[11] Other clinical names used to describe the same phenomenon are developmental dysphasia or developmental aphasia. One should also point out that the term has been extended to language impaired individuals outside the family that Gopnik has been studying and that the term of SLI does not describe a perfectly uniform impairment.
[12] See Rice & Wexler (1997) where SLI is reduced to lack of tense specification.

(33)   a. *Red Riding Hood arrive at HIS Grandma's house. Now THEY say: "Oh, what big eyes you got".*
b. *Jimmy starting eat his breakfast. HE don't like it. Now THEY drop the bowl on the floor.* (Gopnik 1990: 149)

(34)   a. *three Christmas tree*
b. *a cups*
c. *You make one points.* (Gopnik 1990: 147-148)

(35)   *All the girls sing and they are dancing.* (Gopnik 1990: 154)

The SLI children acquiring Italian, a language with rich inflectional morphology, have a deficit only in the area of free-standing morphemes (Leonard, Bartolini, Caselli, McGregor, and Sabbadini 1992, Leonard 1994, 1995) such as free-standing articles.

There is, however, controversy in the literature whether SLI represents a mere delay in acquisition or a deficit which persists through life in spite of the intensive language therapy which the children undergo. Gopnik (1990) and van der Lely (1997) describe SLI as being a syntactic deficit, which persists through life. Rice and Wexler (1997) analyse it as a result of syntactic delay. According to their studies, SLI individuals can catch up; they only acquire language at a slower pace than normal children do. The idea that the impairment does not persist through life is also advanced by those who describe SLI as a processing delay (Leonard 1998). SLI children are assumed to have reduced processing speed, which leads to difficulty with unstressed final sounds.

However, there is general agreement that children with SLI show normal functioning in the intellectual domain; their language impairment is dissociated from their cognitive general abilities, as well as from their social-emotional or auditory behaviour.

It is worth noticing that SLI individuals show a deficit exactly in the area where Christopher seems to be strong: morphophonology (and, obviously rules which match morphological rules into the syntax) and that their deficit does not affect all parts of their language faculty. Their knowledge of thematic relations, for example, is unimpaired (Gopnik 1990). This fact might represent evidence in favour of the view that thematic relations are different from syntactic features (Chomsky 1988, Pinker 1989).

The cases presented above represent evidence in favour of the view that the process of language acquisition does not rely only on general intelligence. Part of our ability to acquire language is linked to a specific faculty of our mind or maybe to specific genetic factors (Jackendoff 1994a, Pinker 1994b). As Jackendoff (1994a) argues, 'the issue ought to be how the two factors balance each other' (p. 112).

The Modularity Hypothesis: the human mind consists of autonomous, domain-specific components, informationally encapsulated. Language is one of these modules.

3.3 *On modularity*

The so-called Modularity Thesis is associated mainly with the name of Jerry Fodor and his 1983 book "The Modularity of Mind".[13] Cognitive processes are argued to fall into two main groups:

(i)   *domain specific processes* (sight, hearing, touch, taste, smell), also called *input systems* (because their role is to turn representations into more accessible information to the central processors) and
(ii)   *general cognitive processes* (thought, problem-solving, and the like).

The most important difference between the two groups is related to 'autonomy'. According to this hypothesis, the human mind consists of a general-purpose central

---

[13] Actually, the idea goes back in time to Franz Joseph Gall (who lived at the end of the 18th c- the beginning of the 19th c) who was the first one to argue that the brain is the organ of the mind and that it consists of distinct anatomical areas, specified for different functions.

34

processing system (related to memory, reasoning, belief, etc.) and a set of domain-specific, pre-specified "modules"[14] which function largely independent from one another. They represent information-processing units that encapsulate a certain type of knowledge and computations on it, i.e. autonomous components that evince distinctive functional properties. Each modular system is hence domain-specific and informationally encapsulated, i.e. the central processing system(s) cannot have access within these modules (but its outputs are sent to the central processing system where the human belief system is built up) and contains genetically determined information.

Language is one of these modules, i.e. a genetically determined independent system[15]. Let us see now in what way one can argue that language has the properties associated with domain-specific processes. When one hears a sentence (in one's native language), the language module will automatically process it. The sentence acts like a linguistic signal, which will trigger its computation like an automatic reflex. The language module can thus be defined as an information-processing unit. Fodor further argues that the computations performed by sentence recognisers are tuned to a complex of stimulus properties, which is specific to sentences. This domain-specificity is closely linked to the property of being informationally encapsulated. Linguistic computation relies only on what is internal to the language module. Information which does not belong to this system is unavailable to the process of input analysis:

> *[...] I know of no convincing evidence that syntactic parsing is ever guided by the subjects' appreciation of semantic context or 'real world' background. Perhaps this is not surprising; there are, in general, so many syntactically different ways of saying the same thing that even if context allowed you to estimate the context of what is about to be said, that information wouldn't much increase your ability to predict its form* (p. 78).

Encapsulation implies impenetrability of the input system. Fodor suggests that much of what is associated with identification of sentence type, i.e. with linguistic *form*, cannot be related to other cognitive processes. Encyclopaedic knowledge, context, wishes, etc. cannot penetrate the linguistic computation of form. However, linguistic computation is argued to stop where interpretation, i.e. content, begins to play a part. Content can be derived from processes outside the language module. The implication is that what we usually associate with semantics is linked to the central processes where interpretation occurs.

The rapidity of the operations of such encapsulated modules is accounted for by hypothesising the existence of specific neural structures.

Such a view is in line with the innateness hypothesis, which assumes that language is a separate organ, but differs from the theory of Piaget, according to which language is linked to cognitive development. The ontogeny of language cannot be explained by resorting to processes in the central processors.

| Evidence in favour of Fodor's view comes from the domain of aphasia. |

One important prediction of the Modularity Hypothesis would be that language could break down when other cognitive abilities are in place or, the other way round, that some cognitive ability may break down leaving the language faculty intact. The case studies discussed in 3.2 prove that this prediction is borne out to a certain point. Further evidence that Fodor's view might be correct comes from studies of focal injuries to different parts of the brain.

Research in the domain of aphasia brought in evidence that lesions which affect different parts of the brain trigger different types of speech impairment. In 1861, Paul

---

[14] For a different point of view, according to which the modules are the product of development, see Karmiloff-Smith (1992).

[15] Egyptian surgeons (1700 BC) had already noted that loss of language was not associated with other cognitive functions (Fromkin 1997).

35

Broca, a French doctor, showed that a lesion localised on the left hemisphere triggered the loss of the ability to speak whereas lesions on the right part did not result in loss of speech. The speech of the individuals affected by what is now known as Broca's aphasia[16] is characterised by loss of grammatical morphemes. Word order is often incorrect and the impaired speakers have difficulties finding their words, they speak slowly and with effort. Sometimes, even comprehension seems to be impaired.

A few years later, in 1874, Carl Wernicke showed that a lesion in the posterior part of the left temporal lobe leads to language impairment of a different nature. This time comprehension is the one that is affected and the impaired individuals (who are affected by Wernicke's aphasia[17]) often use made-up words or the wrong words (they may use 'glass' for 'cup' for example). One can notice that different areas of the brain seem to be associated with different sub-compartments of language.

The first linguist who described aphasia from a linguistic point of view was Roman Jakobson, in his 1941 book "Child Language, Aphasia, and Phonological Universals". He noticed that there is a parallel between child language acquisition and the type of loss of language knowledge in aphasia. In his view, Broca's aphasics lose knowledge of grammatical formatives and thus their syntactic relations are also affected. They tend to use verb infinitives and unmarked Nominative case nouns, phenomena which also characterise the so-called *optional infinitive stage* in child language. Another important insight was that marked elements are the ones which are acquired last but which get lost first in aphasia.

Obviously, we are far from knowing with precision which area of the brain is responsible for which function and probably we should not expect to find a perfect mapping one area – one function. Still, data from studies of aphasics reinforce the view that the brain is the organ of the mind, made up of different discrete areas and that the language faculty may be one of them.

4. On the 'mixed' nature of language acquisition

Since the process of acquisition implies not only syntactic development but also the acquisition of word meaning, of the vocabulary of the target language, if we are to fully understand the acquisition process as a whole we must understand how the two processes develop and interact. The relation between the two is neither simple nor unidirectional, nor can it be reduced to stating "which comes first: syntax or semantics?". When linguists define language acquisition, when they discuss the role of input or the relation between language development and cognition, they often provide a biased answer, addressing the issue either from the perspective of syntax or from the perspective of lexical development. Syntacticians focus exclusively on the learning of the computational system, whereas most of those concerned with the acquisition or word meaning focus on the part which cognition may play in the process. This dissociation seems to have played an important part in the famous debate between Jean Piaget and Noam Chomsky (constructivism vs. nativism). Jackendoff (1994a: 129) reduces the debate to a misunderstanding, which he describes in very clear terms:

> *After all, Piaget and Chomsky have a great deal in common. Both believe in complex unconscious mental processing. Both believe that the structure of the world we experience is in large determined by the internal mental constructs of potentially great abstraction.*
>
> *As far as I can determine, the major difference between the Piagetian and Chomskian traditions concerns what it takes to learn. Not a small part of the*

---

[16] Broca's aphasia is also called expressive aphasia, agrammatic aphasia, non-fluent aphasia or syntagmatic aphasia.

[17] Wernicke's aphasia is also called receptive aphasia, fluent aphasia or paradigmatic aphasia.

problem in the debate was that Chomsky's argument focused almost exclusively on complex details of the learning of syntax, about which Piaget had virtually nothing to say; likewise, Piaget's ground for argument was conceptual learning, about which Chomsky had virtually nothing to say. So, the debate was not carried on in common territory, which led to a certain amount of the mutual misunderstanding and rancor.

It is worth pointing out that, on the one hand, Chomsky (1993:24) argues that both the acquisition of syntax and that of vocabulary are subject to the poverty of the stimulus problem:

> *[..] the pervasive problem of 'poverty of the stimulus' is striking even in the case of simple lexical items. Their semantic properties are highly articulate and intricate and known in detail that vastly transcends any relevant experience.*

But, on the other hand, in previous studies, Chomsky (1988, 1995) advances the view that acquisition of syntax and the learning of word meaning may represent two different types of developmental change:

> *... what we call knowledge of language is not a unitary phenomenon, but it must be resolved into several interacting but distinct components. One involves the computational aspects of language [...]. A second component involves the system of object-reference and also such relations as "agent", "goal", "instrument", and the like; what are sometimes called thematic relations [...]: for want of a better term let us call the latter a "conceptual system". We might discover that the computational aspect of language and the conceptual system are quite differently represented in the mind and brain, and perhaps that the latter should not strictly speaking be assigned to the language faculty at all.*

The acquisition of syntax and the acquisition of word meaning may represent different types of developmental processes.

The implication is that the acquisition of word meaning may not be entirely part of the language faculty and hence this process would be different from the acquisition of syntax. This is in line with what data from linguistic development have proved so far. In spite of the fact that both the acquisition of syntax and lexical development take place at high speed, suggesting that both processes are guided by some innate constraints, we are actually faced with two types of developmental processes. First, the acquisition of syntax is (almost) complete by approximately age 5, when it reaches a relatively steady state, whereas the acquisition of vocabulary, though slowing down with age, continues through life. The active vocabulary of a normal 5-year-old child has been estimated at approximately 3,000 words. A normal adult's active vocabulary is ten times greater, while the passive vocabulary of an educated adult can contain over 100,000 words (Aitchison 1988).

Second, one can talk about uniformity of final attainment only in terms of syntactic knowledge. Knowledge of vocabulary can hardly be described as uniform across individuals. It is dependent on social factors, world knowledge, and general cognitive predispositions. Development in the area of vocabulary requires more than input and an innate device responsible for language development; it is dependent on the existence of an appropriate conceptual structure or the appropriate type of extralinguistic knowledge, requiring probably an incorporation of conceptual universals and language-specific conventions.

The principles which have been postulated as guiding the two processes are also of a different nature: the principles which constrain syntactic development are language-internal, part of I(nternal)-language, while the constraints which guide the acquisition of word meaning also include semantic or pragmatic principles, i.e. which belong to E(xternal)-language[18]. This suggests that UG may not be able to account for all aspects of acquisition, in particular lexical development may have to rely on mechanisms which are not (only) language specific. Bloom (2000:15) states this fact in clear terms:

---

[18] For example, Clark's conventionality assumption or Markman's whole object assumption.

In fact, word learning is the clearest case of learning one can imagine. Nobody was born knowing the meaning of the English word **rabbit**. *Everyone who knows the word has heard* **rabbit** *used in a context in which its meaning could be recoverable from the environment using a rational process; that is, everyone who knows the meaning of* **rabbit** *has learned it. If you can stomach the terminology, I suspect this might be the least controversial claim in the study of language development.*

Evidence that knowledge of syntax and knowledge of vocabulary could be (up to a point) dissociated comes from studies of mentally retarded individuals whose knowledge of language is almost normal, as well as those of language impaired individuals. Let us take Laura's case, for example (presented in 3.2). Her knowledge of morphology and syntax is not impaired, but she has difficulties in the area of semantics and pragmatics. Her vocabulary is that of a 3-year-old and she cannot use her language knowledge in a pragmatically appropriate manner. She cannot make use of her knowledge of language (i.e. her competence) to adequately express her thoughts or to interpret what she hears. Her language deficit is associated with her performance system and her language problems seem to reflect her conceptual deficit.

Also, individuals with SLI show a discrepancy between knowledge of morphosyntax and knowledge of thematic relations. Such cases suggest that the acquisition of syntax does not rely on general cognitive abilities whereas the acquisition of word meaning or of discourse rules is associated to conceptual development and/or knowledge of the world. Also, studies of abnormal language acquisition with impaired grammar but good knowledge of vocabulary and discourse strategies suggest the same thing: that the mechanisms involved in the acquisition of grammar are language-specific whereas those responsible for the acquisition of vocabulary or of pragmatic competence are independent (Curtiss 1988).

We have reasons to believe that language, conceptual system and pragmatic competence interact but, at the same time, they can be developmentally dissociated: they may have different origins and rely on distinct representational systems. But do they follow independent tracks or do they interact? Vygotsky (1962) proposes that originally, language and conceptual development (thought) follow independent tracks. But, at the age of approximately 2 years, the two tracks begin to interact. Hirsh-Pasek and Michnick Golinkoff (1996) argue that mental models (whose construction is closely related to the process of cognitive development) play an important part in the child's ability to use language. Language comprehension, in its turn, may help children to construct primary representations. On such a view, language and conceptual development interact.

Maybe the real issue of language acquisition studies ought to be how these factors interact, within an epistemology that embraces constructivism and innate predispositions. Or, in Lila Gleitman's (1993) words:

> *[...] this is the problem of modern linguistics: how much does a child have to learn and how much is built in?*

5. The Critical Period Hypothesis

5.1 Definition

There is a "critical period" for language acquisition; if people are not exposed to language during this period they may never acquire language with the same results as those individuals who were exposed to linguistic input during this critical period.

Language evinces one more property which *qualifies* it as a biologically programmed ability and which brings support in favour of the view that there is a distinct language faculty: it seems that there is a certain age beyond which our ability to acquire language is reduced[19]. Although linguists and psychologists have not reached an agreement

---

[19] Competence reaches its peak during a "critical period" and then declines in most behavioral domains (Johnson and Newport 1993).

as to what this critical age is or to what its causes might be, there is a common belief that, at a certain point (maybe in their early teens) people lose the ability to learn language without conscious effort.

The so-called Critical Period Hypothesis (or the sensitive period) is associated with the name of the neurolinguist Eric Lenneberg, the first one to argue that there is a critical period for language acquisition, which extends from approximately the age of 2 to the onset of puberty, i.e. between ages 2–13, when functional and biological linguistic development needs to be activated. This period coincides with the specialisation of language to one cerebral hemisphere, normally the left (Lenneberg 1967). If language acquisition does not occur before the onset of puberty language can no longer develop fully. If people are not exposed to language during this period, they might never be able to acquire language in the same way or with the same results as individuals who were exposed to linguistic input during the critical period.

There is, however, evidence that multiple critical periods exist for language: there are different sensitive periods for different components of language. Almost everybody seems to agree that the sensitive period for phonology ends at around age 5 or 6 (which could explain why second language acquisition which begins later may never attain native or near native like accent) whereas the critical period for morphology and syntax declines later, probably at the onset of puberty (Long 1990). The ability of discriminating between phonetic contrasts which are not relevant for the target language is lost at a very early stage. At the age of two, Japanese children can no longer distinguish between /r/ and /l/, a distinction which is not relevant in Japanese (de Boysson-Bardies 1999).

Interestingly, studies of brain lesions which result in speech impairment show that the age when the lesion occurs is extremely important. Seliger (1978) discusses aphasia types which differ according to age group, in spite of the fact that the lesion is in the same area of the brain. A lesion in Wernicke's area can produce jargon aphasia in old age, motor aphasia in a child and conduction aphasia in youth and middle age. Such case studies lead to the hypothesis that 'there is a continuous long-term process of interhemispheric and intrahemispheric localisation of function [...]. Since different aspects of language are affected at different stages in this process, it is hypothesised that there are multiple critical periods which correlate with localisation and the gradual loss of plasticity' (Seliger 1978:15).

For obvious reasons, it is impossible to test what happens to a child who is not exposed to language during the relevant period.[20] That is why most experiments were carried on second language learners and most of the criticism of the critical period hypothesis came, actually, from studies of second language learning. In a nutshell, the core of the criticism was based on the idea that adults can be superior to children in learning a second language or that at least adults are not inferior to children in the process of learning[21] a foreign language.

There are two problems with such a critical approach. Firstly, Lenneberg (1967) did not hypothesise that an adult cannot learn a foreign language:

> *Most individuals of average intelligence are able to learn a second language after the beginning of their second decade [...]. A person can learn to communicate in a foreign language at the age of forty. This does not trouble our basic hypothesis on age limitations because we may assume that the cerebral organisation for language learning as such has taken place during childhood,*

---

[20] However, it seems that there have been cases of such "forbidden experiments". The story says that the Pharaoh Psnatik I of Egypt attempted to isolate young children, giving orders that no one speak to them. He wanted to test whether in the absence of linguistic input children begin to speak the "original" language of mankind.

[21] On the other hand, there are studies in second language learning which clearly show that individuals who begin learning a foreign language in childhood can reach higher levels of proficiency in the end than those who begin learning a foreign language as adults, in spite of the fact that the latter may initially perform better.

and since natural languages tend to resemble one another in many fundamental aspects the matrix for language skills is present. (p. 176)

What Lenneberg assumes with respect to second language learning is that the process may be different from first language acquisition:

> *"...automatic acquisition from mere exposure to a given language seems to disappear after this age* [i.e. the end of the critical period] *and foreign languages have to be taught and learned through a conscious and elaborated effort. Foreign accents cannot be overcome easily after puberty."* (p. 176).

If this is the case, (and the above quotations are relevant enough), testing for the existence/absence of the critical period effects on second language learners somehow departs from the nature of the hypothesis under discussion. Arguing that adults can be good second language learners does not contradict Lenneberg's theory in any way. Similarly, as Hurford (1991) points out, 'one cannot reason quite so easily from second language learning results to a critical period for first language acquisition' (p. 163).

Also, one should not neglect that, if one assumes the view that language is a modular cognitive system, analogy with the development of other systems, such as the system of vision, suggests that there are changes in brain systems and their learning capacity throughout development. The classical example is the study on the development of vision in cats (Hubel and Wiesel 1962, 1970). The neurons of the visual cortex of cats are preset to respond to specific stimuli. When a kitten is deprived of some of these stimuli during the sensitive period for vision, those neurons preset to respond to the stimuli which are absent from the input will become inactive and, finally, they will degenerate. The development of vision in humans seems to have the same specificity. By analogy, the hypothesis is that the language faculty, a modular cognitive system on a par with vision, should display the same developmental requirement: exposure to the appropriate stimuli during the appropriate developmental period.

5.2 Evidence in favour of the critical period hypothesis

Evidence in favour of the critical period hypothesis comes from cases of children deprived of language during their first years of life, be they "normal" children or children who were exposed to American Sign Language (ASL) at a later stage. Their later linguistic development proves that there is a critical period for language acquisition and that there is something special about the maturational state of the child's brain.

A well-known case is that of Genie, a girl who was discovered in 1970 at the age of thirteen. She had been isolated from the world and deprived of language or any other type of social interaction. After her discovery, her cognitive abilities improved but her language ability, though remarkably fast in the beginning, remained, after seven years of rehabilitation, at the level of a two and a half year old child. Her lack of linguistic knowledge, especially in the area of syntax, supports the critical period hypothesis. However, Genie's case must be taken with a grain of salt. Some of the researchers on the team that worked to rehabilitate her questioned whether her lack of linguistic competence was merely a consequence of the lack of linguistic input during her early childhood.

Another well-known case is that of Isabelle, who was discovered in the 1940s, at the age of six, i.e. during the critical period. At the time she was discovered she could not speak and her cognitive development was at the level of a two year old child. But she could speak within a year.

One more case of a severely isolated child is that of Kaspar Hauser (Londen 1999) who is said to have appeared in Nüremberg in 1828, at the age of approximately 16. The story says that he had been kept in captivity, isolated from other people, between

40

the age of approximately 4 and 16. When he was discovered, his speech had all the characteristics of a normal 4 year old child who acquires German (lack of conjunctions, particles and verbal auxiliaries, use of subjectless sentences, misuse of articles with the plural, misuse of personal pronouns, the verbs are mainly used in the infinitive, lack of embedded sentences, etc.) but it seems he "regained" language very fast. His story, if true, points to the fact that language, if acquired, up to a certain degree, during the critical period, can be "reawakened" and further developed beyond this period.

Studies of language acquisition in the congenitally deaf also point to the fact that the later a language is learned the less its use is native (Newport 1990). One such study is the one of Newport and Supalla (reported in Newport and Johnson 1993). They separated subjects (in a residential school for the deaf) into three groups, by their age of exposure:

(a) native learners (exposed to ASL from birth)
(b) early learners (exposed to ASL between the age of 4-6)
(c) late learners (exposed to ASL at age 12 or later, i.e. after the critical period).

The results show a decline in performance (both production and comprehension) with increasing age of exposure. The later the first exposure, the more incomplete the ultimate attainment. These results suggest that the age of the first exposure to language plays an important part in linguistic development.

SUMMARY

In this chapter a general framework for the study of language acquisition has been presented. Language acquisition has been defined as the rapid, effortless process, which turns a deficient and limited input into correct output grammar. The final state which children achieve is uniform.

Though the PLD do play an important part in acquisition (the innate component can become part of our biological potential only when interacting with the environment), the deficiency of the linguistic input points to the fact that the child has to resort to something else in the process of acquisition. The idea that the child must have some a priori knowledge of the constraints of language has been advanced.

It has also been hypothesised that the acquisition of language is not a unitary phenomenon: the acquisition of syntax can be (partly) dissociated from general cognitive development, representing a process distinct from general learning principles, whereas the acquisition of word meaning may rely both on language specific and on general learning mechanisms, world knowledge, and social factors.

Language has been defined as a cognitive module, and its development has been assumed to be constrained, just like the development of other cognitive systems, by certain critical periods, when the relevant stimuli for the development of the module must be present in the input. Their absence may render the faculty inactive or, at least, deficient.

So far, the following general schema for language acquisition has been assumed:

INPUT → | LANGUAGE ACQUISITION DEVICE | → OUTPUT

The LAD has been defined as a mental organ which develops as part of the child's biologically determined maturation. It is the locus of the principles which govern the linguistic constructs, the locus of constraints, a system of innately specified

41

assumptions about the structure of language. It is, in essence, the initial state of the language faculty. It is "a function that maps presented data into a steady state of knowledge attained" (Chomsky 1987: 61).

It has also been said that we do not have direct access to the LAD, that we have to hypothesise about its nature on the basis of our analysis of the input and of the output grammar. Which means that the hypotheses we construct are dependent on the theory of language adopted. In the next chapter the evolution of these hypotheses within generative linguistics will be presented.

Further reading

General: Read Chomsky (1988), Jackendoff (1994b) and Pinker (1994a) for excellent introductions to the nature of language and language acquisition. For a short and out-of-the-ordinary discussion on the nature of language acquisition, read section 1.1 in Uriagereka (1998).

General+advanced: If you are ready for more, read Chomsky (1986) and Chomsky (2000).

Focussed: For linguistic arguments that the acquisition of syntax relies on more than input, read Crain (1991). The reader keen on finding out about pros and cons will also enjoy the Open Peer Commentary section at the end of the paper. Fromkin (1997) summarises the approaches to the neural basis of language and modularity, with evidence from SLI, aphasia and linguistic 'savants'. If you find Fromkin too general and want to find out more about speech impairment, Leonard (1998) provides a recent comprehensive review of the literature dealing with SLI in children.

Textbooks: If you prefer textbooks, try Goodluck (1991), Chapter 1: 'Introduction: Linguistics and Language Acquisition' and Chapter 6: 'Cognition, Environment and Language Learning'. Chapter 3: 'First Language Acquisition' in Cook (1988) is one of the most accessible introductions to language acquisition from a generative perspective.

2

GENERATIVE LINGUISTICS AND LANGUAGE ACQUISITION

<div style="text-align:center; border:1px solid black; display:inline-block; padding:4px 16px;">

2

</div>

GENERATIVE LINGUISTICS
AND LANGUAGE ACQUISITION

*Who does not look back at where he came from will
not reach where he is going.* (Tagalog proverb)

KEY POINTS
In this chapter you will learn about:
* the way in which the generative approach to the study of language departs from the behaviourist approach
* the way in which generative models of linguistic analysis contributed to an understanding of language acquisition
* how language acquisition was dealt with by the Standard Theory model
* how language development was conceptualised within the Principles and Parameters model
* language acquisition and the Minimalist Program

---

1. Introduction

This chapter offers a brief presentation of generative models of linguistic analysis with a focus on the sense in which they have contributed to an understanding of language acquisition.

> Generative linguistics represented a shift from behaviourism to mentalism.

The rise of generative linguistics, associated with the name of Noam Chomsky, represented a radical shift from 'behavior or the products of behavior to states of the mind/brain that enter into behavior' (Chomsky 1986:3), a change of perspective from behaviourism, which dominated the social sciences in the 1950s, to mentalism, which understands 'talk about the mind to be talk about the brain at an abstract level at which [...] principles can be formulated that enter into successful and insightful explanation of linguistic (and other) phenomena that are provided by observation and experiment' (Chomsky 1987:50). Within such an approach, the Cartesian idea that language is a mirror of the mind is resurrected. The main empirical assumption about language is that there is a specific faculty of the mind/brain that can account for the acquisition and use of language.

> Language = a mirror of the mind.

Obviously, such a view represented a significant shift from the school of thought of the well-known psychologists of the time (such as John Watson or B. F. Skinner) who rejected the study of mind as unscientific. The behaviour of organisms was explained with laws of stimulus-response conditioning. The organism (animal or human) was seen as an empty black box while the stimulus (or the input) and the response (or the output) represented the only objectively measurable entities:

(1)   Stimulus ——→ | Empty[1] Black Box | ——→ Response
        (Input)   (Output)

---

[1] The "empty black box" was later abandoned even by behaviourists. Neo-behaviourism argues in favour of the idea that the stimulus-response connection is not sufficient to deal with the problem of situations; there must be some internal mechanism that allows the organism to choose new responses when facing certain situations. The idea of internal mediating mechanisms was introduced. These mechanisms are assumed to account for the fact that the same stimulus does not always produce the same responses.

The mind was seen as a *tabula rasa* before learning (children are born, on such a view, only with the general capacity for analogies and overgeneralization) and learning was described as a combination of association, analysis, analogy, etc. Language was explained in the same vein since it was assumed to be just another form of behaviour. Thus, language can be learned just like any other skill (dancing, playing the piano, etc.). On analogy with other learning processes, one would then expect children to achieve a different level of language knowledge.

Skinner's 1957 book *Verbal Behavior* represented an attempt to explain language without taking into account any meanings, ideas or grammar rules, i.e. anything that might be defined as a mentalistic event. Skinner believed that verbal behaviour could be controlled by the same external processes which were used to control the behaviour of rats or pigeons since, he claimed, 'the methods can be extended to human behaviour without serious modifications' (Skinner 1957: 3). The methods relied on classic conditioning. Imagine a hungry pigeon which is in a box. When it pecks a button by chance, it will receive food. After pecking the button on several occasions, the pigeon will come to learn the connection between the button and food. It will receive positive reinforcement every time it pecks the button: food is provided. Learning language is only one more type of conditioned learning by association. The first sounds a child utters are shaped up by reinforcement (of behaviour by means of rewards) to grow into the full range of verbal sounds of adult language. A verbal response is weakened or strengthened, depending on the type of consequences it may have: negative or positive.

Skinner provides a few examples of how verbal responses are conditioned and reinforced. A *mand*, for example, is, according to him, the result of need stimulus, such as the need for water. The verbal response to such a stimulus may be the message 'Give me some water'. The person being given what he/she has asked for reinforces the message: he/she says 'Thank you', which reinforces the response of the listener, and so on. When an adult teaches a child how to speak correctly, positive reinforcement is given by saying: 'That's right' or 'Good' when appropriate linguistic behaviour has been emitted. What happens when the behaviour is not the expected one? Skinner suggests... 'generalised punishments' (!). How do children create new sentences? Sentences are defined as strings of words, organised in linear order. Within the behaviourist approach, language is thus acquired by habit-formation, via positive/negative reinforcement.

When acquiring language, defined as a set of habits, gradually built over the years, the child must solely rely on environment. The study of language acquisition is reduced to the study of observables, i.e. of input-output relations, without resorting to any study of the internal structure of the organism.

In 1959, Noam Chomsky, in his famous critical review of Skinner's book, argued that the stimulus-response model is completely untenable for language behaviour. Firstly, such a system cannot account for the production and comprehension of entirely new sequences of words. We can understand/utter sentences which we have never heard before. Chomsky's famous sentence 'Colorless green ideas sleep furiously' clearly proves that any sequence of words which has not been heard before can, however, be recognised as a grammatical sentence. A stimulus-response model cannot possibly explain the fact that every sentence which a person might understand or utter can be a novel combination of words or that children can acquire language rapidly, without any formal instruction, growing to correctly interpret constructions they have never heard before. Language cannot be described as a repertoire of responses nor can language acquisition be defined as the process of learning this repertoire.

Such an approach to language acquisition can neither account for the lack of negative evidence. It has already been shown that communication between children and parents does not seem to depend in any way on the ill- or well-formedness of children's utterances. Parents only rarely correct their children's (grammatical) errors. According to Skinner's hypothesis, the child learns how to speak correctly via positive

and negative reinforcement. The hypothesis does not say anything about what may happen in the absence of negative reinforcement and, consequently, it cannot answer the question of how children manage to acquire language in the absence of negative input.

The behaviourist view does not make any assumptions about the learner's predisposition to learn. It cannot explain why only human beings can acquire speech, if knowledge of language can be achieved via conditioning.

It also allows for an unstructured hypothesis space and thus renders the task of learning extremely difficult (Saleemi 1992) and slow. There is evidence that children learn both grammar and vocabulary rapidly, sometimes after one single exposure to a particular word or a particular structure. Behaviourism also oversimplifies the problem[2]. It has been shown in Chapter 1 that language cannot be acquired merely by resorting to analogy or associations, i.e. to domain-general learning mechanisms.

The generative approach seeks to explain the problems raised above on the assumption (already discussed in Chapter 1) that the brain is equipped with a faculty, which allows children to build an infinite number of new sentences out of a limited, deficient input.

The central problems of the study of language are, within such an approach, the following ones:

(i) what is the system of knowledge called 'language'?
(ii) how does the child acquire this system of knowledge on the basis of a deficient linguistic input?

The answers provided by generative linguistics to the issues in (i) -(ii) above are crucially different from the ones provided by behaviourism. Language is no longer interpreted as a system of habits, dispositions and abilities but as a computational system of rules and constraints, specific to humans. Such a view on language obviously led the path to a radically different interpretation of how knowledge of language is attained.

The empty black box of early behaviourism is replaced by the language acquisition device (LAD) of the language faculty which is far from being 'empty'. It contains the tools which help the child to construct a correct steady output on the basis of the PLD and which are responsible both for the great speed with which humans acquire language as well as for their creativity. The LAD is regarded as the device with which the child is equipped from birth, it is the initial state of language.

> Generativism: the child is equipped with a LAD, which is responsible for the speed with which humans acquire language as well as for their linguistic creativity.

Hypotheses about the contents of the device itself have varied from one model to another. As we are going to see, within a Standard Theory approach, it contains substantive and formal universals, within a Government and Binding approach or within a Minimalist one, it is defined as containing a set of principles and a set of parameters.

As access to the LAD is indirect, in the sense that we can only hypothesise about it relying on the data offered by the analysis of the input and of the output, it is but natural that the details varied from one model of grammar to another. The changes reflect the fact that a better understanding of the acquisition process can only be achieved by revisions in the linguistic theory. At the same time, investigating language acquisition, 'one may hope to give some real substance to the traditional belief that the principles of grammar form an important, and very curious, part of the philosophy of the human mind.' (Chomsky 1965:59)

> Generative linguistics seeks to meet explanatory adequacy.

One of the goals of generative linguistics has been, from the very beginning, explanatory adequacy. Choosing one model or the other also takes into account the ability of the model to explain the process of acquisition. The linguist will prefer that

---

[2] *To imagine that an adequate grammar could be selected from the infinitude of conceivable alternatives by some process of pure induction on an infinite corpus of utterances is to misjudge completely the magnitude of the problem.* (Chomsky and Miller 1963:277)

particular model, i.e. that theory of grammar, which can best account not only for what languages share and for what distinguishes one language from another, but also for how children manage to learn language so fast, without any conscious effort. Developmental facts can be extremely revealing for the study of the organisation of the language system.

Within such a view, knowledge of language is no longer interpreted as relying on analogy and it is regarded as a different, specific skill. The use of language is defined as rule governed behaviour.

2 Standard Theory and Language Acquisition

2.1 Preliminary remarks

The Standard Theory (ST) of transformational generative grammar was first formulated in Chomsky's (1965) *Aspects of the Theory of Syntax*. From the point of view of acquisition it represents the first systematic attempt to formulate an argument in favour of a rationalistic approach to the study of language[3] which assumes that there are 'innate ideas and principles of various kinds that determine the form of the acquired knowledge in what may be a rather restricted and highly organised way'. (Chomsky 1965: 48).

Equally important, it raises the problem of adequacy (or adequacy-in-principle) and that of feasibility. The former concerns the matching of the principles (to be applied to primary data) proposed by the theory with the various grammars which are actually discovered when the linguist examines real, natural languages. The question of feasibility concerns the potential of a certain theory to explain how grammars are produced[4]. Accounting for the learning algorithm becomes a condition imposed on any linguistic theory.

2.2 Standard Theory

In order to understand what view of language acquisition the ST approach can offer and, more specifically, what the LAD is assumed to consist of, one should first examine the model of grammar adopted by ST. Remember that the LAD can only be hypothesised on the basis of the analysis of the input and of the output, i.e. its contents derive from the model of grammar assumed.

In what follows, the ST view on the organisation of grammar will be briefly presented[5], with a focus on those aspects which are directly relevant for the present discussion.

A ST grammar is organised in various components. It consists of a base, which contains a set of context-free phrase structure rules and a lexicon. The lexicon is defined as a list of idiosyncratic properties of lexical and grammatical formatives; the entry of each item contains specification of its phonological and semantic properties, as well as information about its subcategorisation and selectional properties. The context-free phrase-structure rules rewrite[6] single non-terminal symbols wherever they may appear in the derivation, i.e. they apply independently of context, and they are of the type shown in (2):

---

[3] In this respect, Chomsky follows the line of Descartes, Leibnitz or Humboldt. His point of view differs sharply from that of philosophers like Quine and Wittgenstein, who adopt the empiricist position with regard to language, which they assume to be independent of innate mental faculties and thus learnable through drill or explanation.
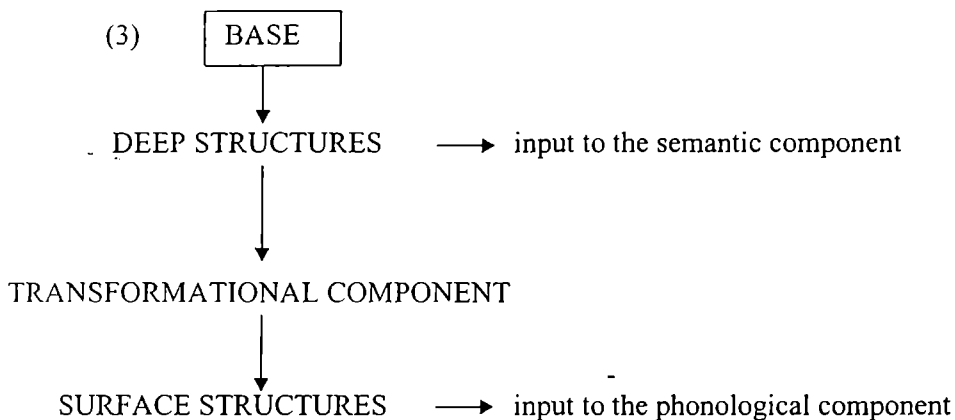
[4] Wexler and Culicover (1980), for example, define feasibility as easy learnability, i.e. 'learnability from fairly restricted primary data, in a sufficiently quick time, with limited use of memory' (p.18).

[5] For a more detailed presentation of the ST model the reader is referred to Ruwet (1967), Chapter 2 in Şerban (1982) or Chapter 2 in Cornilescu (1995).

[6] That is why they are also called rewriting rules.

48

(2)   S   → NP AUX VP
            VP → V NP
            NP → Det N
            Det → *the*
            PP → P NP

The rules apply mechanically and in a stepwise fashion until no more rules can be applied. At this point, a structure has been created. The structures produced by the base, the deep structures or the underlying structures, are taken over by a transformational component (which, in its turn, consists of transformational rules) which maps them into surface structures:

(3) | BASE |

      ↓

DEEP STRUCTURES   ⟶   input to the semantic component

      ↓

TRANSFORMATIONAL COMPONENT

      ↓

SURFACE STRUCTURES   ⟶   input to the phonological component

> The ST model: the LAD consists of substantives (grammatical categories, their projections, and grammatical features) and formal universals (formats constrained by UG).

The deep structures and the surface structures provide input to the semantic and the phonological components respectively. Notice that, within the ST model, only deep structure is subject to semantic interpretation.

Each level of representation is derived from another and derivation is mediated by rules. These rules are defined on sets of substantive universals, i.e. grammatical categories (N, V, P, A) and their phrasal projections (VP, VP, PP, AP) and grammatical features (+V, +N) in the syntactic component, semantic primitives in the semantic component (such as [+/-abstract], [+/-human], etc. and phonological features in the phonological component[7]. Rules are construction-particular. There are rules such as Dative Transformation, Relative Clause formation, Passive formation, Reflexivization, a.s.o. They are composed of elementary operations and have different formats, which are constrained by formal universals[8].

2.3 The LAD within ST

The LAD, a mediator of the input-output relation, is defined as consisting of these substantives and formal universals which 'provide a schema that is applied to data and that determines in a highly restricted way the general form [...] of the grammar that may emerge from presentation of appropriate data' (Chomsky 1965:53):

---

[7] Substantive universals could be defined as 'primitive elements which a grammar establishes in order to analyse linguistic data' (Crystal 1985:295) and which consist of 'any feature or category, phonological, syntactic or semantic, which is part of the vocabulary necessary and sufficient, for the description of the world's languages' (Smith and Wilson 1979: 288).

[8] They specify 'the form of rules in a grammar' (Smith and Wilson 1979:253.) representing 'the necessary conditions which have to be imposed on the construction of grammars in order for them to be able to operate'. (Crystal 1985 : 321).

(4) INPUT ⟶ | LAD = Substantive and formal universals | ⟶ OUTPUT
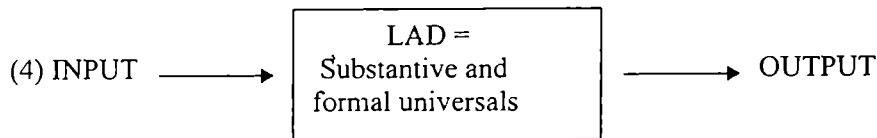
One immediate consequence of such a view is that the LAD can acquire or use only certain symbolic systems, whereas others are unlearnable. A second consequence is that the input filtered by this LAD will generate more than one possible grammar. How does the child choose one single grammar out of this set? The acquisition process is assumed to involve an *evaluation measure* which imposes a ranking on the members of the set of possible grammars, thus reducing the hypothesis space and allowing the child to choose that grammar which is the most compatible with the data offered by the input and which has the status of 'predicted descriptively adequate grammar':

(5) INPUT ⟶ | LAD | Evaluation measure | ⟶ OUTPUT
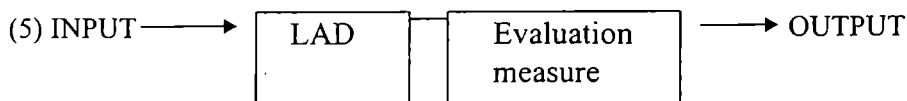
Most subsequent studies of language acquisition (Berwick 1985, Atkinson 1992, Saleemi 1992, O'Grady 1997) criticised the ST model for offering an instantaneous view of the acquisition process, i.e. all the data seem to be accessible to the child at once. However, several remarks are in order here. Firstly, one should not ignore the fact that such an idealisation is legitimate from the point of view of linguistic theory and that it was necessary when the focus was on showing that language acquisition mirrors mainly 'the general character of one's capacity to acquire knowledge - in the traditional sense, one's innate ideas and innate principles' (Chomsky 1965:59) and not 'so much the course of one's experience'. Chomsky (1965: 202) himself stresses the fact that he is idealising and points out the developmental dimension which is involved in the process:

> *Obviously, to construct an actual theory of language learning, it would be necessary to face several other very serious questions involving, for example, the gradual development of an appropriate hypothesis [...] and the continual accretion of linguistic skill and knowledge [...]. What I am describing is an idealization in which only the moment of acquisition of the correct grammar is considered. [...] it might very well be true that a series of successively more detailed and highly structured schemata (corresponding to maturational stages but perhaps in part themselves determined in form by earlier steps of language acquisition) are applied to the data at successive stages of language acquisition.*

This quotation alone proves that the idea of language growth is present in the model as early as 1965, and that the criticism that the schema for language acquisition offered by the ST model is characterised by a 'total lack of developmental dimension' (Atkinson 1992:43) is not grounded, if not misleading. It is one thing to say that the model which it offered was idealised, and hence language acquisition was presented as instantaneous, but it is quite a different thing to say that the model lacked a developmental dimension. As we are going to see, the learnability models grounded in the ST framework assumed an incremental view of the process of language acquisition.

The model of language acquisition which ST could offer was faulty to the extent to which the model of grammar was faulty, i.e. it was not the abstract way in which language acquisition was conceived that was at stake, but the type of hypothesis one could build about the LAD on the model of grammar which the linguistic theory could offer at the time. The general assumptions which lie behind the history of language acquisition within generative linguistics have remained the same. What has been changing, in an attempt at gaining a better understanding of the

50

language faculty, has been the descriptive, not the explanatory, part of the grammatical theory. That language acquisition is a gradual process, that it represents a development of language skills which relies on some species-specific innate predispositions is an idea which has always been present in generative studies. It is the model of grammar which has been revised, very often with the goal of leading towards a more appropriate learnability theory.

It should also be pointed out that acquisition of language, though associated with a distinct specific faculty of the human mind, is not seen as entirely separate from other components of the abstract mind:

> *Notice that we do not, of course, imply that the functions of language acquisition are carried out by entirely separate components of the abstract mind or the physical brain, just as when one studies analyzing mechanisms in perception [...], it is not implied that these are distinct and separate components of the full perceptual system. In fact, it is an important problem for psychology to determine to what extent other aspects of cognition share properties of language acquisition and language use, and to attempt, in this way, to develop a richer and more comprehensive theory of mind.* (Chomsky 1965:207)

2.4 Learnability models grounded in the ST model

2.4.1 Degree-2 Learnability

One of the first attempts at providing a theory which unifies linguistic representation and learning is associated with the names of Ken Wexler and Peter Culicover. In their 1980 book, *Formal Principles of Language Acquisition*, they tried to show that transformational grammar is 'naturally' and 'easily' learnable[9], i.e. they define 'feasibility' as 'easy learnability', 'that is, learnability from fairly restricted primary data, in a sufficiently quick time, with limited use of memory' (Wexler and Culicover 1980:18), and developed a theory of language learning which incorporates a theory of generative grammar and a learning procedure.

They start from two main assumptions:

(i) the primary data provided by the input which the child receives consist each of a base phrase-marker (b) paired with a surface string (s): (b,s). The base phrase marker (or the deep structure) is conceived as close to the semantic representation of the utterance. The child can understand a sentence even when he/she cannot analyse it because he/she relies on the situation in which the sentence is uttered as well as on the spoken words. Thus, the child is assumed to have the capacity to relate this interpretation to syntactic structures, i.e. semantic information facilitates access to deep structures;

(ii) the child's task in the process of language acquisition is to construct a transformational component.

The learning mechanism which they propose is quite simple and gradual: it creates transformations on the basis of PLD (i.e. pairs of base phrase markers and surface strings). The child's task is that of learning the transformational rules. Whenever the input datum

Degree-2 Learnability: on the basis of a simple input, the child constructs the transformational component, considering phrases which need contain no more than two embeddings.

---

[9] 'Learnable' should not be understood to mean learnable by some general learning mechanism which can account for the learning of any kind of cognitive capacity. As Wexler (1982:286) points out: 'an ability (e.g. the ability to speak a natural language) is learnable if there is an (empirically true) way in which the ability can develop. In this sense, if an ability is innate it is learnable [...]. If the ability develops via a learning mechanism based on other innate capacities, the ability is also learnable [...]. In short, any human capacity is learnable.'

51

allows an error to be detected (i.e. whenever the transformation hypothesised by the learner is different from the transformation in the target grammar), that transformation is deleted and the child will hypothesise a new transformation. It is important to point out that the mechanism can 'see' only the latest datum, it does not go back to earlier data; the rejection and the selection of transformations does not target the transformational component wholesale. Hypotheses are changed gradually, as new data are provided by the input.

The main idea is that the child can select a correct transformational component on the basis of a relatively simple input. Even though eventually the learner will master a grammar which contains complex sentences, in the process of language acquisition the most complex phrase marker which the child must consider will contain no more than two embeddings. Hence the name of the theory: degree-2 learnability. In the process of acquisition, the child will make some errors which, for the learning to take place, must be detectable errors.

Within the framework adopted, all the transformations are obligatory. Thus, the child will be able to see that his/her hypothesised transformation is incorrect every time the input provides a paired base structure phrase marker and surface string if the surface string is different from the one his/her transformational component would have generated from the same base structure. Suppose the child's transformational component has generated the surface string s1 from the base structure b. Then the child hears a primary datum (b, s2) and realises that the transformation he/she applied to b is incorrect. On the basis of the latest datum, a new transformation will be hypothesised. But some errors may not be detectable until a degree-2 phrase marker. The hypothesis is that transformational grammar 'can be learned from data of degree less than or equal to 2' (Wexler and Culicover 1980:117), i.e. errors are detectable on a base phrase marker of degree-2 or less. That would be in line with the assumption that the input which a child receives is relatively poor; however, grammar can be learned from an input of reasonably small complexity: 'Nothing more complicated than sentences that contain sentences that contain sentences is needed for convergence' (Wexler 1982:299).

The transformation theory provided by ST was relatively unconstrained. Hence, one of the major problems for degree-2 error detectability was the possibility of a low cycle error to be undetected until on a much higher cycle. That required phrase markers of a high degree of embedding as part of the PLD, an undesirable result. Given this shortcoming of ST, Wexler and Culicover had to add a number of constraints, conditions and principles to the standard definition of transformations[10].

Their work shows in what way developing a learnability theory is linked to the development of linguistic theory itself. As Baker (1982) puts it: 'only by making major revisions in the linguistic theory itself were they able to achieve satisfactory learnability results' (p.420).
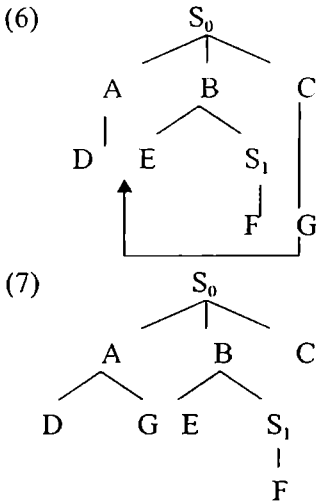
However, the model they propose is not without problems. Most of the constraints they propose are 'specific', providing a solution to one kind of situation. Assuming that all the transformations are obligatory, their model cannot give an account of error detectability in the case of those errors linked to optional rules (although they assume many of the rules which were formulated as optional rules).

Also, recall that one of the background assumptions they made was that the child has the ability to construct base structures on the basis of semantics. Such an assumption is, as Atkinson (1992) points out, both too strong and too weak at the same time: the input is defined as consisting of surface strings which do not provide any structural information.

---

[10] Among which the so-called Freezing Principle ('if a transformation changes the structure of a node so that it is no longer a base structure, nothing under that node may be analysed (and thus changed) by a further transformation' - Wexler and Culicover 1980:119), the Raising Principle (if a node is raised, no further transformations can apply to any of the nodes dominated by the raised one) or the Binary Principle ('a transformation may apply to the level at which it is operating plus the next lower level, but no further down' Wexler and Culicover 1980:109). These principles are still at work in more recent generative models, under different names.

2.4.2 Degree-1 Learnability

Morgan (1986) proposes an alternative learning theory which modifies the model of Wexler and Culicover by introducing the so-called Bracketed Input Hypothesis. According to this hypothesis, input is bracketed: it contains sequences of base structure – surface bracketing pairs, with certain clues about the way in which words are grouped into syntactic constituents. Suppose that the target grammar contains a transformation which operates on the base structure in (6) yielding (7):

(6)
```
              S_0
        _____/|_____
       A      B        C
       |     / \
       D    E   S_1
       ↑       / \
       |_____F   G
```

(7)
```
              S_0
        _____/|_____
       A      B      C
      / \    / \
     D   G  E   S_1
                |
                F
```

As shown in (6) –(7) G raised and adjoined as a right sister to D.

Now suppose that the child has hypothesised a transformation that raises G but adjoins it as a left sister to E, as in (8):

(8)
```
              S_0
        _____/|_____
       A      B      C
       |     /|\
       D    G E  S_1
                 |
                 F
```
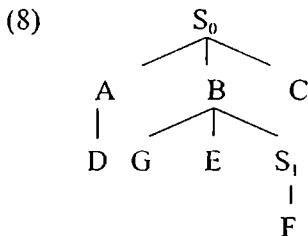
The surface string in (7) and (8) will be the same: DGEF. The error will not be detectable if the input provides only strings (as in Wexler and Culicover's model) not structures. If the Bracketing Input Hypothesis is assumed, (7) and (8) will have different representations, as shown in (9) and (10) respectively:

(9)   [D – G] [E] [F]
(10)   [D] [G – E] [F]

The child will be able to detect the error on a phrase marker which contains no more than one embedding, i.e. on a degree-1 datum.

One can notice that Morgan enriches the input by adding 'bracketed' structural information to the simple input of Wexler and Culicover (1980), but then simplifies it by reducing the degree of complexity of phrase markers necessary for error detection and hence for learning.

Examining the two learnability theories from a contemporary stance, when constraints are generally limited to elements within the same clause, one might wonder why children need to hear more than a simple, unembedded clause in order to be able to construct a correct grammar. In 3.3.2 an alternative to the Degree-2 and Degree-1

> Degree-1 Learnability: on the basis of an input which contains sequences of base structure –surface bracketing pairs, the child builds the transformation-al component considering phrases which need not contain more than one embedding.

theories will be presented: Degree-0, put forward by Lightfoot (1989, 1991), according to which everything can be learned from unembedded domains. Children do not seem to need access to complex structures in order to reach the correct generalisations.

2.5 Questions about language acquisition which ST cannot answer

In spite of the fact that the ST model (in particular the program set forth in *Aspects of the Theory of Syntax*) emphasised the central role of language acquisition in linguistic inquiry, it could not offer a satisfactory account of the process of acquisition. What should be stressed once again is that the model needed changing, among other things, because it could not deal in a satisfactory way with learnability phenomena.

The grammatical theory proposed by ST was not restrictive enough in terms of the range of grammatical rules which were allowed. Hence, the need to add constraints on rules[11] in order to provide an appropriate learnability theory (see Wexler and Culicover 1980, for example). The model offered too many types of transformation, whose ordering was (often) not available from the relatively impoverished and deficient input. This made it difficult to explain how the child could choose one particular grammar rather than another.[12] For example, the Passive Transformation Rule, formulated as in (11), raises several questions. How could a child detect, on the basis of the input, i.e. of surface strings (as in Wexler and Culicover's model) or surface structured information (as in Morgan's learnability model) the number of movements the transformation implied or the order in which the movements must apply: move first the two NPs (from position 5 to position 2, and from 2 to 7), insert *be* and *–en* and then insert *by* in front of the NP which has moved to the right?

(11) X – NP – AUX – V – NP – Y – *by* – Z
     1   2   3   4   5 6 7 8   ⟶
     1   5   3+be 4+en Ø <-6 by+2 8

The ST model also resorted to an evaluation measure (whose exact nature was left unspecified) which was designed to impose a ranking of the members of the set of possible grammars, i.e. to reduce the hypothesis space. However, the concept of evaluation measure was not only a sort of idealisation needed to account for the fact that, in the end, the child chooses one particular grammar, i.e. the one which is consistent with the input he/she has received, but it also heavily relied on the assumption that the child, given the LPD and UG, has to choose out of a set of candidate grammars. Within the Principles and Parameters (PP) model, where UG is constrained in such a way that the set of possible grammars is reduced, at all stages, the evaluation metric has been abandoned.

Questions about the role of the evaluation metric have also come from the domain of language change: *If the data and the associated structural description to which the child is exposed correspond fairly closely to the grammatical capacity of some older individual, one would expect the child's evaluation metric to select the same grammar as that of older individual's* (Lightfoot 1997). However, languages are not stable. If children acquire language without error (in the end), how does language change occur? What would the role of the evaluation metric be in this respect?

It is also worth mentioning at this point that the ST model does not say anything about conceptual learning, the arguments focussing exclusively on the learning of syntax. That triggered a lot of misunderstanding as well as criticism which targeted an area about which the model did not actually say anything.

---

[11] See Braine (1971) or Baker (1979) for comments on the disadvantage and inappropriateness of resorting to restrictions into the statement of rules.

[12] 'In essence, the problem is that there are too many rule systems. Therefore, it is hard to explain how children unnerringly select one such system rather than another' (Chomsky 1987:15). 'Virtually any imaginable rule can be described in transformational terms. Therefore a critical problem in making trnsformational grammar a substantive theory with explanatory force is to restrict the category of admissible phrase markers, admissible transformations, and admissible derivations.' (Chomsky 1972:124).

3. Principles and Parameters Theory

3.1 *The model and its implications for the study of acquisition*

Much contemporary research in the acquisition of syntax has been carried within the framework provided by the theory which was first known as the Theory of Government and Binding (GB) (Chomsky 1981). As one of the main shortcomings of the ST approach resided in its failing to offer a theory of UG sufficiently constrained in the options it permitted and sufficiently devoid of stipulations that did not follow from general principles, which implied also failing to account for the fact that grammars can develop in spite of the limited input, the goal of the new approach was to provide a theory of grammar which should be able to meet both the descriptive adequacy and the explanatory adequacy conditions. Its descriptive statements fall into two categories: language-invariant and language-particular. The language-invariant statements are fundamental principles which can restrict the class of possible grammars and also constrain their form. From the perspective of acquisition, that meant reducing the searching space significantly. Also, with a general system of principles replacing the construction-particular rules which contained arbitrarily ordered operations, the model can better account for the acquisition process. The language-invariant statements also contain parameters, whose value is fixed by experience. The particular values which parameters have represent the language-particular statements and they account for cross-linguistic variation. The model assumes that UG provides a finite array of parameters with a finite number of available values, possibly only two.

As government and binding represent just two of the concepts assumed in the theory, and as the theory actually focuses on the interplay between the principles and the parameters provided by UG, the name of Principles and Parameters Theory (P&P), which captures the core of the model in a more accurate way, replaced that of GB.

This is not the place for a detailed presentation of the model[13]. P&P developed over more than a decade, with far-reaching ideas being pursued in many areas of linguistic theory, language acquisition included. I will only focus on the core ideas, trying to point out in what way the new model overcomes the shortcomings of ST. Needless to say, the emphasis will be on the consequences for the study of the acquisition process.

The overall organisation of grammar[14] within a P&P approach is the one given in (12) below:

> Within a P&P model, UG is defined as consisting of general principles and a set of parameters whose value is fixed by experience.

> The searching space is reduced: the principles restrict the set of possible grammars and constrain their form.

(12)
```
                    LEXICON
                       ↓
                 D-STRUCTURE
                       |
                       |←———— T-COMPONENT
                       ↓
                 S-STRUCTURE
                  ↙          ↘
              PF level        LF level
        PF-REPRESENTATIONS    LF-REPRESENTATIONS
```

---
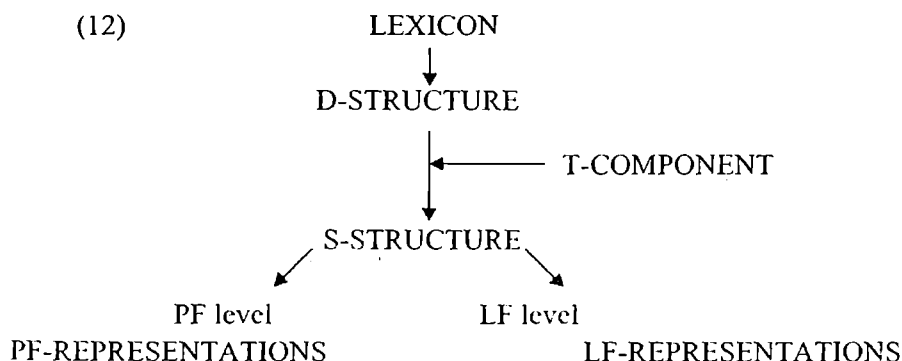
[13] For a detailed presentation of the theory, the reader will benefit from consultation of Lasnik and Uriagereka (1988), Haegeman (1991/1994), Chapter 1 in Chomsky (1995) or Cornilescu (1995).

[14] One thing which should be made clear from the very beginning is that organisation of grammar within a P&P approach actually means UG. The concepts of 'grammar' and UG refer to two different systems: UG is an element of biological endowment and it characterises the child's pre-linguistic initial state. 'Grammar' is a certain system of knowledge, acquired on the basis of experience via UG, i.e. it represents experience filtered /mediated by UG. A particular grammar results from the process of fixing values to parameters.

The base consists of a lexicon (which is, just as its ST predecessor, a repository of idiosyncratic information about particular items) and a categorial component.
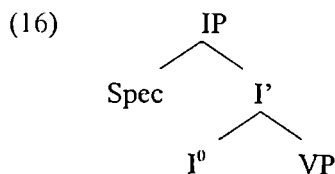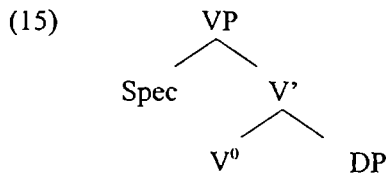
The categorial component within a ST approach contained context-free phrase-structure rules. But they could not capture the generalisation that syntactic categories have similar structure. Moreover, from the perspective of acquisition, postulating these rewriting rules in the base could not theoretically prevent the child from having to analyse strings of the type in (13) in his/her searching space, since nothing in UG excluded such rules:

(13)   a. $VP \rightarrow V - V - V$
        b. $PP \rightarrow P - P - P$

Of course, we can always assume that such rules do exist in the hypothesis space and that it is part of the child's task in the acquisition process to discard them and choose the 'right' ones in the end. However, that would mean placing a heavy burden on the young learner; the acquisition process would slow down in a significant way. The P&P categorial component contains rules that meet the requirements of X-bar theory according to which all phrases are headed by a lexical or functional head, they are endocentric. The head represents a zero projection (X^0) and the general format for phrase structure is the one in (14) below:

> Lexical and functional categories project according to X-bar schema, part of UG.

(14) $X'' \rightarrow$ $Spec - X'$
        $X' \rightarrow$ $X^0 - (YP)$

The format in (14) captures what is common for the different types of phrases (VP, NP, AP or IP[15], DP, etc.), providing a universal schema for phrase structure. It is part of UG. It is essential to point out that lexical (or open class elements) (15) and functional categories (belonging to closed classes)[16] (16) project according to the same format:

(15)

```
            VP
           /  \
        Spec   V'
              /  \
            V⁰    DP
```

(16)

```
            IP
           /  \
        Spec   I'
              /  \
            I⁰    VP
```

Both lexical (verbs, nouns or prepositions, for example) and functional categories (such as Tense, Agreement or Aspect) can be the *head* of a phrasal category (in 15 above V^0, a lexical category, is the head of VP and in 16 Inflection – I^0, a functional category, is the head of IP), taking a complement and a specifier. For example, V, the head of the phrasal projection VP, takes a determiner phrase (DP) as its complement, whereas the Specifier position is assumed to be the base position of the subject DP:

---

[15] IP = Inflectional Phrase; Inflection is an umbrella term for functional heads such as Tense and Agreement (Pollock 1989) or, within more recent studies, for all the functional projections of VP (Tense, Agreement Object, Agreement Subject, Aspect and Mood) and it represents the core of the sentence, being responsible for the relation between the subject and the predicate.

[16] For more on the properties of functional categories see Abney (1987), Grimshaw (1991), Avram (1994) or Cornilescu (1995).

56

(17)

```
              VP
            /    \
        Spec      V'
          |      /   \
          |    V⁰     DP
          |     |     /\
        John  reads  linguistics
```

Now, the child will no longer have to discard rules like the ones in (13) for the mere reason that such rules are not possible in the given (X-bar) system provided by UG. There is one single available format for both lexical and functional material.

· The lexicon contains relevant information about items, be they substantive or functional. Each entry will contain only idiosyncratic information, i.e. information which is not already provided by UG or which cannot straightforwardly follow from UG. Thus, a typical entry consists of information about the phonological matrix, about categorial status (whether the entry is + N or + V, for example) as well as phi-features (number, gender, person, and Case). Let us see how this works in order to understand its implications for the acquisition process. Consider a verb like 'read'. In the lexicon, 'read' comes together with information about its phonological form, a specification about its syntactic category (it is +V, -N) and with information about its notional (or thematic) structure, i.e. information that it takes an Agent, the reader, and a Patient, the object which is being read:

(18)   read V: Agent, Patient   -

The association between these notional arguments and argument positions in syntax seems to be largely predictable (thematic properties 'specify' the argument structure) and will not be stated in the lexicon. The representation in (18) is then projected to D-Structure:

(19)   NP1 read NP2

The relation between the lexicon and D-structure is a principled one: the information in the lexicon is projected to all the levels: D-Structure, S-Structure and LF. The subcategorisation properties of lexical items must be observed at each syntactic level. This is the so-called Projection Principle, which prevents, among other things, strings of the type in (13). Notice that the representations at the level of D-Structure (an internal interface level where lexical properties are expressed in a form accessible to the computational system) are determined by the Projection Principle and not independently generated by phrase-structure rules[17], as in ST, which become redundant within this model. Both subcategorisation and selectional restrictions follow now from theta-role specification and from thematic properties. The semantic features of an argument are required to be compatible with those of the theta-role associated with it. The D-Structure representations are the projection of the information stored in the lexicon, i.e. the projection of lexical properties. The thematic positions are saturated at this level. The Projection Principle and the X-bar format are given by UG. The child has to learn the idiosyncratic properties of lexical items. Chomsky (1981) did not specifically address the question of how exactly children learn these properties. But the suggestion is that knowledge of subcategorisation properties determines knowledge of the syntactic properties of that specific item. For example, an English speaking child must discover the subcategorisation features of *read*, one aspect of learning its meaning. Given this knowledge, the properties of the syntactic structures in which *read* appears are determined by the Projection Principle, which means that they do not have to be learned

---

[17] For a discussion on whether phrase structure rules are/are not necessary within GB see Lasnik and Uriagereka (1988), pp. 2–5.

57

independently. Similarly, knowledge of the lexical properties of an item will lead to knowledge of its LF representation. The implications of this view, according to which subcategorisation frames are derivative from notional properties, are far from trivial and they have far-reaching consequences especially for the study of lexical development.

The most radical consequence would be to assume that once the child knows the semantic properties of a word, he/she would also be able to cope with the syntactic frame of that particular word. Another non-trivial consequence of this line of reasoning is that semantic primitives, of the type Agent, Patient, etc. can be applied by the learner in his/her pre-linguistic analysis of the input, whereas notions such as NP, VP are derived. The former would meet, on such a view, the condition of epistemological priority, representing the basis for linguistic development. From the perspective of acquisition, this view raises at least one important question: how does the child know that an element in a sentence is an Agent or a Patient before having any knowledge of syntax? For acquisition to be possible, it may be the case that both information about the thematic structure and about the argument structure are available in the input at the same time (Chomsky 1995). However, notions such as 'Agent' belong to the conceptual compartment whereas argument structure belongs to the computational compartment.

D-Structure is no longer the feeder of information to the semantic component, as in the ST model. Surface structure, associated with the external interface LF, becomes crucial for semantic interpretation: the semantics can be read off surface strings. This creates a tension between the assumption that thematic information determines argument structure and the view that semantic information is accessible via surface structures. In the domain of lexical development, the consequence of this tension is reflected in the by now classical debate over 'what comes first: syntax or semantics?'

The D-Structure representations are mapped to S-Structure by rules of the transformational (T) component and then they 'branch' to PF and LF. Recall that within a ST approach there were too many construction-specific rules, such as Passive, Question Formation, Dative-Shift, a.s.o. The acquisition task was rendered extremely difficult not only because there were too many transformation rules which the child was supposed to acquire but also because these rules were decomposed into more elementary operations which were said to apply in an order which was often an arbitrary one and which was not given by the input. Within a P&P approach, the transformational component consists of one single basic operation Move α, where α is arbitrary. Deletion and insertion are also operations of this component.

> D-Structure representations are mapped to S-Structure via a basic operation Move α .

Move α is a general rule, which says that anything can be moved, leaving behind a trace, co-indexed with the moved element. The application of Move α is constrained by conditions imposed by general principles, which are applied to construct or license derivations in order to prevent the rule from producing a wide range of S-structures.[18] The child is no longer supposed to learn a lot of transformation rules, each with its own more elementary operations. Move α always has the same format. The trace which it leaves behind represents an empty category, i.e. one that lacks a phonological matrix, but which is relevant for the operations of the computational system[19].

> Move α always has the same format and its application is constrained by general principles. The child's task is thus easier.
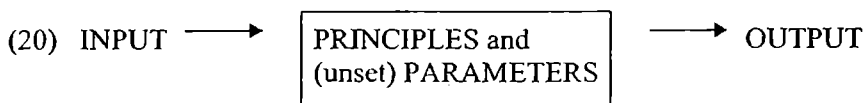
The sub-components of the rule system, i.e. the lexicon, the syntax, the PF-component and the LF-component, interact with the principles of UG which are operative in all or many of the interacting modules of grammar which license different types of information at different stages of the derivational process: (i) government theory;

---

[18] Just like in the case of d-structures (which should not be mistaken for the deep structures within the ST approach), S-Structure is not the P&P equivalent of the ST surface structure. Recall that in ST the input to the semantic component was deep structure. The surface structures were not linked to semantic interpretation. In the schema given in (6) one can easily notice that within a P&P approach S-Structure provides input to LF.

[19] For an example of how such a trace may work and of how children deal with traces very early, see the discussion on *wanna* constructions in Chapter 1.

(ii) binding theory; (iii) theta-theory; (iv) bounding theory; (v) Case theory; (vi) Control theory. The properties of languages are derived from the interaction of the sub-systems of the rule system and the sub-systems of principles.

The LAD is assumed to provide a set of universal principles (i.e. a fixed network) and a set of parameters [20] (a switch box) whose value will be fixed on the basis of input:

(20) INPUT ⟶ ┌─────────────────────┐ ⟶ OUTPUT
              │ PRINCIPLES and   │
              │ (unset) PARAMETERS │
              └─────────────────────┘

Language acquisition = the acqui-sition of lexical items and fixing the value of the parame-ters of the initial state.

The principles provided by UG reduce the hypothesis search in a significant way. Acquisition of the computational system reduces to the process of fixing the parameters of the initial state. The task of setting the correct value for parameters is made easier, since certain forms or configurations are simply impossible given the system of principles of UG. The primary task of the child is to set values to parameters.

Within such an approach, language acquisition is defined as 'the acquisition of lexical items, fixing of parameters, and perhaps maturation of principles' (Chomsky 1995:28). The question is what the exact nature of 'fixing of parameters' is, what in the input can license parameter setting. What is the role which maturation plays in the process?

Parameters are mainly associated with functional categories, such as Determiners or Tense, which represent the locus of language variation. If UG provides the general principles, one may assume that the child has to learn only what is language-specific, i.e. the values associated with functional categories. Recall that functional categories project just like lexical categories. An element is assumed to come from the lexicon in its 'bare' form and then, via head-to-head movement, moves to the functional categories in its extended projection in order to get its inflection (see, for example, 49). This view allowed building-structure accounts of syntactic development (Lebeaux 1988, Radford 1990, among others), according to which the child's phrase marker 'grows' as the child sets the right values for the parameters associated with functional categories.

3.2 Setting parameter values

3.2.1 The Problem

Reducing the task of acquisition to the search for the correct parameter values also meant reducing the search space. However, various questions were raised with respect to the nature of the process of parameter setting:

(i)   in what order does the young learner consider the values of a given parameter?
(ii) does UG provide an initial set of parameter values?
(iii) does the child fix the correct value from the very beginning or does he/she reset the parameter on the basis of positive data?
(iv) is the process of parameter fixation best defined as hypothesis formation and testing or as triggering?
(v)   what element(s) in the input can count as triggers for parameter setting ?

Let us address these questions and discuss some of the answers that the literature can offer at the moment.

---

[20] The parameters may have both settings (+/−) available (Valian 1990, Fodor 1998 a.o.) or they may be available with a default setting (Hyams 1986).

3.2.2 Possible answers

3.2.2.1 *Markedness and parameter fixation*

The answer to question (i) may rely on the notion of markedness, which has been analysed as playing the part of an evaluation metric in the process of parameter fixation. One possible answer along this line is the one provided by the so-called Subset Principle, versions of which have been proposed by Baker (1979), Berwick (1985), Manzini and Wexler (1987), Wexler and Manzini (1987), Wexler (1993). In what follows I will only refer to this principle in the form in which it was formulated by Manzini and Wexler.

Their argument has been developed in relation to binding domains and it relies mainly on the analysis of the interpretation of reflexive pronouns. Languages differ with respect to the constraints imposed on the co-indexation of reflexive pronouns with their antecedents. In languages like English, for example, a reflexive pronoun can only have an antecedent in the same clause. 'Himself' can be co-indexed with 'John', in (21a), since they are both in the same clause. But in (21b), 'himself' can no longer be co-indexed with 'John', since 'John' is in a higher clause:

(21) a. *John$_i$ admires himself$_i$.*
      b. **John$_i$ believes [that Bill admires himself$_i$].*

In other languages, such as Japanese or Korean, reflexive pronouns can be co-indexed with an antecedent that is either in the same clause or in the higher clause, provided the reflexive and its antecedent are in the same sentence. Thus, Principle A of Binding Theory (formulated in 22) can be parameterised, with values (a) and (b) in (23) as possible options:

(22) Principle A:
      An anaphor must be bound in its governing category.
(23) The governing category may be:
      a. the smallest clause which contains the anaphor (the reflexive pronoun)
      b. the sentence containing the anaphor (the reflexive pronoun).

One main assumption is that each parameter has to observe the so-called Subset Condition:

(24) For every given parameter and every two given values of it, the languages defined by the values of the parameter are one a subset of the other. (Wexler and Manzini 1987:60)

This set inclusion is regarded as determining the ordering of the two values and hence the ordering of parameter fixation: the child will begin with that value which allows the smallest range of structures and, on the basis of experience, he/she will then opt for that value which allows for a wider range of constructions. This is the so-called Subset Principle which could be formulated in simple terms as in (25):

(25) If every structure that is grammatical under A is also grammatical under B, then choose option A if it is consistent with the input. (Wexler 1993:217)

Let us go back to Principle A and see how the principle works. The child acquiring English will come across sentences like the ones in (26), where the reflexive pronoun can be co-indexed with an NP which is once in the smallest clause (26a) and once in a complex sentence (26b):

(26) a. *John admires himself.*
      b. *I think John admires himself.*

60

Recall that the Subset Principle says that the LAD must choose the most restrictive value of the parameter, provided it is consistent with the positive data which the child has received. Hence, the child will choose option (a), according to which the reflexive pronoun is co-indexed with its antecedent in the smallest clause. This choice allows for a more restrictive range of constructions. In this way, choosing the value which permits a wider range of constructions is disallowed. From the point of view of learnability, there will be no need for correction. If the child chose the value consistent with the wider range of constructions, there would be no way to ever retreat to the correct value, since the positive data provide sentences which are consistent with both options.

The Subset Principle is an independent principle, part of a learning module which interacts with UG.

It is important to point out that the Subset Principle is viewed as an independent principle, part of a learning module which interacts with UG. The non-trivial implication is that the child resorts to an explicit learning procedure and that acquisition theory needs more than linguistic theory (vs. the view advanced by Hyams 1986). The second implication of this view of parameter setting is that markedness plays an important part in the ordering of parameter values: parameter fixation starts with the unmarked value and then, on the basis of positive data, moves to the marked one.[21]

A critical look at the set-theoretical approach of Wexler and Manzini will reveal that it is not without problems. Saleemi (1992) qualifies it as 'far too deterministic to be psychologically convincing and too conservative to be applicable to a wide range of parameters' (p.76).

Gair (1988) points out that assuming that there are marked and unmarked parameters which determine core grammar can have far reaching implications for language acquisition and language change: (i) languages can be ranged along a scale of markedness, according to the number of marked/unmarked parameters which determine their core grammar; (ii) one would expect marked languages to move towards unmarkedness and marked languages to be more stable (fact which has not been borne out by empirical data); (iii) some languages (the 'unmarked' ones) can be acquired faster than others, since the unmarked values are set first.

Recall that the Subset Principle relies on the Subset Condition. But it is not at all clear that all parameters observe the Subset Condition. Take for example the head-complement order parameter. The two values of this parameter are (a) and (b) below:

(27)   a. the head precedes the complement (i.e. head-initial)
       b. the complement precedes the head (i.e. head-final)

Both (a) and (b) are equally restrictive, neither of them is a subset of the other. In this case, the Subset Principle cannot apply. Obviously, as O'Grady (1997:284-285) points out, 'this need not create a learnability problem (since an incorrect setting would quickly run up against counterexamples in experience), but it does suggest that the parametric options permitted by UG are not all of the same type'.

Another parameter which questions the Subset Principle is the so-called null subject or *pro*-drop parameter which can have two values:

(28)   a. null subjects are allowed.
       b. null subjects are not allowed.

Languages like Romanian, Italian or Spanish will select value (a) which allows for a wider range of constructions (i.e. for both structures with null subjects and structures with overt subjects) whereas languages like English select value (b). With value b being more restrictive, according to the Subset Principle the child acquiring

---

[21] The idea that markedness is a sort of evaluation measure is explicit. See for example the definition of the Subset Principle in Wexler (1993:219):

Subset Principle (Relativized Statement): Suppose that principle X allows for 2 values, i and j, of a parameter P. Suppose furthermore that for all derivations D, if D(j) violates X, then D(i) violates X. Then value i of parameter P is unmarked with respect to value j.

English should never use null subject sentences, since he/she should first opt for the b value of this parameter which is also the correct value for the target language. But empirical data from child English show that children choose value (a) first.

3.2.2.2 Parameters have a preset value

Another possible answer with respect to the ordering of parameter fixation is the one provided by Hyams (1986). Markedness is no longer considered an evaluation device whose task is to determine which parameter value is the non-marked one and hence the priorities in the process of parameter setting. Hyams's theory is based on the analysis of null subjects in child English. The main pillar of her evidence is that children acquiring English use null subjects where adults would require an overt one. One possibility of accounting for why children choose this value first is to assume that actually one value of the null subject parameter is given by UG 'in advance of experience with a given language' (Hyams 1986:8); the task of the child will be to 'reset' the parameter according to the input which he/she receives. Thus, the English child will use null subject sentences in the beginning, since this value is given by UG, it is the initial value of the parameter. Then, because of the input he/she is exposed to, the child will 'reset' the parameter and choose the value which is consistent with the target language.

<div style="border:1px solid">
Parameters have one value set prior to experience with a given language. The child has to reset this value on the basis of positive data.
</div>

As we are going to see in **4.3.**, where various analyses of null subject sentences in child language will be considered, Hyams's solution is not the only one and it is not one without problems. From the point of view of the study of acquisition, one should point out that her approach does not resort to any other theory besides the linguistic one in order to account for parameter fixation. Recall that the approach put forward by Wexler and Manzini resorted to a learning module which interacted with UG. Within the approach put forward by Hyams the initial value of the parameter is given by UG, the child does not have to search for the less marked value. The various possible values of a parameter are fixed in a prescribed order. No learning module is necessary; linguistic theory can also be viewed as a theory of language development.

Among the problems which such an approach faces[22] one could mention the one linked to the notion of 'resetting'[23]. Allowing for one value to be chosen first and 'corrected' later may lead to learnability problems. If we adopt the view that 'there may also be specific principles of markedness relating various parameters, which need not and may not be fully independent' (Chomsky 1986:146), fixing one parameter for one particular value may trigger fixation of other parameters in a\way which is consistent with the combinatorial possibilities. Once certain parameters have been set, it might be impossible for the child to retreat from certain choices, because the PLD will not provide sufficient data for correction. Even when the child has already 'reset' the value of the first parameter, for which there is positive data that lead to correction, for some other parameters, which have been set as a consequence of the fixation of the first parameter in the 'flow', there might be no way back. Obviously, this view relies on the assumption that parameters are not fully independent from one another.

3.2.2.3 Parameter setting as a triggering process

<div style="border:1px solid">
Parameter setting is deterministic and automatic.
</div>

We have seen that the process of language acquisition reduces, to a large extent, to the setting of parameters, the 'switches' which can be (automatically) fixed by experience. The idea of language acquisition as parameter setting has been taken to solve the traditional hypothesis-testing models in that the setting process is simple and

---

[22] See, among many others, Saleemi (1992) (Chapter 5) or O'Grady (1997) (Chapter 5).
[23] For arguments against resetting of parameters see, among others, Platzack (1996).

62

mechanical and hence can be more uniform across learners. A brief and clear explanation of what the automatic flipping of parameter switches on the basis of relevant input could be is the one in Fodor (1999: 366):

> *What this means, presumably, is that some immediately accessible property of a word sequence is detected by the learning mechanism, and causes a change in the grammar without there being any intervening computation of consequences or evaluation of alternatives.*

The advantages of such an account are obvious: no thinking process is required, no rules or generalisations need to be detected, no understanding of the relationship between grammars and the languages they generate is necessary. Evidence does not need weighing. The process is extremely simple, mechanical and, consequently, it can explain why learning is fast and uniform.

However, this view is not without problems. Very often the term of hypothesis or hypothesis formation is still present in studies of language acquisition which adopt the principles and parameters model[24]. The main idea behind the switch-setting metaphor is the fact that a model of language acquisition should be able to account for the ease with which the child acquires language in the absence of instruction; that acquisition is something that 'happens' to the child, not 'something that the child does'. Hypothesis formation or hypothesis testing refers to a different type or style of learning[25] which is neither deterministic nor automatic in the way in which parameter setting is assumed to be.

A second important problem is related to the fact that parameters are not always evident in the input. Some sentences may be ambiguous with respect to parameter value(s), at first sight they can be licensed by more than one combination of parameter values (Fodor 1999).

Also, if one assumes the possibility of parameter re-setting, i.e. that parameter fixation is not a once-and-for-all deterministic fact, at least in some modules, then one must also assume that the child adopts and rejects hypotheses with regard to the appropriate value of the respective parameter. Thus, if a deterministic approach is to be adopted, the hypothesis of resetting parameters is no longer tenable.

The P&P approach tried to reduce the searching space such that parameters could be switched to one of the (probably) two possible values[26]. The space is further limited by the fact that setting one particular value to one particular parameter may automatically trigger setting one particular value to a cluster of other parameters. Parameter fixation can be defined as a 'triggering'[27] process, during which the learner can set the value of each parameter possibly only once.[28]

---

[24] See, for example, the following fragment from Chomsky (1986: 55): *In light of the facts of language acquisition, the basic problem is to construct UG so that the class of admissible hypotheses is small, perhaps single-membered.*

[25] For a different point of view, according to which parameter setting is defined as hypothesis testing, see Goodluck (1991).

[26] This does not imply that one and the same language should choose one single value as a possible option. Chomsky (1992) speculates that Arabic may have both +strong and + weak Tense. If this is true, then this learnability story might need revisiting.

[27] Fodor (1978)(cited in Goodluck 1991) points out that there is a clear difference between triggering and learning. Learning is defined as an externally occasioned change in epistemic state where there is a relation of content between the learner's representation of the externally occasioning event and the change in epistemic state (for example, if one observes tokens of red London buses one comes to believe that London buses are red; also if one is told that London buses are red one will come to believe that London buses are red). Triggering is an externally occasioned change in epistemic state where there is an arbitrary relationship between the representation of the external event and the change in epistemic state (for example, after receiving a blow on the head, one might come to believe that he/she is the queen of Denmark).

[28] As will be shown in 3.3.3, the learning model of Gibson and Wexler (1994) assumes a different view: the learning system randomly chooses one value on the basis of the input and relies on its possibility to correct the value later.

If one accepts this line of reasoning, the next problem that needs solving is related to what exactly in the input which the child receives can count as a 'trigger': a whole sentence, as argued in Gibson and Wexler (1994) or a subpart of a sentence, as argued in Lightfoot (1991, 1998) and Fodor (1998)?

Given the fact that triggering is automatic, the second important question addresses the possibility of mis-triggering and, consequently, of re-setting of parameter values. Can mis-triggering be avoided? If it cannot be avoided, what does the learner do in order to get rid of a 'wrong' setting? Within Gibson and Wexler's learnability model, mis-triggering is allowed: the child may mis-set a parameter and then, on the basis of the PLD, he/she will change the value previously associated with that particular parameter if a certain sentence in the input cannot be syntactically analysed with that particular value. With Fodor (1998), the child can set the parameter value only once.

Let us consider three learning models relying on a P&P approach to the computational system and see what possible answers one might provide to the above questions.

3.3 P&P and Learnability

3.3.1 Cue-based acquisition and degree-0 learnability

Degree-0
Learnability:
in order to set
parameters,
the child has
to look for
cues in
unembedded
binding
domains.

While ST led to learning models which proposed that children could acquire language on the basis of complex input, the P&P model provided the framework for a theory of learnability whose main idea is that parameters are set by structurally simple data, defined as unembedded binding domains. Hence the name of Degree-0 Learnability (i.e. 0 levels of embedding) (Lightfoot 1989, 1991, 1994). The task of the learner is, within this model, 'to scan the linguistic environment for cues only in simple syntactic domains' (Lightfoot 1999:139) where 'cues' are defined as 'some kind of structure, an element of I-language' (Lightfoot 1999: 139). During the acquisition process the child looks for abstract structures. For example, a cue-based learner of English can set the Specifier-head parameter on exposure to the phrase *John's hat* (where *John's* occurs in the Specifier position, preceding the head of the DP, *hat*, when he/she has a partial analysis of the input form as separate words. The learner is assumed to look for such cues only inside structurally simple domains. Let us see then what counts as a structurally simple domain. The hypothesis of degree-0 learnability builds on the assumption that an element's binding domain is the first CP which contains an accessible SUBJECT[29] and that 'a degree-0 learner sets parameters on the basis of data not from embedded clauses, which would obviously be too restrictive, but from unembedded binding domains' (Lightfoot 1994:458). Parameters are set on the basis of data from matrix clauses plus the so-called 'connection points' (i.e. elements which play a part in selectional restrictions, in subcategorisation frames or in linking time reference) with embedded clauses:

(29)   [$_{CP}$ SPEC C [(NP) I...]]

Lightfoot's hypothesis captures the distinction which Emonds (1976) drew between root and structure-preserving transformations or Ross's (1973) Penthouse Principle, which said that operations in embedded clauses represent some subset of operations in matrix clauses. In terms of learnability, this insight translates into the hypothesis that if parameters can be set on the basis of the data provided by unembedded binding domains, then whatever affects embedded domains is a by-product of what affects matrix domains, i.e. the LAD requires only main clauses in the input.

---

[29] An accessible SUBJECT for an element is defined as the AGR of finite clauses or the first c-commanding NP with which that element can be co-indexed without violating any grammatical principles.

Let us now examine how degree-0 works. Rizzi (1982) argued that one of the parameters which distinguish between languages like Italian, on the one hand, and languages like English, on the other hand, is that in English NP and IP can be bounding nodes whereas in Italian the bounding nodes[30] can be NP and CP. This difference could account for why the Italian sentence (30) is correct (*a cui* can move across two instances of IP because IP is not a bounding node in Italian) whereas its English counterpart (31) is incorrect (IP is a bounding node in English):

(30)   *Tuo fratello$_i$ [a cui$_i$ [$_{IP}$ mi domando [$_{CP}$ che storie$_j$ [$_{IP}$ abbiamo raccontato e$_j$ e$_i$]]]], era molto preoccupato.*

(31)   **Your brother$_i$ [to whom [$_{IP}$ I wonder [$_{CP}$ which stories$_j$ [$_{IP}$ they told e$_j$ e$_i$]]]] was very troubled.*

According to such an analysis, the child would need access to degree-2 data in order to set this parameter. However, Lightfoot (1989, 1991) argues that the parameter can be fixed on the basis of simple triggers. A sentence like (32) can provide evidence that IP is not a bounding node for Italian:

(32)   *Ne$_i$ ho visti [$_{IP}$ [$_{NP}$ molti e$_i$] corregli incontro]*
of them (I) saw many run towards him

Ne has moved over NP and IP in a monoclausal structure. The child acquiring Italian can learn that IP is not a bounding node in his/her target language only on the basis of simple data, i.e. from unembedded sentences.

Thus, the child can look for cues in simple, Degree-0 domains. But what kind of structure available in such simple domains can count as a cue?

Lightfoot provides an example from the domain of V2. In V2 languages, such as German, Swedish, Danish or Norwegian, the finite verb in the matrix must always occur in second position, whereas the first position is occupied by an arbitrary constituent of type XP:

(33)   *[Pünktlich, korrekt und logisch] sind die Deutschen.*
Punctual, correct and logical are the Germans

(34)   *[Einige Dinge] findet sie auch positiv.*
Some things finds she also positive

(35)   *[Sie] arbeitete als Lehrerin.*
She worked as teacher

(36)   *[Hier] kann man Rad fahren.*
Here can one bicycle ride-INF

(37)   *[Außer der Bibel] hat sie in ihrem Leben kaum etwas gelesen.*
Except for the Bible has she in her life hardly else read

As can be seen in the German examples above, the finite verb is always preceded by an XP constituent: AP in (33), DP-direct object in (34), DP-subject in (35), AdvP in (36) or PP in (37). The finite verb moves to Infl and then to Comp, and the Specifier position of CP hosts an XP constituent:

---

[30] A bounding node is a constituent (IP, CP or NP) which represents a boundary for movement. The bounding nodes are subject to parametric variation. The Subjacency condition states that movement cannot cross more than one bounding node.

(38)
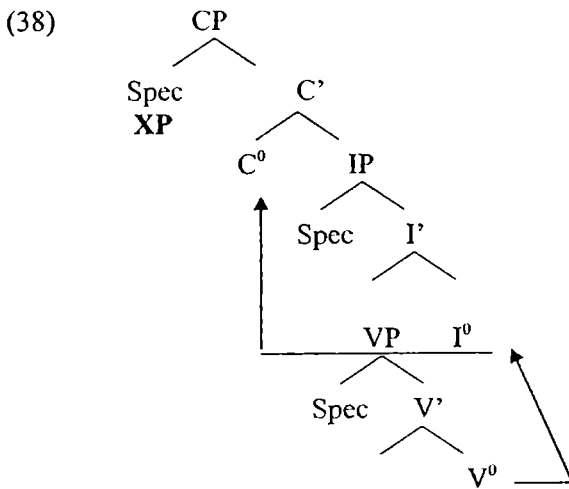
Whenever the Specifier is lexically filled, the finite verb must move to Comp or else the sentence is ungrammatical:

(39)　* *Hier man kann Rad fahren.*
　　　Here one can bicycle ride

How does a child acquiring a V2 language realise that the target language is V2, i.e. that the finite verb in the matrix must always occur in second position? What exactly in the input triggers the correct setting of the V2 parameter? Within a cue-based learnability model, what the child needs to learn is that matrix clauses begin with an arbitrary XP and UG provides the rest of the information: lexical material in the Spec of CP must be licensed by a lexically filled Comp (Lightfoot 1991,1999). The cue is the abstract structure given in (40) below:

(40)　　　　Spec$_{CP}$ [XP]

The cue must be robust, in the sense that it should pass on clear information with respect to the position to which the verb must move. If the XP in the cue is a DP-subject, the cue will not be robust: in this case, there is no clear evidence that the verb must move to Comp, since the DP-subject could also land in Spec of Infl with the finite verb occupying Infl. The input should provide a reasonable number of utterances with initial non-subjects XPs so that the cue might meet the criterion of robustness.

The child's task is to look for such cues in simple syntactic domains: *children's linguistic development results from their finding certain abstract structures in their chaotic environment, in much the same way that the development of their visual system results from exposure to very specific, abstract, visual stimuli like edges and horizontal lines. This is pretty much what one would expect of selective learning quite generally.* (Lightfoot 1999:19). Data from the acquisition of V2[31] seem to support the view that children seek for cues in simple domains: Dutch and German children know that the verb can occur in sentence final position before they know how to use embedded clauses.

Lightfoot provides further arguments in favour of his hypothesis from the area of language change and from the domain of creole languages, showing in what way his learnability model can also account for the change and development of languages. A very important assumption which lies at the core of the model is that the child is not seeking to match the input. According to Lightfoot, any input-matching model of learnability cannot account for language change or for the creation of creoles, where the child creates an output grammar different from the one provided by the speech of the elders. For example, the

---

[31] For a different analysis of the acquisition of V2 (in German) see Weissenborn (1999).

Guyanese creole language Berbice Dutch is an SVO language. The two languages on which it is based are Dutch and the Kwa language of Eastern Ijo, which are both underlyingly SOV, order which is surfaced as such in embedded clauses but almost never in matrix clauses. This empirical fact, argues Lightfoot, points to the fact that the Guyanese children relied on matrix clauses when setting the VO parameter. If they had relied on embedded domains, Berbice Dutch would be an SOV language, not an SVO one.

The Degree-0 hypothesis is both restrictive and quite radical[32]. However, if one assumes a P&P approach to language acquisition, this hypothesis is in the spirit of the model. In spite of the problems such a learnability theory might raise, it has pointed out that one should look for principled constraints on the type of data on which the LAD can depend.

A cue-based model of acquisition can also account for the possibility of language change. If one adopted the view that the child is looking for grammars which necessarily match the input', one could not account for why certain parameter values changed in the history of particular languages.

3.3.2 The structural templates hypothesis

Fodor (1998) develops a similar learning model. She defines triggers as 'small structural templates that are innate, are stored by the language faculty, and constitute the parametric options offered by UG for languages to make use of if they choose to' (p.19). The task of the learner is to detect which of these templates (or 'treelets') are for the target grammar. The learning system which she creates is able to avoid mis-triggering due to ungrammatical or unambiguous input, i.e. a system which is endowed with the skill of detecting ambiguous/unambiguous input and respond differently to each of the two types. The learning model she adopts is the one in which parameters can only be set once. If the input is ambiguous, the learning system simply 'waits' for unambiguous input to set parameters.

Within her model triggers are allowed to include structure, they are 'structural templates', 'syntactic subtrees' (p.18):

> *Each parameter value is thus associated with its own structural (or in the limiting case, featural) signature, that is, with whatever constitutes its essential contribution to the sentence structures that are licensed by grammars which have that value.* (Fodor 1998:17)

One problem still remains to be solved: how does the learner (come to) know which subtree, which treelet can count as an appropriate trigger? The answer is more difficult to find than it might look at first sight since with Fodor many parameters cannot be set on the basis of the 'surface' input. Many sentences may be ambiguous in this respect. This suggests that the child has to rely on an analysis of the underlying structure. Sentences have to be assigned a full structural description of all levels of derivation before the child can detect the cue which will trigger the appropriate setting of the parameter value related to that cue. The claim is that treelets are underlying syntactic structures which act as global triggers. For example, a sentence like (41), with the structure in (42), is an unambiguous trigger for the parameter value Verb-Object (VO):

| The cues to parameter fixation are underlying syntactic structures. |

(41)   *Mary saw me.*

---

[32] For commentaries on Degree-0 learnability, see the Open Peer Commentary section in Lightfoot (1989). Also, for arguments in favour of the need of embedded domains for parameter setting, see Roeper and Weissenborn (1990).

(42)

```
                CP
               /\
              C'
             /\
            IP
           /\
         NP    I'
        Mary   /\
            Vᵢ+I   VP
            saw    /\
                 V    NP
                 tᵢ   me        (Fodor 1998:15)
```
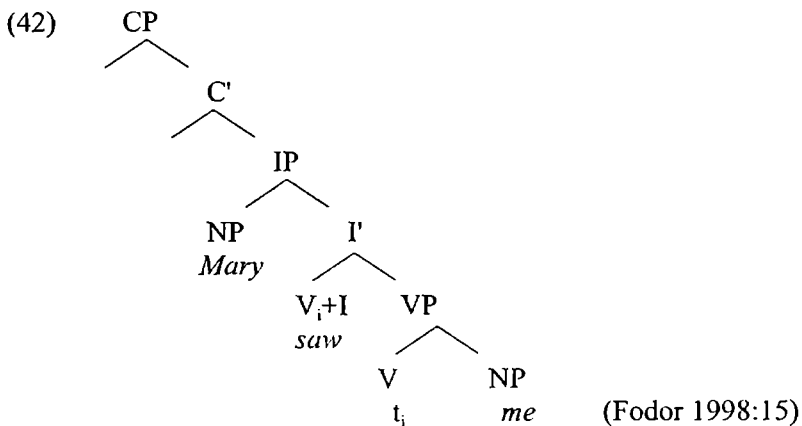
But the VO value of the parameter is not given by the surface word order, but by the fact that the direct object is to the right of the trace of the verb, i.e. by the underlying order of constituents. Which actually means that the treelet acting as a trigger is the one in (42); what is relevant for the setting of this particular parameter, is not the whole sentence, but only the structural sub-tree of the whole clause given in (43):

(43)

```
        VP
       /\
      V    NP
```
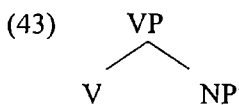
Learning is defined as incremental, in the sense that only one parameter can be set per input sentence, even when the sentence provides an unambiguous input for several parameters. Treelets serve both as the parameter value and as its trigger. More significantly, these triggers are global; they occur in every language which evinces that particular parameter value.

How does the learner recognise a trigger on the basis of the input which he/she receives? As a trigger, the treelet must be identified in the structure assigned, via parsing, to the input sentence. The learner tries every grammar out on this input sentence in order to see if more than one of them is successful. The sentence counts as unambiguous only when one single grammar is successful. Fodor identifies this recognition problem with a perceptual problem and reduces it to the ideal parsing test in which the learner parses the input sentence only once and knows which structural triggers are contained in the input. The child knows the structural triggers because they are part of UG[33]. Thus, within this learning model, the grammar for a particular language consists of: (i) the principles of UG; (ii) a lexicon; (iii) universal structural resources, as for example, X-bar format; (iv) a set of parameter values/structural triggers provided by UG. With this grammar, the learner parses the input sentences. If only one analysis is found, the input is unambiguous and the learner fixes the parametric values. If more than one analysis can be found, the input is ambiguous and hence it is safe for the learner to wait for an unambiguous input.

Such a view differs from the one put forth in Chomsky (1995), for example, where parameter values are metaphorically associated with the different positions of a switch. Within Fodor's model, both values of a parameter are provided by the grammar with which the learner parses the input. But only one value can be used during a parse.

One advantage of this model is that children are no longer attributed psychological processes different from those of adults. The trigger structures they need in order to parse the input are the ones which adults use in parsing the same input. Also, we avoid the 'resetting'- of- parameter- story, which is not without problems. At the same time, it is more in the spirit of the 'deterministic' parameter fixation process

---

[33] In this, Fodor's view is along the line put forth by Dresher and Kaye (1990) or Dresher (1998), according to which UG provides both the set of parameters and a cue for each parameter.

adopted within a P&P approach to acquisition and, by putting forth the hypothesis that triggers are 'sub-trees' and not whole sentences it can account in a more elegant way for the acquisition process in the absence of a rich, non-deficient input.

3.3.3   The Triggering Learning Algorithm

Unlike Lightfoot or Fodor, Gibson and Wexler (1994) take whole sentences as possible triggers: 'there are sentences in the child's experience that point directly to the correct settings of the parameters. [...] for any setting of a non-subset parameter, there is a sentence that is grammatical under that setting but not under any other'[34] (p. 408). The parameter space is assumed to unambiguously signal the value of one single parameter, i.e. small changes are preferred to larger ones. They posit the so-called Triggering Learning Algorithm under which the child uses his/her current grammar to syntactically analyse sentences provided by the input and changes the previous hypothesis about this current grammar (for example, the value of a certain parameter) only when the sentence cannot be syntactically analysed on the basis of the previous hypothesis (the TLA is error-driven). The algorithm analyses the next piece of input. If the sentence can be accepted as 'grammatical' using the value already assigned to that given parameter (i.e. using the current grammar), nothing happens. But if the sentence cannot be parsed, the algorithm will change the value of the parameter.

> The child has to analyse the whole sentence in order to fix the value of a parameter.

A parameter is (more often than not) randomly selected (if it does not have a default initial value) to have its value changed and the new value is adopted (at least for a while) only when it allows the syntactic analysis of the new sentence. The new value is not necessarily the correct one: it only allows the analysis of the current sentence and it may have to be changed again. However, the child will finally converge on the correct grammar: it is assumed that there is always at least one trigger for an incorrectly fixed parameter value. In the process, the learner relies only on positive evidence. Memory of previous parameter settings is not required.

One can see that, on such an account, parameters can be set and re-set, in a step-by-step process. The learner changes one parameter at a time, since, as has already been said, small changes are preferred.

Within Gibson and Wexler's learnability model, triggers fall into two classes: global and local. A global trigger for the value v of a parameter is defined as a sentence that is grammatical if and only if the value of the parameter is v, no matter what the values for other parameters are (p. 409). For example, the pattern Subject Verb works as a global trigger for the value Spec-first of the specifier-head ordering parameter. A child acquiring English, upon hearing the ordering Subject Verb, will end up hypothesising a Spec-first value in order to be able to syntactically analyse the current sentence. So far, no value for the complement-head parameter has been selected, since a trigger of the type Subject Verb allows for both comp-final (SVO) and comp-first (SOV) orderings. The value of the Specifier-head parameter has been selected without taking into account the comp-head ordering. Since English is an SVO language, how does the child converge on the correct grammar? The local trigger, a sentence of the type Subject Verb Object, which is correct only if the value for the comp-head parameter is comp-final, will allow the child to fix the correct value of the comp-head parameter and hence converge on the correct English grammar.

However, there are certain situations for which there exist no triggering data, be they global or local.[35] The learning algorithm is 'trapped'. This so-called *local maxima*

---

[34] This reminds of Morgan's Degree-1 learnability model, since no embedded sentences are considered possible triggers.

[35] Actually, in the end the authors abandon the idea of global and local triggers in favour of the so-called deductive triggers.

69

problem can be, nevertheless, avoided because (i) some parameters have default values and (ii) some parameter values may mature. An example of such a situation is the one related to the V2 domain in Dutch and German. What can the TLA do for the German or Dutch child to help him/her finally fix the correct parameter value? It is hypothesised that some parameters (one or two) receive a default initial value from the set of possible values while others are initially unset. The child begins with default initial values being allowed to change only a subset of parameters for an initial period of time. The other parameter(s) will be considered at a later stage. Thus, in the case of V2 languages, it is assumed that there is a default value for the V2 parameter, -V2. The child will only try to fix the values of the specifier-head and complement-head parameters: if the hypothesised grammar does not allow the analysis of the current sentence, the value of the parameter will be changed. It is only after the values of these two parameters have been set that the child considers the alternative value for the V2 parameter.

Gibson and Wexler's model actually implies that the learner hypothesises that there are two types of parameters: parameters whose value is not fixed and parameters which can have a default value. Moreover, the default value is assumed to be different from the correct value of that particular parameter in the target language. This further implies that the child simply knows he/she does not have to consider some parameter(s) for a certain amount of time. The hypothesis from which the child starts with respect to some parameters must be false. The model also stipulates that there is a fixed parameter ordering: the child has to consider the parameters whose value is not pre-specified first and only later (maturation?) to consider the parameter(s) with a default setting. It does not, however, say anything with respect to the ordering of the setting within the class of unspecified-value-parameters[36].

4. Acquisition from a Minimalist Perspective

4.1 New focus of inquiry

The Minimalist Program (MP) (Chomsky 1993, 1995, 1998, 1999) builds on assumptions already present in the P&P, but with a shift in focus. The main area of inquiry regards the optimality of design of the language faculty. A genuine explanation of why language is the way it is represents the goal of minimalist inquiry. The program is not really what one would have expected in terms of descriptive strength. But it certainly represents a gain in terms of a deeper understanding or at least deeper inquiry into the nature of the computational system of language.

The tension between descriptive and explanatory adequacy is this time being solved with an obvious bias towards the explanatory part. The puzzling link between the derivational approach to language and the condition of explanatory adequacy, on the one hand and the nature of the mind/brain on the other hand, has never before been as clearly and strongly assumed. The Minimalist Program is not, actually, a fully developed theoretical model which readily allows for the technical description of empirical data. It is a 'program' which provides a framework of inquiry into the study of language[37]. The Minimalist Program as presented in Chomsky (1998, 1999) already revisits ideas presented in Chomsky (1995) and Chomsky (1993). But the new solutions are all in the spirit of the program, they do not represent a radical shift from the core as they do not represent a radical shift from earlier generative assumptions (especially the ones of

---

[36] For a more detailed discussion on how the model works, as well as on its advantages and disadvantages, see Dresher (1998) or Berwick and Niyogi (1996).

[37] 'At the methodological level, the program has certain heuristic and therapeutic value. It brings to light what might be fundamental problems, where empirical evidence and minimalist expectations conflict. And it encourages us to distinguish genuine explanations from "engineering solutions".' (Chomsky 1998: 5).

70

P&P), which find a better explanation or a better formulation or which are now questioned from a perspective enriched with the results of generative inquiry. Language is still viewed as a component of the human mind/brain, a faculty with which humans are endowed from birth, uniform for the species. Linguistic development is defined, as in previous models, as the change from an initial state S_0 ('constituted of invariant principles with options restricted to functional elements and general properties of the lexicon' Chomsky 1995: 170) to a final state S_f, an idealised I(nternal)-language, a complete specification of parametric option, on the basis of experience (PLD). UG provides the invariant principles of S_0 as well as the parameters which represent the range of permissible variation. The approach to language is, as always, derivational, and linguistic expressions are defined as a sequence of representations along the derivational process. Language is seen as consisting of a lexicon and a computational system. What is then the contribution of the Minimalist Program to the study of language?

In what follows, let us briefly present how the program views the lexicon and the computational system as well as the relation between them and how this may shed new light on old questions, with a focus on the questions related to acquisition.

4.2 The Minimalist Program in a Nutshell

4.2.1 The general organisation of grammar

The general organisation of grammar assumed within a minimalist approach is the one in (44):

(44)   LEXICON
                |
                ↓
            SPELL-OUT
             ╱   ╲
    PF level   LF level
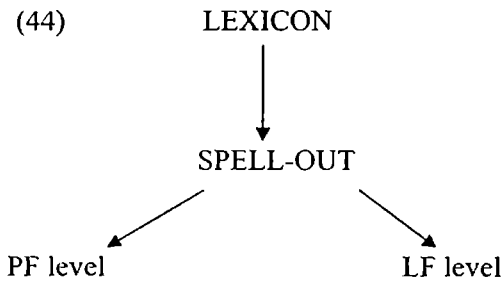
> MP: only the external levels (PF and LF) have been preserved. Linguistic objects must satisfy conditions imposed by these two levels.

As can be noticed, the assumed organisation is simpler than the one adopted within the P&P model. The only available levels are the external ones: the level of Phonological Form (the articulatory-perceptual interface) and the level of Logical Form (the conceptual-intentional interface, the place where linguistic expressions interface with the cognitive systems). D-Structure and S-Structure have been eliminated. Within a ST approach, Deep Structure represented the only input to the semantic component, with surface structures playing no part in the semantic interpretation of linguistic representations. In a P&P model, D-Structure represented the internal interface where the relation between the lexicon and the computational system was expressed. The information at D-structure was no longer assumed to be directly sent to the semantic component. It was mapped to the level of S-Structure and then to LF. Essentially, the D-Structure information as such was not directly accessible to the performance systems. Within the minimalist model, each derivation has to meet the interface conditions: those of the PF level and those of the LF level. Some parts of the computational system are relevant for PF, other parts are relevant for LF. A linguistic object is defined as a pair (a, b), a formal representation of sound and meaning, satisfying the PF and the LF conditions. When these are met, the derivation is convergent. When they are not met, the interpretation is deviant. As can be seen, the role of the interface levels, i.e. the point of interaction between language and the sensorimotor systems, on the one hand, and

71

language and modes of thought and understanding, on the other hand, gains in significance. On such a view, there is no justification for any additional level. Observed properties of language are accounted for in terms of legibility conditions imposed by the two available visible levels and by properties of the computational system of language.

What are the consequences of this new picture for the computation? On P&P assumptions, the information in the lexicon was projected to D-Structure via the Projection Principle and constrained by the Theta-Criterion, with the tension regarding the primacy of syntax vs. semantics already mentioned. With no D-Structure available, there is no justification for the two principles to be postulated and the tension disappears[38]. Postulating only two interface levels, the external ones, as well as preferring operations required by these interfaces represents an obvious gain in the direction of explanatory adequacy which requires that 'parameters be easily detectable for language acquisition' (Chomsky 1999:2). Also, importantly, the complexity of computation is reduced.

4.2.2. From the Lexicon to PF and LF

4.2.2.1 Remarks on projections

Let us see now how the information from the lexicon is taken over by the computational component within a minimalist model. An array of lexical items is selected from the Lexicon via an operation Select. The array of lexical items selected from the Lexicon is called Numeration and it contains, in simple terms, the entities from which syntactic objects, such as sentences, will be formed:

| Syntactic objects are created via Merge and Move. |

(45)   LEXICON
           ↓ ←
           ↓ Select

Numeration /Lexical array
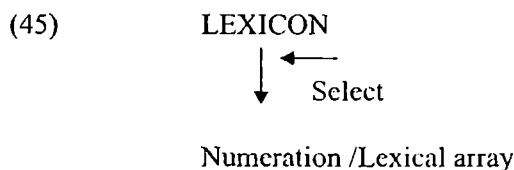
A Numeration consists of pairs of the type (LI, i), where LI stands for a linguistic item and i for its index, i.e. for the number of times the item has been selected in the Numeration. Its psychological counterpart could be defined as 'what the speaker has in mind'.

| Projections are created via Merge, externally determined. |

The computational system, which can access only the Numeration, not the whole lexicon, maps the Numeration into a syntactic object (LF and PF can interpret only single objects), via permissible operations which recursively construct syntactic objects, until all indices are reduced to zero. The core operations which apply are *Merge* and *Move*.

The minimalist definition of the lexicon does not radically differ from the one adopted in previous studies. However, it is worth pointing out that the inventory of functional categories available in the lexicon is reduced:

> *It is clear that the lexicon contains substantive elements (nouns, verbs) with their idiosyncratic properties. And it is at least reasonably clear that it contains some functional categories: complementizer (C), for example. But the situation is more obscure in the case of other possible functional categories, in particular T, Agr, specific phi-features, a Case category K, and so on...* (Chomsky 1995:240).

This suggests that functional categories may actually fall into at least two different classes, with different properties, whose acquisition depends on the amount of computation and/or lexical learning involved in the process.

---

[38] But see Uriagereka (1999) for the defence of D-Structure within the Minimalist Program.

72

One more thing worth pointing out is that the MP focuses more than the P&P model on the idea that all categories are to be defined as sets or bundles of features[39].

In earlier versions of the MP (1993) the information stored in the lexicon simply projects to an X-bar structure, i.e. the format of X-bar is still assumed to be provided by UG, just as in P&P. In Chomsky (1995,1998, 1999) projections are assumed to be determined by the relational properties of the categories which constitute them and are created via Merge, with standard X-bar theory being thus largely eliminated. Projections are the result of a simple operation, Merge.

4.2.2.2 Merge

Merge is the simplest operation which takes a pair of syntactic objects, forming a complex syntactic unit out of the ones provided by the Numeration[40] or already constructed in the derivation. Suppose we have two objects a and b. In earlier versions of the MP, if *Merge* applies to these two objects, a new larger object will be created: $\{c,\{a, b\}\}$, where c stands for the label of the new object, determined derivationally: if a projects and is the head of the new object, its label will be a: $\{a, \{a,b\}\}$. If b projects, the label of the new object will be b: $\{b, \{a, b\}\}$. Merge (a, b) is thus asymmetric, allowing either a (46a) or b (46b) to project:

(46) a. a
```
      a      b
```

(46) b. b
```
      b      a
```
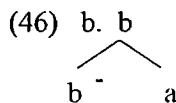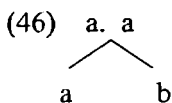
The 'wrong' option is filtered out at LF, by various principles. For example, if a verb like *eat*, and a direct object DP, *chocolate*, Merge, the option with a DP label (47b) is filtered out by theta theory, with (47a) being the only possibility:

(47) a. VP
```
      eat      chocolate
```

(47) b. *DP
```
      eat      chocolate
```
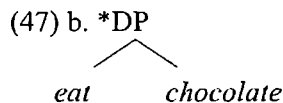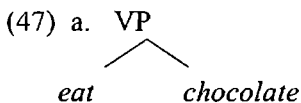
The X-bar format is thus radically simplified, the idea of binary structure is the only one that has been preserved.

Why is it desirable to replace the X-bar format with *Merge*? What does it actually mean for the computational system? On these assumptions, items from the lexicon project not because of some postulated format rules, which are given on grounds of virtual conceptual necessity, but because of conditions imposed by the interface. Only single objects can be interpreted by LF and PF; smaller objects must hence merge into a larger one which can be interpreted. *Merge* is externally determined. Recall that when two objects merge, either can be a head and project. Thus, the headedness property is accounted for by the *Merge* operation and hence derivative from external conditions.

The child will have to learn the properties of the items stored in the lexicon and set the correct value to parameters. No format rules have to be assumed anymore. Lexical and functional items are projected via a simple, binary operation, *Merge*. In terms of computational cost, this is the least costly operation. If one assumes that

---

[39] One should stress, however, that this idea goes back to Chomsky (1970) and that it underlies X-bar theory: 'In the earliest work in generative grammar it was assumed that the elements of the underlying base grammar are formatives and categories; each category corresponds to a class of strings of formatives. [...] it was soon found necessary to depart from this assumption in the case of lexical categories [...]. We might just as well eliminate the distinction of feature and category, and regard all symbols of the grammar as sets of features.' (Chomsky 1970:48).

[40] See Collins (1997) or Johnson and Lappin (1997) for arguments against the use of numerations from the perspective of performance theory.

computational complexity matters for linguistic development then one can also assume that *Merge* should be the only operation present in early child syntax during very early stages. This hypothesis is borne out by data. *Merge* receives direct representation in early child syntax which it can account for and from which it can, at the same time, receive strong motivation. The existence of *Merge* allows us to account for early lexical stages in acquisition, when children adjoin lexical items between which there is no unique relation in adult grammar:

(47)   a. ***more car/ more cereal/more read/more hot/ more walk***
        b. ***no bed/no home/no wet/no high/no fix/no plug***   (Powers 1998)
        c. ***are you put this on me/are you help me/are this is broke/are you sneezed*** (Roeper 1994)
        d. *toto **auch**/ich **auch**/hauschen **auch*** (Tracy, Penner and Weissenborn 1993)

Items such as *more* or *no* represent, at this early stage, heads of Merge projections:

(48) a. *more*   (48) b. *no*

    more   X   *no*   X

They differ from other entities: they are lexically specific (Roeper 1996) and semantically stable (Powers 1998) and their projection is not to be found in adult grammar. Such phrase markers exist only in child syntax. Powers (1998) proposes that these elements behave like semi-lexical items defined by the following properties:

(i)   they have the same semantic features as target lexical items;
(ii) they have different (or none of the) syntactic features than (of) target lexical items;
(iii) seemingly, they have the same distribution as truly grammatical functors.

The operation of *Merge* makes the existence of such representations possible. Once the Numeration has been selected, elements are syntactically connected as Spec-head (49a) or Head-complement projections (49b), before the emergence of the more complex specifier-head-complement structures (49c)[41] (Roeper 1996):

(49)   a.
       Specifier   head
       Mommy   *sock*   (used for *Mommy's sock*)

       b.
    head   complement
     more   *car*

       c.
    Specifier
      Head   complement

---

[41] Notice that if this assumption is true, its implication will be that in early child syntax no distinction is made between the complementizer and the specifier positions. In the 1993 version of the MP, the complement and the specifier represent different domains, the checking and the internal domains of the head, and the specifier position is associated with *Move*, an operation which is not available at an early stage according to this developmental account.

74

An approach to syntactic development in terms of *Merge* can elegantly capture the acquisition sequence from the single-word speech to later multiword speech, which can be now defined as successive applications of *Merge*:

> [...] *the operation Merge applies and reapplies to the syntactic objects (the phrase markers already constructed) yielding longer and more complex structures.* (Powers 1998: 4)

(50) a. *Single word speech*   *Early multiword speech*

    [*see*] [*ball*]   Merge ⟶

                                see   *ball*

b. *Early multiword speech*   *Late multiword speech*

     see   *ball*   Merge ⟶   VP
        [*girl*]

                              girl   K
                                        see   *ball*
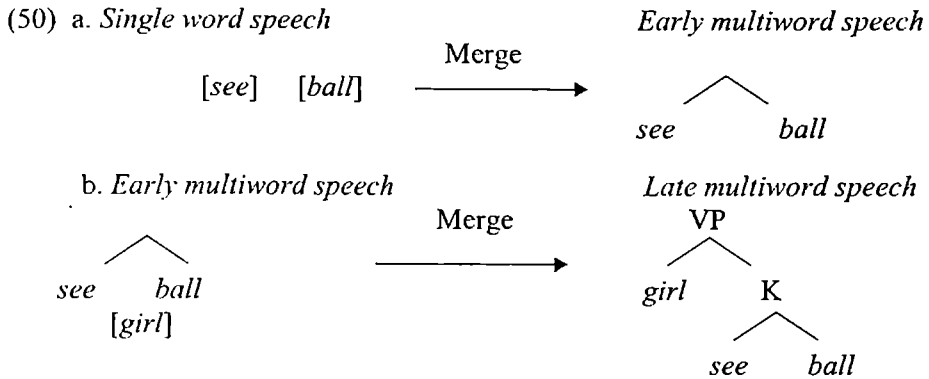
The existence of these *Merge* structures, 'micro-steps of acquisition' (Roeper 1994:14), in early child speech, whose sequence reflects the sequence of syntactic representations, provides evidence for *Merge* as a core property of the computational system, especially if one adopts the view that *the grammar constructed by the child is a derivational one, and that this is later converted into alternative formats* [...]. *This would mean that the study of acquisition* [...] *would give a unique purchase of grammar in the derivational mode* (Lebeaux 1988).

A few remarks are in order here with respect to the implications of the earlier definition of *Merge* (Chomsky 1993, 1995) for the computational complexity involved in the process. On the one hand, *Merge* is assumed to be the simplest, the least costly operation. On the other hand, providing the appropriate label to the associative object created via *Merge* was said to be decided on only at LF. This implies that one has to 'look ahead' in order to avoid the 'wrong' projection. Or, looking ahead, in its turn, implies substantial computational complexity. We are thus faced with an operation which is defined as the least costly but which involves, at the same time, computational complexity. The implications for acquisition are obvious. In order to avoid this 'puzzle', in Chomsky (1998) it is proposed that the label of the new syntactic object created via *Merge* is determined by the selectional properties of the merging elements. For example, a verb and its direct object DP merge to satisfy the requirements of the verb which, being the *selector*, will determine the label of the new object:

(51)   {*eat*}{*chocolate*} ⟶ {*eat*{*eat, chocolate*}}

The wrong label is no longer detected as late as LF and 'look ahead' is eliminated since only one single label is possible. *Merge* is indeed the least costly operation. But, if it is now defined as relying on the selectional properties of the items in the Numeration, what would the implications for acquisition be? How can one account for those early two word structures which are made of two items adjoined according to relations different from the ones available in adult syntax (see 47)? There seems to be no selection involved in *more car*, for example. In Chomsky (1998) a distinction is made between *set-Merge* and *pair-Merge*. The former operation can apply only to two elements which stand in a kind of selectional relation whereas the latter does not involve such a relation (for example, the merger of an adjective and a NP). Early grammars may use only *pair-Merge*, possibly because the selectional properties of items have not been acquired yet.

4.2.2.3 Move

The second important operation is *Move*. Within a P&P model, any syntactic object could be moved to a target position leaving behind a trace with which it formed a chain. Constraints on movement were derivative from various principles. For example, under the VP-Internal Hypothesis the subject was assumed to be generated in the Spec position of the VP from which it then had to move (in languages like English) to satisfy the Extended Projection Principle[42]:

(52)
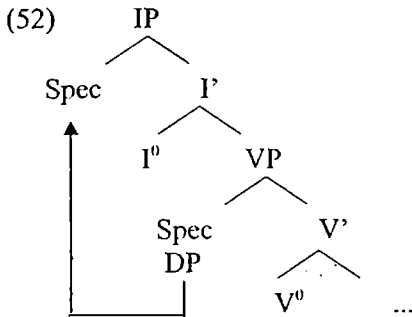
Crucially, items were taken from the lexicon uninflected and inflectional morphemes were assumed to head projections on a par with lexical items. In (53) below the affix *-s* is assumed to lower and adjoin to the bare, uninflected lexical verb. Then PF rules will interpret the complex *arrive + -s* as a single inflected phonological word.

(53)
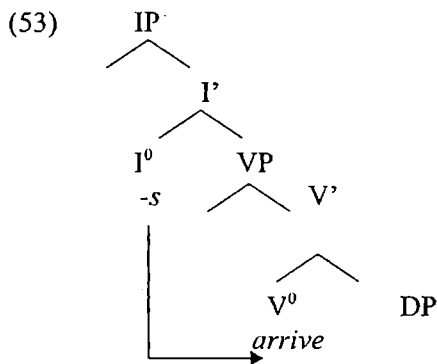
Within MP, Move is still defined in the same way: the operation via which an item moves to a targeted position leaving behind a trace with which it forms a trace. The crucial difference is that such operations are now assumed to be driven by morphological necessity, by features associated with functional categories such as Tense, Agreement or Determiner. Items are drawn from the lexicon fully inflected. *Arrives*, for example, has all its inflectional features (Tense and Agreement) in the lexicon and enters the derivation as such. Affixes are associated with features which have to be checked against the appropriate inflectional projection, i.e. they have to agree or to match the (abstract) features represented in the functional heads. Abstract features seem to be more relevant for the computational system than the overt morphology itself.

Overt movement is seen as feature-driven movement, in an attempt at checking the so-called strong (uninterpretable) features which are not allowed to survive at LF. The dislocation property of language is thus associated with uninterpretable features. Weak (interpretable) features can procrastinate, they can wait until LF, where they trigger covert movement. PF can only 'see' the lexical item, features are not visible at this interface level. Once they have been checked, they disappear and the item can Spell-Out, since interface

---

[42] The Extended Projection Principle (EPP) requires that sentences must have subjects.

requirements are met. If a feature remains unchecked, the derivation crashes. Notice that *Move* is driven by morphological features, which differ from one language to another. Movement is not required by some general principle, but by language-specific properties which can elegantly account for the different word orders available cross-linguistically in terms of morphological variation. Word order is visible in the linguistic input; being determined by morphological features, it can help the child to determine the properties of grammatical formatives.

Move is subject to conditions of economy: it must choose the shortest possible route, either by choosing a smaller number of rule applications (i.e. the shortest derivation) or the shortest possible movement (the so-called Minimal Link Condition).

Economy of derivation is assumed to require a minimum of transformational activity. *Move*, as has been shown above, being a composite of sub-operations, is computationally more complex than *Merge*. This is why it has to apply as late as possible (as *Last Resort*) in the derivation: an element can move only when it really has to move, otherwise it must stay *in situ*.

Such an account of movement is not without problems. On the one hand, the distinction between covert and overt movement is reduced to the distinction between strong and weak features which means, at the conceptual level, that we have to stipulate that movement is driven by *the feature of a feature* (Solà 1996, Chomsky 1998). Also, Procrastinate induces 'look-ahead', i.e. one has to look ahead in the derivation in order to check whether Procrastinate is justified, which is undesirable at least in terms of computational complexity. This approach to movement is also challenged by instances of movement which is not triggered by the need to check uninterpretable features. One such example is EPP (Extended Projection Principle). In the 1995 version, EPP was assumed to be triggered by an uninterpretable feature on Tense. But what EPP actually means is that a DP must be merged next to the predicate, in sentence initial position. Whether the feature on Tense is /is not interpretable is irrelevant (Chomsky 1998, 1999). There are also instances of feature checking without movement, such as the agreement relation between an expletive and the predicate. All these problems led to the abandoning of the distinction between strong and weak features and the intuition that different movements apply at different stages in the derivation (captured in early minimalism in the distinction between movement in overt syntax and covert movement at LF) is now captured by the definition of the derivation as a sequence of phases, with Spell-Out being cyclic (Uriagereka 1997, Chomsky 1998, 1999).

What are the implications of all these facts related to movement for acquisition?

Firstly, in terms of complexity, we have seen that *Move* requires a more complex computation. If we adopt the view that early grammars can only cope with simple computations, then we expect *Move* and phases comprising movement to be available only at later stages of linguistic development[43].

Secondly, the Multiple Spell-Out approach to derivation may represent an appropriate framework which can account both for adult and child syntax. Assuming that computational complexity matters for cognitive development, the main difference between child and adult language will be related to the speaker's capacity of dealing with complex operations, i.e. it would reduce to processing capability. Early two-word utterances, for example, could be defined as the outcome of a 'simple' phase, which does not require any costly or heavy operations. Syntactic development would thus be tied to the child's growing processing capability.

On minimalist assumptions the initial state of the language faculty is defined as comprising an array of (invariant) properties and operations which fall into two classes: assembly operations (which create lexical items) and computational operations (responsible for the formation of more complex expressions out of lexical items formed by assembly operations). This suggests that the child has to notice and learn whatever falls under 'variation' which includes, besides functional categories (or non-substantive

> Move is driven by morphological necessity; the child has to set the correct options with respect to the functional categories in the target language on the basis of the word order visible in the input.

---

[43] See **4.1** for arguments that there is movement in early child grammar.

parts of the lexicon), PF options, lexical arbitrariness (association of concepts and their phonological matrices in the traditional sense), and general properties of lexical items. The child has to set the correct options with respect to the properties (the features) of lexical and functional items on the basis of what is visible in the input. This is possible because 'variety is restricted to easily detectable properties of utterances' (Chomsky 1992:2).

SUMMARY

The main goal of this chapter has been to show that the core cluster of assumptions with regard to language acquisition within the generative approach has remained unchanged throughout its various models: the Standard Theory model, the Principles and Parameters model and the Minimalist Program. The child is endowed with the ability to acquire language, with the faculty of language, which undergoes changes under the influence of the linguistic input and possibly of maturation. The input-output relation is mediated by a device, call it the Language Acquisition Device (LAD), which 'filters' the linguistic input the child is exposed to. It consists of general principles which guide the process of acquisition, restricting the set of possible grammars. And it is exactly the description of this LAD together with the assumptions with respect to the language computational system which have changed from one model to another, in an attempt to meet explanatory adequacy.

	S T	P &P	MP
LAD	Substantive and formal universals + evaluation measure	Principles and (un-set/pre-set) parameters	An array of (invariant) properties and computational and assembly operations

The theoretical assumptions with respect to Universal Grammar as well as with respect to the operations of the computational system led to various learnability accounts:

A. On **Standard Theory** assumptions, the child's task is defined as constructing the transformational component on the basis of the input. The question of what exactly in the input was necessary for the child to be able to detect the appropriate transformations received two main answers:
  (i) the child needs to consider phrases which contain no more than two embeddings (Degree-2 Learnability);
  (ii) the child needs to consider phrases which do not contain more than one embedding (Degree-1 Learnability).

B. On **Principles and parameters** assumptions, the child's main task in the domain of syntax is to set appropriate values to parameters on the basis of the linguistic input. The question is, this time, what exactly in the input can help the child to set this value:
  (i) the child has to look for cues in unembedded binding domains (Degree-0 Learnability);
  (ii) the structural templates which trigger parameter fixation are innate and stored in the language faculty. The child must detect the underlying syntactic structure (a treelet) associated with each parameter value appropriate in the target language (the structural templates hypothesis);
  (iii) the child has to analyse whole sentences in order to fix the value of a parameter (only one at a time), using previous hypotheses about

78

the target grammar. If the sentence cannot be accepted as grammatical on the basis of a previous hypothesis, a new hypothesis (i.e. a new parameter value) will be adopted (the Triggering Learning Algorithm).

C. Since **Minimalism** is still a research program, there is no learnability account grounded in this model.

The second goal of this chapter has been to show how data from language acquisition as well as the need to account for the process of linguistic development have led to significant changes in the generative model, which has always had as a major task the explanation of acquisition.

Further Reading

Advanced: If you want to get a comprehensive view of the generative models discussed in this chapter and "read" them with your own mind, you must, by all means, go to the very source: Chomsky (1965), Chomsky (1981) and Chomsky (1995). For an unusual but extremely captivating presentation of minimalism (and much more), read Uriagereka (1998). Atkinson (1992) is an excellent discussion on how the P&P model deals with acquisition.

Textbooks: If you are a textbook person and a beginner, try Cook (1988), Radford (1988) and Haegeman (1991). If you already have some knowledge of generative grammar and want to know more, read Lasnik and Uriagereka (1988).

Focussed: If you are interested in matters of learnability models grounded in the generative model, read the very studies presented in this chapter. If you want to find out more about how acquisition could affect language change, Lightfoot (1999) is a good choice.

3

MORPHOLOGICAL DEVELOPMENT

MORPHOLOGICAL DEVELOPMENT

Language maximises the distinct advantages of words and rules by comprising both, each handled by a distinct psychological system. There is a lexicon of words for common or idiosyncratic entities – the psychological mechanism designed to handle it is simply a kind of memory. And there is a separate system of combinatorial grammatical rules for novel combinations of entities; the psychological mechanism designed to handle it is syntactic computation. (Pinker 1998:221)

KEY POINTS:
In this chapter you will learn about:
- **accounts of how children cope with regular and irregular inflection**
- **possible explanations of the phenomenon of overregularization in child speech**
- **the causes of regularisation and irregularisation in the acquisition of inflectional morphology**
- **derivational rules and acquisition**
- **children's knowledge of the ordering of constraints of inflectional and derivational rule application**

1. Introduction

Empirical data of early grammars reveal that children go through a developmental stage when they tend to overgeneralize the pattern of regular morphology, producing incorrect past tense forms such as *comed* or *goed* and incorrect plural forms such as *mouses* or *tooths*. To make things even more puzzling, they begin to produce the regularised *goed* after having used the correct irregular *went*, or *mouses* after having acquired the correct plural form *mice*. They also go through a stage when they extend irregular past tense patterns to regular verbs, producing pairs such as *bring-brang* or *trick – truck*.

Experimental studies and longitudinal data also reveal that children are able to extend the regular pattern of inflection to new lexical items and to make use of derivational rules to create new words. This proves that the child is not a rote learner, that he/she is as creative in the domain of morphology as he/she is in the domain of syntax.

Traditionally, morphological rules fall into two main classes: inflectional and derivational. Derivational rules create new words, whereas inflectional rules change the form of a word according to its relation to other words in a sentence, i.e. according to the syntactic environment in which the word occurs. According to the 'split morphology' hypothesis (Perlmutter 1988), all derivational morphology belongs to the lexicon or to the module called the morphological component, whereas all inflectional morphology is treated non-lexically, i.e. it is transformationally derived at the syntactic level (see, for example, Anderson 1982). The weak lexicalist hypothesis assumes that only some derived elements belong to the lexicon, while others are derived transformationally (Chomsky 1970). The strong lexicalist

> Children over-regularise irregular forms, extend irregular patterns to regular or irregular forms, and are able to use derivational rules to create new words.

83

hypothesis, recently incorporated into the Minimalist Program, assumes that items come inflected/derived from the lexicon. At the opposite end, Distributed Morphology (DM) (Halle and Marantz 1993) assumes that both inflectional and derivational morphology are transformationally derived. Vocabulary items are inserted in the syntax at different terminal nodes. The theoretical consequences of these approaches for the domain of acquisition are radically different. The 'split morphology' hypothesis implies that inflectional and derivational morphology are probably acquired differently. At the opposite end, the DM approach implies that children acquire inflectional and derivational morphology in a similar way. A challenging question would then be if there were any difference and/or any connection between children's acquisition of inflectional and derivational morphology. Things get even more complicated. There is regular and irregular inflection. How do children cope with these two sub-domains?

The questions which we will be addressing in this chapter are the following:

(i)   are there any innate constraints which guide the children through their language development in the domain of morphology?
(ii)   what exactly in the input is responsible for the child's acquisition of the inflectional system?
(iii)   how can one account for the overregularization tendency in early grammars?
(iv)   how can one explain children's tendency to extend the irregular pattern to regular forms?
(v)   do they acquire regular and irregular inflectional morphology in a similar way or do they have to resort to different learning strategies?

The focus will be on the acquisition of inflectional rules, but derivational rules as well as the possible connection(s) between the two types of rule will also be tackled.

2. The acquisition of inflection

2.1 Regular inflection

> There is experiment-al evidence that children have knowledge of the rule dealing with regular plural inflection.

Berko (1958) was the first linguist to provide experimental evidence that children have knowledge of morphological rules, being able to extend them when dealing with new words. She tested for knowledge of regular inflectional morphology: the plural -s of nouns, the two possessive forms of the noun (the *of* genitive and the *'s* genitive), the third person singular -s, the regular past tense form, the present participle -ing as well as the comparative and the superlative of the adjective.

English monolinguals aged 4 –7 years were shown various cards and supplied made-up words for the object/action in the card. Then they were asked questions which required them to use the right inflection with the made-up words. The reason for which invented words were used in the experiment was that in this way one could test the child's ability to extend morphological rules to new words providing, at the same time, a strong argument against the rule-rote theory[1]. Several actual words were also included to test children's knowledge of some of the irregular patterns.

In order to test knowledge of the noun plural formation rule, the child was presented a card with one bird-like animal and then with two bird-like animals. The experimenter would say: « This is a wug. Now there is another one. There are two of them. There are two... ». The child was thus required to supply the plural form of a completely new lexical item.

---

[1] For a different point of view, see Park (1978), who studied the development of plurals in German-speaking children on the basis of observational data. Park's conclusion is that apart from analogy, rote learning plays a dominant role in the acquisition of plural forms.

The results of the experiment with regard to the tested children's knowledge of the regular plural form of nouns (presented in Table 1) provide evidence that children aged 4-7 years have knowledge of the rule dealing with regular plural inflection. They can extend the /s/ and /z/ allomorphs to new words. However, it seems they cannot extend the /iz/ allomorph (see the low percentage of correct plural forms in the case of *gutches* or *tasses*), in spite of the fact that they already know the plural form of words like *glass*.

Table 1

Percentages of children supplying correct plural forms

Item	Allomorph	Percentage correct
Glasses	/iz/	91
Wugs	/z/	91
Luns	/z/	86
Tors	/z/	85
Cras	/z/	79
Tasses	/iz/	36
Gutches	/iz/	36
kazhes	/iz/	31
Nizzes	/iz/	28

(Berko 1958: 161)

In order to test for children's knowledge of the regular past tense inflection, the experimenter showed the child a picture of, for example, a man standing on the ceiling. Then, she would say: « This is a man who knows how to bing. He did the same thing yesterday. Yesterday he... ». And the child was requested to provide the past tense form of the made-up verb. The results (see Table 2 below) show that children have knowledge of the allomorphs /t/ and /d/ but they do not seem able to extend the rule for forming the past tense of *melted* (which they have acquired) to new verbs, i.e. they cannot handle the allomorph /id/ (see the correct percentage in the case of *motted* and *bodded*). The tendency to extend the regular pattern to any form is obvious in the case of made-up verbs such as *bing* and *gling*, where only one child (of the 86 who were interviewed) said *bang* and one child said *glang*. Virtually all *–ing* verbs have irregular past tense forms and adults, when tested on the same items, chose the irregular pattern over 50% of the time.

> There is experiment-al evidence that children have knowledge of the rule dealing with regular plural inflection.

Table 2

Percentages of children supplying correct past tense forms

Item	Allomorph	Percentage correct
Binged	/d/	78
Glinged	/d/	77
Ricked	/t/	73
Melted	/id/	73
Spowed	/d/	52
Motted	/id/	33
Bodded	/id/	31
Rang	/ /	17

(adapted from Berko 1958: 163)

2.2 Irregular vs. regular inflection

2.2.1 The question

The next legitimate question addresses children's knowledge of irregular forms, which are (mainly) unpredictable. Do they acquire regular and irregular forms in the same way and /or at the same stage?

Traditionally, it has been assumed that children create inflectional rules in order to generate regular forms (for example, English-speaking children create the inflectional rule *add –ed* before they can use regular past tense forms). Irregular inflectional forms, being unpredictable, would have to be memorised individually.

Pinker (1991, 1998) argues against such an explanation which he calls «inadequate» because it cannot account, among other things, for the fact that irregular past tense forms fall into similarity groups (*sing/sang, ring/rang*). Nor can it explain why children may extend these irregular patterns to new forms, coming up with *bring/brang, bite/bote.*

2.2.2 A dual-mechanism model

> The acquisition of irregular forms is linked to properties of associative memory. The acquisition of regular forms is linked to the computational component.

Pinker & Prince (1988, 1992), Pinker (1991, 1998) argue for a theory of language which contains both a **computational component**, with specific rules and representations (responsible for the regular forms), and an **associative memory system**. Regular inflection is productive and open ended, and involves symbol-manipulating rules of grammar. Irregular forms are 'memorised pairs of words, but the linkages between the pair members are stored in an associative memory structure fostering some generalisation by analogy ' (Pinker 1991: 531). Within this dual-mechanism model, *string* and *strung* are separate items but they are, at the same time, represented as linked words. This mental representation may overlap with similar forms. This can account, on the one hand, for the fact that similar pairs are easier to learn and, on the other hand, for the existence of overextension of the irregular patterns.

Such a view departs from the unitary representation of inflection, like the one proposed by Rumeelhart and McClelland (1986), according to which regular and irregular morphology are treated as belonging to one single associative network. It also departs from the traditional model, within which regular forms are rule-based, whereas irregular forms are rote-learned. According to Pinker (1991, 1998) and Pinker and Prince (1992), the acquisition of irregular forms is affected by properties of associative memory (such as similarity or frequency) whereas the acquisition of regular forms is linked only to the computational component. The acquisition of regular and that of irregular inflection are seen as representing two qualitatively different psychological mechanisms. Regular inflection is based on symbolic rules, whereas irregular inflection is based on an associative process of storing information. Regular past tense forms, for example, do not depend on similarity to existing regular verb forms nor do they depend on the frequency[2] with which the verb is encountered in the input. The regular rule, Pinker claims, applies as a default, i.e. whenever the irregular form is blocked.

Irregular forms are not memorised individually by mere rote, though. Errors of the type in (1) below, attested in child English, provide evidence that patterns can be detected among irregular forms as well:

(1)   *bring – brang*
       bite – bote
       wipe – wope (Pinker 1998)

This suggests that 'irregular pairs are stored in a memory system that superimposes phonological forms, fostering generalisation by analogy' (Prasada and Pinker 1993:2). This distinguishes the creation of irregular from that of regular forms, which are created via a 'default suffix concatenation process capable of operating on any verb, regardless of its sound' (Prasada and Pinker 1993:2). Only spontaneous irregularisation tends to be phonologically similar to irregular pairs.

---

[2] For a different point of view, according to which frequency in the input is relevant, see Bybee (1991).

One strong prediction of the dual-mechanism model is that it should be possible to find individuals whose regular morphology is impaired, whereas the irregular one is intact. This prediction is borne out by case studies of language impaired individuals. Broca's aphasics, for example, have problems reading aloud the regular past tense forms of verbs (they pronounce *smiled* as *smile* or *wanted* as *wanting*) but they can read irregular past tense forms with accuracy. SLI individuals also have difficulty with the acquisition of regular forms, while they acquire irregular forms relatively normally.[3]

Another interesting prediction (also borne out by empirical facts) is that irregular forms can enter compounds, since they are memory-listed. Regular forms, which are computed at the output end of the morphology system, cannot appear in lexical compounds. The two types of morphological forms differ with respect to compounding. For example, one can say *mice-infested* but not **rats-infested*. As will be shown in section 4 of this chapter, children have knowledge of this distinction.

Further evidence in favour of the dual-mechanism model comes from the acquisition of German, a language with rich inflection. Longitudinal data from monolingual German-speaking children show that they make a qualitative distinction between regular and irregular inflection (Clahsen, Rothweiler, Woest and Marcus 1992).

2.3 Overregularisation

2.3.1 The phenomenon

Empirical data of spontaneous child English as well as experimental results point to the fact that 'children are pattern makers. And when they begin to acquire the inflections that mark tense, for instance, they typically take irregular verbs such as *break*, *bring*, and *go*, and treat them as if they belonged to the regular paradigm of *walk*, *open*, and *jump*' (Clark 1987: 19). This pattern-making process is preceded by a stage during which the child uses the irregular forms correctly. It looks as if children rejected irregularities. However, during this pattern-extending stage, the child still uses the correct irregular forms. 'Irregular forms rarely drop out, but rather continue to compete with their overregularised counterparts throughout the period of error making' (Bowerman 1982: 342).

Maratsos (1987: 19) noticed the existence of the same phenomenon:

'[…] *children may alternate between the overregularized -ed form and the irregular form for a period of months to years, using both broke and breaked […]. Their analysis and resolution of such alternatives is a long-drawn-out tabulation process, not one which quickly seizes upon one or two properties of the language as heard'.*

Marcus et al. (1992) analysed 11,521 past tense utterances from the spontaneous speech of 83 children. The results showed that children overregularised the past tense in only 4% of the situations. This suggests that the correct irregular forms are not completely replaced with the overregularised regular ones.

Children go through several stages of morphological development before acquiring the correct irregular forms: they begin with the correct irregular forms but, after acquiring the regular pattern, they extend it to all the forms. At this stage, they use both the overregularised form and the correct irregular one. After a while, they stop overregularising and they start using all the forms (regular and irregular) appropriately.

Which is the possible explanation of this puzzling developmental process? The traditional explanation of overregularisation is that the younger child simply

Stages of morphological development: (i) the correct irregular forms are acquired; (ii) the regular pattern is detected; (iii) the regular pattern is extended to all the forms; the irregular form can be extended; (iv) both correct and overgeneralised forms are used; (v) regular and irregular forms are used correctly.

---

[3] For more on language impaired individuals see Chapter 1.

memorises the correct irregular form (which is encountered in the input) and then repeats it. At this stage, it is assumed that the child has no knowledge of the pattern of regular past tense forms and hence no overextension or overregularisation is possible. When the child has acquired the pattern, he/she will extend it to all the verbs and will start to use incorrect overregularised past tense forms. However, straightforward as it might seem at first sight, this explanation is not without problems. Marcus et al. (1990) discuss some of the problems which such an account encounters. Adults, just like children, have knowledge of the pattern of regular past tense inflections. If knowledge of the pattern is the one which leads to overregularisation with young children, how can we account for the fact that adults do not use *comed* instead of *came?* This hypothesis does not predict (nor explain) that children may use the correct irregular forms as well as incorrect overregularised forms at the same stage. From the point of view of learnability, such an account cannot explain how children give up overregularisation in the end.

The explanation that children use the correct irregular forms at a very early stage because they have not heard the incorrect regularised form in the input is untenable. New verbs enter the language quite frequently and adults accept or create past tense forms for such verbs which they have not heard before:

(2)   *Yeltsin has finally out-Gorbachev'd Gorbachev* . (Marcus et al. 1990 :8)

This means that children's overregularisation process is of a different nature. What linguists have labelled **the blocking principle**[4] or **the unique entry principle** (Pinker 1984) does not seem to apply in a similar way in child and adult grammars. The very fact that at a certain stage children may use both the correct irregular and the incorrect regularised form questions their knowledge of this principle. Do they acquire it at a later stage? How do they do it? Children do not seem to receive any negative feedback. Or, if they do, they do it rarely and with no success. For example, Zwicky (cited in Marcus et al. 1990: 12) describes the overregularisation of participles by his daughter, aged 4; 6. He reports that six subsequent months of frequent correction by her parents had no noticeable effect.

Can indirect negative evidence help them, i.e. is it enough to notice that a form like *comed* does not exist in the input to realise that this is not a correct form? Marcus et al. (1990) argue that children do not receive any evidence, of any kind, that a form like *breaked* or *comed* is incorrect. This information is, actually, unavailable. Which means that one has to look for the relevant explanation somewhere else.

Children appeal to overgeneralisation when they fail to retrieve the correct irregular form stored in the lexicon.

2.3.2 The blocking-and-retrieval-failure hypothesis

One possible way out would be to assume that children's language system incorporates a mechanism which implements blocking. When a child hears the correct irregular past tense form of a verb, he/she will store it in the lexicon. The mere presence of this idiosyncratic form in the lexicon will then block overregularisation. The advantage of this account is that it can nicely explain the fact that children can attain knowledge of morphology in the absence of negative evidence. But it can incorrectly predict that children do not use both the correct irregular form and the incorrect overregularised one at the same stage. Blocking cannot explain the empirical data nor can it explain why children and adults appeal to overregularisation in different circumstances.

Marcus et al. (1992), assuming a dual-mechanism model, propose that children store the correct irregular form in the lexicon but cannot access it (for memory reasons) all the time. When they can retrieve the correct irregular form from memory, the default regular rule cannot apply, it is blocked. But when the irregular form cannot be retrieved, i.e. when the

---

Overgeneralisation disappears when the irregular forms have been consolidated in memory.

---

[4] The blocking principle = an idiosyncratic form listed in the lexicon as corresponding to a particular grammatical form of a word will block the application of a general rule to that word.

88

associative lexically based network fails to provide the irregular form, the child will appeal to overregularisation. The regular rule applies by default, since nothing blocks it. They call this **the blocking – and – retrieval – failure hypothesis**. The advantage of such an account is that it links retrieval of irregular forms to memory. Memory storage is probabilistic and it depends on frequency of exposure to each particular idiosyncratic form. This will predict that low-frequency irregular forms are prone to overregularisation, i.e. children tend to overregularise those verbs which are less frequent in the input. For example, we expect a child to use the correct past tense form of a verb like *say* most of the time, while the past tense form of a verb like *win* may often be used incorrectly. It also predicts that overregularisation applies in a similar way with children and adults. Adults can make errors (under time pressure, for example) but most of these errors regard low-frequency irregular verbs.[5]

In a nutshell, very young children are assumed to have no knowledge of the regular *–ed* pattern. At this early stage, they memorise (regular and irregular) past tense forms and use them correctly, but no general rule has been extracted. In early English, past tense form errors are very rare and children seem to be unable to generalise a certain pattern to new forms. During the next stage, when they have acquired the regular pattern, they begin to extend it to irregular verbs as well, producing occasional overregularised forms. At this stage, the rule-based mechanism becomes operative. But the irregular forms have already been stored in the lexicon and can, sometimes, be retrieved. This explains the fact that, at this developmental stage, children can use both the correct irregular and the incorrect overregularised form of one and the same verb. Hearing the irregular forms more often, they will consolidate them in memory and will be able to retrieve them more and more often until they give up overregularisation.

Further evidence in favour of the blocking-and-retrieval-failure model comes from the domain of noun plural overregularisations. The model predicts that a period of correct usage of plural forms should precede overregularisations, i.e. overregularisation begins after the child has learned the regular default rule, which can be applied whenever retrieval from memory of the correct irregular form fails.

Marcus (1995) compared noun plural overregularisations to past tense overregularisations in the spontaneous speech of 10 monolingual English-speaking children (CHILDES database, MacWhinney and Snow 1985). The comparison showed that children begin to overregularise noun plural forms after a period of correct plural usage. Also, the overall rates of noun plural overregularisations are rather low, just like in the case of past tense overregularisations.

These data suggest that overregularisations of past tense and plural forms are produced by the same mechanism. The fact that the number of irregular plural forms is smaller than that of irregular past tense forms did not affect the rate of overgeneralisation[6].

A few solutions have been suggested so far:

(i) young children have knowledge of regular inflectional morphology
(ii) overregularisation could be explained by appealing to the blocking-and-retrieval-failure hypothesis
(iii) the acquisition of regular and that of irregular forms fall within the domain of different mechanisms
(iv) children are not mere rote-learners.

2.3.3 Some inflection markers are not overgeneralised

The *-ing* verb inflection, the earliest which English-speaking children seem to acquire, is rarely if ever overgeneralised.

---

[5] In the history of English, lower frequency irregular verbs became regular over time (Bybee 1985).
[6] A different position is defended in Marchman et al. (1997) where it is argued that children are more likely to produce plural overregularisation than past tense overregularisation.

This may be due to the fact that children use a different learning strategy in the case of the progressive marker. It might be the case that children do not learn a general rule, but individual instances of verbs which can take the progressive. That could explain why they make no overgeneralisation errors.

But if children do not learn the rule, how do they extend the use of the progressive to verbs which they have not met in the progressive in the input?

Kuczaj (1978) puts forth a different hypothesis: children do not overgeneralise the progressive because there are no irregular verbs to which it could be overgeneralised. The progressive can co-occur with many verbs; under special circumstances, even with states which are defined as resisting the progressive.

Kuczaj proposes that one should distinguish between two types of possible overgeneralisations:

(a) a regular rule may be applied to an irregular form (as in *goed*)
(b) an inflection is used with verbs which do not take that inflection in adult language, but which are not morphologically irregular (as *knowing* in **I am knowing English.*)

Empirical data from child language show that type b is almost never encountered. According to Bickerton's (1981, 1984) language bioprogram hypothesis this may be due to the fact that certain semantic distinctions, such as state vs. process, are innate. Children do not use the morphological marker *–ing*, associated with processes, precisely because they have some a priori knowledge about the semantics of predicates[7].

Children may, however, occasionally extend the progressive to newly created verbs as in the following examples, which suggests that they are aware of the pattern:

(3) *It's weather out there, too. Why is it **weathering**? Is that weather?*
(4) *I'm **sticking** it* (= hitting it with a stick) *and that makes it go really fast.*
(5) *I'm **shirting*** (= putting a shirt on) *my man.*
(6) Child: *He's **hikking up**.*
     Adult: *What?*
     Child: *He's got the hiccup.* (Kuczaj 1978: 169-170)

These examples prove that children can detect the rule and that they are able to correctly extend it.

2. 3.4 Overregularisation and lexical development

One interesting question with respect to language development addresses the existence of a possible link between lexical acquisition and morphosyntactic development. The answer to this question crucially relies on the general view about grammar, in particular whether grammar is assumed to be or not to be lexically based. Cognitive Grammar and Lexical-Functional Grammar, which subscribe to the view that grammar is lexically based, may provide a theoretical framework for the postulation of a tight relationship between lexical and grammatical development. Within a generative approach to acquisition, morphosyntactic development is viewed as caused by properties of the grammatical system itself and, possibly, by maturation. Vocabulary size does not directly trigger morphosyntactic development. Moreover, acquisition of grammar and lexical acquisition are assumed to possibly rely on different mechanisms.

We are thus faced with two radically different positions:

---

[7] For more on the acquisition of aspect and aspect markers, see **5.2** *The Acquisition of Tense and Aspect* .

(i) lexical acquisition and acquisition of grammar are strongly interconnected, so that the acquisition of morphosyntax is dependent on lexical development;

(ii) there is a strong dissociation between the mechanisms guiding the acquisition of vocabulary and that of morphosyntax; consequently, the former cannot determine the latter.

The view in (i) is defended, for example, in Marchman and Bates (1994), where it is argued that vocabulary size determines morphological development. In particular, they claim that vocabulary size is tightly linked to the process of overregularisation. They analysed parental input data from 1,130 monolingual English-speaking children aged 1; 4-2; 6 with a view to testing whether there is any relationship between the children's vocabulary growth and their morphological development. The study focused on the usage of (regular and irregular) past tense forms.

The hypotheses they wanted to test were whether vocabulary size is related to the early correct usage of past tense forms and whether overgeneralization errors begin to occur only when verb vocabularies have become sufficiently large.

The results of their study show that very early lexicons (less than 10 verbs) are dominated by irregular verbs; when the children's vocabulary size increases to about 20–30 verbs, it still contains more irregular than regular verbs but no irregular verb is produced in the past tense. When the vocabulary size is lower than 50 items, only half of the irregular verbs in the early lexicon were produced only as stems. As soon as the number of verbs grows over 50, the number of stem-only forms begins to decrease. And it is only after the lexicon contains over 90 verbs that the mean number of past tense forms produced correctly exceeds the stem-only forms in frequency. Increase in vocabulary is thus taken to lead to extension of the regular pattern to novel forms. They take these results as proof that children learn morphology at the same time that their vocabularies undergo expansion and consequently that there is a strong interrelation between vocabulary size and morphosyntactic development.

However, this relationship seems to be more of a statistical artefact. We do expect children to overgeneralise more when they know more verbs. The increase of overgeneralization errors cannot be the result of vocabulary growth per se. Vocabulary growth simply provides the opportunity for more errors. Studies of individuals such as Laura (see Chapter 1) have proved that impairment in the domain of vocabulary does not affect grammatical knowledge. Also, studies of aphasics also show that only one area (grammar or lexicon) may be affected, with the other one remaining intact.

One should notice that denying a tight link between the two sides of language development does not deny that vocabulary size may offer the opportunity of morphosyntactic development. A structure-building model of syntactic development can very well accommodate this idea: the child begins with a lexical stage and enters a functional stage after having acquired a certain number of lexical items. This suggests that the acquisition of morphosyntax has to wait until the child has acquired a certain amount of vocabulary. But it is one thing to say that vocabulary growth offers the opportunity for morphosyntactic development and quite another thing to claim that vocabulary size directly determines grammatical development.

2.4 Irregularisation

2.4.1 The phenomenon

Empirical data of spontaneous child English as well as experimental results also reveal that children may apply irregular past tense (or past participle) patterns to inappropriate verbs (either irregular verbs which belong to a different pattern, as illustrated in 6 or regular verbs, as in 7):

91

(6) *bring-brang, think-thunk, hide-hod, bite-bot, bite-bat, bite-bet, break-brekked, say-set, fling-flang, fight-fooed, drink-dranked, see-sawn*

(7) *Wipe-wope, trick-truck, walk-has walken, jump-janged, lift-left, crush-crooshed, trip – trippen*

<div align="center">(Xu and Pinker 1995)</div>

This led some researchers to the rather radical conclusion that children go through a stage when they irregularise all verbs or irregularise some verbs all the time:

> [other] *children, beginning with the regular rule, abandon it for an irregular rule which they indiscriminately apply to all verbs, only later separating out the truly irregular ones and returning to the regular rule for the rest* . (Haber 1975 cited in Xu & Pinker 1995: 534).

2.4.2 Possible explanations

The obvious question is how one can explain this phenomenon. Is it similar to overregularisation ? What exactly leads the child to producing such irregularised forms and how does he/she de-learn it?

Various explanations of the phenomenon have been proposed. Starting from the empirical data which suggest that children extend both the regular and the irregular patterns, some linguists defend the view that both types of generalisation can be explained in a similar way (Kiparsky and Menn 1977, Kiparsky 1982). On such a view, children would overextend both regular rules, such as 'add -*ed*' and minor rules. They also go through a stage when they consistently and systematically apply an irregular pattern to inappropriate verbs.

Kiparsky and Menn (1977) propose that a child acquiring the past tense morphology of an irregular verb goes through the following stages:

(i) the present and the past tense forms are learned separately and stored in the lexicon

(ii) the child learns the regular past tense rule and overgeneralises it to irregular verbs

(iii) the irregular past tense is relearned

(iv) the child learns an irregular pattern and overgeneralises it, creating irregularisations

(v) the correct past tense form is relearned.

The assumption is that both overregularisation and irregularisation are associated with distinct stages. Moreover, they are seen as attributed to grammatical rules. But, as discussed in **2.3**, children never completely replace the usage of correct forms with overregularised ones. We expect them not to replace all the correct forms with irregularised ones either. That is why the rule-based explanation seems inadequate.

A different account is offered by connectionist models (Rumelhart & McClelland 1986, Plunkett & Marchman 1991, 1993, Sproat 1992) which assume that children make correlations between the phonological shape of the stem and that of the past tense form, which they superimpose in a pattern associator memory. When a correlation has been strengthened across a set of verbs, it will override the correlation which the child has made for the features of another verb, resulting in the overregularisation or irregularisation of the latter. On such an approach, there is no distinction between storage of regular and irregular verbs, and hence no distinction between overregularisation and irregularisation errors, which are all claimed to be caused by the same mechanism.

92

A third possible explanation is the one offered by the dual-mechanism model (2.2.2). Within such an approach, irregularisation is seen as the result of a retrieval failure. The irregular form has been stored in the lexicon but, due to the associative nature of memory, the phonological properties of a particular verb may overlap with those of a phonologically similar verb. When the correct irregular form cannot be retrieved, the child mistakenly applies the pattern of a similar verb. Since memory storage and retrieval depend on frequency of exposure, the child will no longer 'irregularise' those forms to which he has been exposed often enough to consolidate in memory and he/she will be able to retrieve it all the time.

> Irregularisation is the result of a retrieval failure and relies on irregular forms stored in memory.

Xu and Pinker (1995) analysed a large sample of child speech (20,000 past tense and participle usages from 9 English-speaking children from the CHILDES database) looking for what they call 'weird past tense forms', i.e. extensions of irregular vowel change patterns to inappropriate verbs. They only found 63 examples of irregularisation, which show that children rarely irregularise. Also, the comparison between the rate of overregularisation and irregularisation showed that the latter is lower.

The data also revealed that children do not systematically and consistently irregularise. Such errors seem to be 'sporadic malfunctions in a system designed to suppress them, not recurring products of the system' (p.553). However, one can notice that there is a tendency to irregularise irregular verbs more frequently than regular ones. Also, irregularisation reflects a close analogy with existing irregular patterns. This suggests that the mechanism is not free; it is constrained by the existing irregular forms.

Summarising, we can say that irregularisation, just like overregularisation, can be accounted for by appealing to the dual-mechanism model. Irregularisation does not reflect mere rule-overgeneralization, but relies on irregular forms stored in the memory.

2.5. Causes of regularisation

In this subsection we are addressing the general question of what kind of information represents input to children's inflectional system, i.e. what kind of information is relevant to generating regular/irregular inflected forms.

The literature offers three answers:

(i)   children are sensitive to phonological information
(ii)   children are sensitive to grammatical structure
(iii) children are sensitive to semantics.

Connectionist models propose that phonological information is the only one which determines regular and irregular inflectional patterns. Rumelhart & McClelland (1986) argue that the child will be able to map the stem to the appropriate past tense form on the basis of the phonological input alone. Pinker & Prince (1988) and Kim et al. (1991) provide evidence that for adults the phonological input is not enough. In English, there are pairs of verbs which have homophonous stem forms but different past tense forms, such as:

(8)   a. *Muddy rang the bell.* (ring /rang)
       b. *Muddy wrung the washcloth dry.* (wring/ wrung)
(9)   a. *T-Bone lay on his bed.* (lie/lay)
       b. *T-Bone lied to me again.* (lie/lied)   (Kim et al. 1994: 177)

Secondly, denominal verbs uniformly take a regular past tense form, even when they happen to be homophonous with an irregular verb, as the following examples show:

(10)   a. *He grandstanded to the crowd.* (*grandstood)
       b. *He spitted the pig.* (*spat)

c. *The doctor casted his leg.* (*cast)
d. *He sleighed down the hill.* (*slew) (Kim et al. 1994: 179)

Such data are taken as evidence that the phonological input is not enough and that irregularity seems to be rather a property of verb roots, not of verbs. If a verb has a noun root or an adjective root, it will take a regular past tense form. This is part of a more general phenomenon: the grammatical structure of a verb determines its semantic, syntactic and inflectional properties.

Some words are exocentric, i.e. they are headless. This is the case of *ring* in *ring the city* for example (or of any verb in 10 above). The whole word is labelled as a verb but it is made of a noun which cannot be its head; had N been the head, the whole word would have had the status of a noun.

(11)
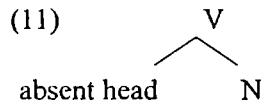
In (11) the homophonous (irregular) form cannot percolate to attach to the whole verb. The regular *-ed* rule applies as a last resort.

Semantically, exocentric words generally represent extensions of meaning; but it is exocentricity which leads to treating the verb as a regular one, and not its semantics. The hypothesis Kim et al. (1994) put forth is that both adults and children are sensitive to formal grammatical structure when they have to decide whether a certain verb takes a regular or an irregular past tense form.

They tested 12 monolingual English-speaking children aged 6; 8-8; 10 and 26 children aged 3; 2-5; 2 to see if they are indeed sensitive to grammatical structure. The verbs used in the elicitation task were *see, buy, meet, drink, fly, stick, write, leave, ring*. Each item was used twice: once as a verb root and once as a denominal, as illustrated in (12):

(12)   a. Denominal: *This is a fly. Can you say 'This is a fly'? I'm going to fly this board. I just...*
         b. Verbal root: *This airplane is going to fly. Can you say 'This airplane is going to fly?'. This airplane is about to fly through the air. The airplane just...*

The results were consistent with the hypothesis: the children responded with regular past tense forms more often than irregular past tense forms for denominals and with irregular past tense forms more often than with regular ones for the verb roots.

Two more experiments were designed to test whether children were sensitive to grammatical structure when having to choose between regular /irregular noun plural inflection. The hypothesis would be, in this case, that only nouns with noun roots in head position can have an irregular plural form (13), while exocentric nouns will tend to have a regular plural form (14):

(13)   *They do not have one single child, they have two children.*
(14)   *We're having Julia Child and her husband over for dinner. You know, the Childs are really great cooks.*

Endocentric/exocentric pairs were constructed for irregular nouns: *fat man/Batman, fuzzy mouse/Mickey Mouse, little goose/Mother Goose, little child/Superchild, purple tooth/Mr Tooth*, a.s.o.

The same two groups of children in the previous experiments were required to supply the correct plural form in situations of the following type:

(15)   a. exocentric nouns: *This is Mr Tooth. Can you say 'This is Mr Tooth'?*
(Bring out another Mr Tooth). ***There are two...***
b. endocentric nouns: *But this is a purple tooth. Can you say 'This is a
purple tooth'?* (Point to another purple tooth). ***There are two...***

The children in the two groups gave more regular plural responses for exocentric nouns than for endocentric ones. The results in the experiments show that the input to children's inflectional systems cannot be the phonological shape of words. Children are sensitive to the grammatical structure of words. Kim et al. (1994) thus provide data in favour of the view that children's inflectional systems are sensitive to grammatical structure, and not to phonological or semantic structure.

Lakoff (1987) or Shirai (1997) defend a different position: regularisation of denominal verbs is due to semantic extendedness. On such an approach, extended verbs are more likely to be regularised. Given that denominal verbs are extended, it is natural that they should be regularised more often than non-extended verbs. Shirai (1997) argues that speakers avoid irregular forms with denominals because they do not want to convey meanings associated with the homophonous irregular forms. The child knows that the irregular form is associated with a certain meaning and realises that the denominal is semantically different. Consequently, he/she will opt for the regular form in order to mark this semantic difference. That means that choice of regular/irregular form depends on communicative gain in the end.

Such an approach raises at least two questions, though. It is known that communicative strategy is acquired late. Also, there are cases of ambiguity or extension of meaning when the irregular form is still the choice, as in *blow someone away*. Some denominals are homophonous with regular verbs and, in this case, the choice is also a regular past tense form:

(16)   a. *I stared at him for hours.*
b. *For exercise I used· to bike but now it's so cold that I run stairs.
Yesterday, I staired for an hour.* (Kim et al. 1994: 200)

Denominal verbs also take a regular past tense form even when there is no homophonous irregular which could create ambiguity:

(17)   *She kinged the checker piece.*
My car pinged all the way home.

It would be difficult to account for all these data on a semantic approach. From the point of view of learnability, it is also desirable to adopt a grammar structure explanation:

> *The simplest account is that children's linguistic systems are inherently
> organised to distinguish rules from lexical storage (with regular and irregular
> inflection associated with these two modes of producing linguistic forms,
> respectively), and to use head inheritance to interpret new complex words from
> their familiar components.* (Kim at al. 1994: 204–205).

3. Derivational rules

3.1. Children are gifted creators

The examination of children's means of deriving new words at a very early stage in their linguistic development leads to a similar conclusion as in the case of inflectional morphology: children are innovative learners. Given that the number of conventional words

95

which they have learned is still limited, they create novel forms out of words or on the pattern of those words which they already know. Whenever they produce innovative compounds, the words are appropriately ordered as in *burn-man* or *burner-man*, compounds used as an answer to the question:' What do you call someone who burns things?' (Clark and Hecht 1982 cited in Gottfried 1997a). If asked to select a picture which best matches the meaning of a compound, they correctly choose the picture which depicts the object labelled by the head of the compound. For example, if shown three pictures: one depicting a round black bug, one a stick and the third one a bug that looked like a stick, and asked to choose the picture where they saw a 'stick-bug', children correctly choose the third picture (Gottfried 1997b). As early as the age of 3, children even reject compounds which do not observe the appropriate word order, such as 'bed-cat' for 'a kind of bed that cats sleep in' (Clark and Barron 1988, cited in Gottfried 1997a).

Children seem to be extremely gifted word creators. Clark (1993) examined the detailed corpus of a child's language development between 1; 8 – 5; 11. She found 1,351 innovative nouns, which would roughly correspond to one new noun per day over the four-year period. For example, children can derive denominal verbs which do not exist in the adult lexicon:

(18) *You have to scale it first.* (= to weigh)
(19) *I broomed her.* (= hit her with a broom)
(20) *Is it all needled?* (= is it all mended?)
(21) *Mummy trousers me.* (= put my trousers on)
(22) *I'm crackering my soup.* (= put crackers...)
(23) *Will you chocolate my milk?* (= put chocolate...) (Goodluck 1991: 52)

Bowerman (1982) reports some innovative causatives which are rarely used in adult English:

Children use derivational rules creatively.

(24) *It always sweats me.* (= makes me sweat)
(25) *This is aching my legs.* (= makes my legs ache)
(26) *Enough to wish me one of those beds.* (=to make me wish for...)
(Goodluck 1991: 53)

Longitudinal studies or experimental ones provide evidence that young learners can create metaphoric compounds:

(27) *bird-car* = airplane
      ball-beads = spherical beads
      butterfly-bugs = dragon-flies
      flower-wheels = car wheels shaped like flowers
      heart-fruit = grape shaped like a heart (Gottfried 1997a)

Such data undoubtedly show that children are able to use derivational rules creatively in order to form innovative words.

3.2 Principles of early word formation

The question is whether children are guided in their word formation development by some principles which may explain the speed and easiness with which they create new words. Clark (1993) suggests that children's innovations reveal systematic reliance on principles of acquisition:

(i)   transparency of meaning
(ii)   simplicity of form
(iii) productivity.

96

Early compounds do not contain any changes to the form of the words which enter that compound. For example, early compounds created by English-speaking children are of the form **(bare) Noun + Noun**, such as the ones in (28) below:

(28)   *fire-dog* (= dog found at the site of a fire)
       snow-tree (= fir tree, without any snow on it)
       plant-man (= gardener)
       plate-egg (= fried egg)   (Clark 1991: 50)

Compounds such as *boat-driver* are created later, since they also contain affixes and are therefore more complex. The same simplicity-bias in early word – compounding has been noticed in early Dutch (29), early German (30), early Icelandic (31) and early Swedish (32):

(29)   *koppie-tafel* 'coffee + table' (= table for coffee)
       trem-boeken 'tram + books' (= [books of] tram tickets)
(30)   *Fensterhaus* 'window + house' (= house made of transparent blocks)
       Felsenberge 'rock + mountains' (= mountains made of rock)
(31)   *fiatabill* 'Fiat + car' (= Fiat)
       kubbabill 'block + car' (= car made of blocks)
(32)   *simbil* 'swim + car' (= car that travels in water)
       golvkäpp 'floor+stick' (= stick for hitting on the floor)

Transparency refers to the children's bias towards using already known words, affixes and meanings, i.e. words and affixes which are already transparent to them, when creating new words: 'the new meaning must be accessible in part from the elements making up the new word' (Clark 1993: 115). Thus transparency refers to both familiar meaning and familiar form. See, for example, a few denominal verbs coined by 2-year-olds (reported in Clark 1982):

(33)   *key* (= to open with a key)
       needle (= to mend, to sew)
       string (= to fasten with a string)

Children often create new verbs from familiar nouns:

(34)   *to button* = to press the button (of a calculator)
       to flag = to waive like a flag
       to bell = to ring
       to rug = to vacuum the rugs (Clark 1993: 117)

When they coin compound words, they tend to use familiar nouns:

(35)   *sky-car* = airplane
       crow-bird = crow
       hole-sack = sack with holes in it
       cup-egg = boiled eggs (Clark 1993: 117)

Because their repertoire is not very rich yet, they may use the same noun as a head in several compounds, such as *man* (as in 36), *car* (illustrated in 37) or *bird* (as in the compounds in 38):

(36)   *rat-man* = man who works with rats in a lab
       plant-man = gardener
       button-man = man who throws buttons
       fix-man = mechanic
(37)   *taxi-car*
       beach-car

(38)   *parrot-bird*
         flamingo-bird (Clark 1993)

Children also use familiar affixes to create new words. *–er* is often used in an innovative way when children want to denote agents of various actions:

(39)   *cooker* = cook (!)
         climber
         gunner
         hider = for a paper basket the child invented and put over his head
         sharper = pencil-sharpener

The principle of simplicity of form refers to the children's tendency to make the fewest possible changes to familiar words or affixes when creating new ones. The earliest innovative compounds in corpora of child English seem to be compounds of the form bare **Noun+Noun**:

(40)   *snow-tree* = fir-tree
         fire-dog = dog found at the site of a fire

They mainly rely on roots before combining roots and affixes.

The principle of productivity states that children first acquire and hence use in innovative words those forms which are the preferred ones within their speech community. When several options are transparent, the child will decide which one to use on the basis of productivity.

4. Level-ordering and morphological development

Recent theoretical proposals put forth the idea that there is an ordering of levels of rule application in the domain of morphology (Siegel 1977, Anderson 1982, Kiparsky 1982, 1983).

According to Kiparsky (1982) there are three such levels:

(i)   ***Level 1*** which includes:
       ❑ irregular inflection (*mice, went*)
       ❑ pluralia tantum (*scissors, clothes*)
       ❑ semantically unpredictable derivational affixes (of the type *-ion, -ous, -ity, -th*) which are not very productive and which deform their host by stress shifting and vowel reduction.
(ii)   ***Level 2*** which includes:
       ❑ (more) semantically predictable derivational affixes (*-ness, -ism, -er, -ist, un-*) which are quite productive
       ❑ compounding rules.
(iii) ***Level 3*** which includes:
       ❑ regular inflection affixes, which are non-deforming and semantically predictable (*-s, -ed, -ing*).

Rule application is constrained by the level to which the particular rule belongs

> Morphological rules apply in a strict level order.

in such a way that rules at a later level, Level 3, for example, cannot apply prior to rules which belong to Level 1 or 2.

One of the most powerful predictions of Kiparsky's level-ordering model is that regular inflection affixes will only be added to a word after derivational affixes (which belong to Level 1 or 2) have been added to the same word. That can explain why *mice-infested* is a possible compound in English, whereas **rats-eater* is not. Pluralia tantum nouns (which belong to Level 1) can also be found inside compounds: *clothes basket*.

98

Gordon (1985) tested for children's knowledge of this ordering of morphological rules. His experiment is interesting from several points of view. In spite of the fact that English allows for nominal compounds in which the irregular plural form of a noun has been used (such as *mice infested, teeth inspection*), the examination of high-frequency compounds with irregular plurals (Kucera and Francis, cited by Gordon 1985) reveals that there is a strong tendency for the use of the singular form: *toothbrush, mouse-trap, man-eater*. This means that the input which the child receives offers little evidence for the ordering of rules. If one can prove that children have knowledge of level ordering of morphological rules, this can provide strong evidence in favour of the existence of level ordering as an innate constraint on word formation. The developmental prediction would be that the child should produce compounds of the type *rat-infested* but not of the type **rats-infested*. The child will start using (optionally) the appropriate irregular plural form inside compounds as soon as he/she has stopped overregularisation of the irregular forms. Also, the child will start using pluralia tantum inside compounds after he/she has learned that such nouns do not have a singular form.

Gordon (1985) tested 33 three to five year old children to see if they can produce compounds of the *rat-catcher* type. The children were introduced to a Cookie Monster puppet and they were told: 'Do you know what this is? It's Cookie Monster. Do you know what he likes to eat? He likes to eat all sorts of things' (Gordon 1985: 3). Then the children were shown various objects and were asked if Cookie Monster could eat the object in the picture (X). Then they were asked what they called someone who eats X. The experimenter elicited compounds of the form *teeth eater/rat eater* and *scissors eater/knife eater*.

> There is experimental evidence that children have knowledge of level ordering of morphological rules very early.

The subjects used the correct pattern **singular noun** + *eater* at all ages with regular forms (even with those which the subject overregularized); when the children knew the correct irregular plural form, they used it inside the compound. The results showed that young children observe the constraints of Kiparsky's level-ordering model.

But these constraints seem to be violated by examples of the type *publications catalogue, drinks cabinet, weapons analysis, Parks Commissioner, Human Services Administration, programs co-ordinator, buildings inspector, letters policy, equal rights amendment, American cars exposition*[8]. On the one hand, the plural tends to be associated with an idiosyncratic meaning inside these compounds. For example, *programs* in *programs co-ordinator* leads to the interpretation of the compound as « co-ordinator between programs », whereas *program co-ordinator* is interpreted as « co-ordinator of one single program (Alegre and Gordon 1996). *Drinks*, in *drinks cabinet*, can only denote alcoholic drinks (Gordon 1985). On the other hand, even if the meaning of the plural form inside the compound were not idiosyncratic, such examples would not provide real evidence against the level-ordering model, since we are still faced with the question of why regular plurals cannot be used in most compounds.

Kiparsky suggested that the compounds which contain a regular plural are formed through a recursive procedure: the regular affix attaches first and then the output enters compounding at a later stage.

A compound of the type *red rat eater* can be generated as in (41a) or as in (41b):

(41)   a. NP

---
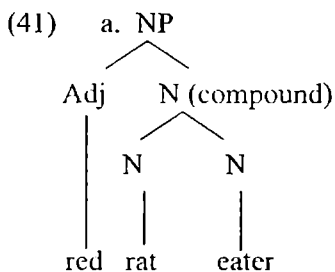
[8] Selkirk (1982) used such examples as an argument against the level-ordering model.

b. N (compound)

```
           N (compound)
          /          \
        NP            N
       /  \           |
     Adj   N          |
      |    |          |
     red  rat       eater
```
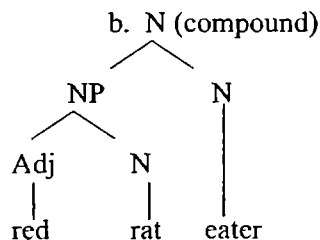
In (41a) the compound *rat eater* was formed first and the reading of the whole compound is « eater of rats which is red ». In (41b) recursion has applied and the compound was formed at the last stage. The reading of this compound is «eater of red rats».

When the plural form of the noun is used, the compound can only be generated through recursion (as in 42b). In this case, (42a) is impossible:

(42)   a. *   NP
```
              NP
             /  \
          Adj.   N (compound)
           |      /    \
           |     N      N
           |     |      |
          red   rats  eater
```

         b.   N (compound)
```
           N (compound)
          /          \
        NP            N
       /  \           |
     Adj   N          |
      |    |          |
     red  rats      eater
```
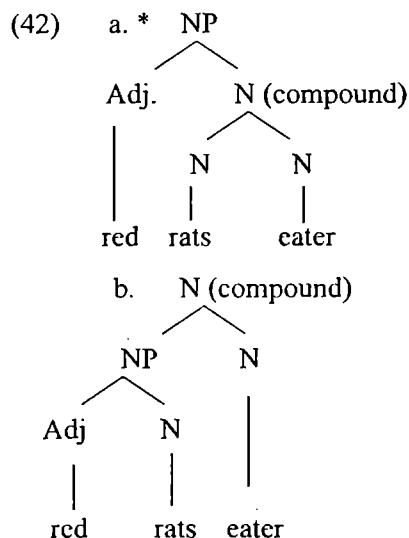
The presence of a regular plural inside the compound represents positive evidence for a recursive compound and hence it blocks the non-recursive interpretation. *Red rats eater* can only be interpreted as «an eater of red rats». When there is no overt signal of recursion, both interpretations are allowed but the non-recursive one is preferred.

Alegre and Gordon (1996) tested this hypothesis with 36 children (aged 3; 4 – 5 years) with the aim of finding out whether children at this stage have knowledge of recursion. During a pre-test, the experimenters tested the subjects' knowledge of colours. In the test, the children were presented four pairs of pictures, each depicting a creature eating some smaller creatures (a monster eating rats, a cow eating flowers, a monster eating spiders and a fish eating crabs). Half the children were assigned to the singular condition and the other half to the plural condition. Then, the children in the singular condition were asked: 'Can you point to the picture which shows a *red rat eater*?' while being shown two pictures: one depicting a red monster eating blue rats, and the other one depicting a blue monster eating red rats. The children in the plural condition were asked: 'Can you point to the picture that shows a *red rats eater*?' while being shown the same set of pictures.

Throughout the experiment care was taken to use even stress, so subjects would not be led to one reading or the other.

Children in the singular condition tended to interpret the compounds as not involving recursion. The ones in the plural condition tended to interpret the compounds as containing a NP, i.e. as having been generated recursively. This supports the hypothesis that young children (aged 3–5 years) distinguish between compounds with a plural noun (inside) when fronted by an adjective. Alegre and Gordon's experiment continues the

> There is experimental evidence that children have knowledge of recursion.

experiment of Gordon (1985) and provides evidence that while disallowing regular plurals inside compounds, children know that regular plurals are allowed when they are preceded by an adjective. They interpret the adjective as part of the NP constituent inside the compound, which supports the hypothesis that in this case the compound has been generated through recursion.

Unfortunately, the problem of compounds is more complex. Alegre and Gordon's experiment leaves the problem of the acquisition of compounds of the type *publications catalogue* unsolved. They admit the limits of their analysis: ' Even if we stay within English compounding, the problems remain extremely complex and difficult to account for in terms of acquisition. In the present study, we have examined only one kind of exception to the no-plurals-inside-compounds generalisation: those fronted by adjectives. But this does not exhaust the exceptions list'. (P.77)

The literature offers further evidence that regulars and irregulars are treated differently in the grammatical system at a very early phase. This time, evidence comes from early German. Clahsen et al. (1992) studied the acquisition of German noun plurals in relation to the question of how children treat the plural forms within compounds. In German, the plural form of nouns is determined, to some extent, by gender and morpho-phonological characteristics. Feminine nouns ending in -e form the plural with -n: *die Strasse – die Strassen*. But there are many exceptions and the input which the German-speaking child receives is very uninformative about which is the regular plural:

(43)   der Daumen – die Daumen (thumb/thumbs): 0
        die Mutter – die Mütter (mother/mothers): 0 + Umlaut
        der Hund – die Hunde (dog/dogs): -**e**
        die Frau – die Frauen (lady/ladies): -**(e)n**   -
        der Wald – die Wälder: -**er**
        das Auto – die Autos (car/cars): -**s**

All these plural morphemes are present in early German, but very often they are not used correctly. Many children tend to use 0, -**n** or -**s** when they do not know the appropriate plural. The fact that -**s** is also used in adult language for borrowings or newly created words made some linguists consider that –**s** is the default form for the plural of nouns in German. -**s** is a Level 3 inflection, unlike the other plural affixes, which belong to Level 1 or 2:

Level 1: irregular inflection - 0, -*e*, -*er* and irregular plurals
Level 2: -n *plural and compounds*
Level 3: regular inflection and default -*s* plural (Wunderlich 1986, cited in Clahsen et al. 1992)

Given that the -*s* plural form belongs to Level 3, the prediction is that plural -*s* forms cannot occur inside compounds.

Clahsen et al. (1992) examined the Simone corpus (1; 7 – 3; 9 years) (CHILDES, MacWhinney and Snow 1989) in an attempt at finding out if German children have tacit knowledge that regular affixes cannot be used inside compounds. Simone does not often overgeneralise the 'regular' plural morpheme, but, when she does, she uses –s as the regular/default form:

(44)   manns (=Männer) (men)
        lopers (= Pullover) (pullovers)
        wauwaus (dogs)
        lalas (pacifiers) (Clahsen et al. 1992:238)

In the 71 compounds found in the corpus the plural -s never appears, though, in spite of the fact that other plural morphemes are used:

(45)   schweinehirt (pig herdsman)
        bilderbuch (picture book)
        bananenquark (banana cottage cheese)
        katzentatze (cat paw) (Clahsen et al. 1992:239)

The data in the Simone corpus show that, in spite of the fact that all the different types of plural endings were active, the default form was, in this case, *-s*. The 71 compounds which exist in the corpus do not contain any plural *-s* form, not even when the non-head is a noun which takes an *-s* plural form:

(46)   *autobahn* 'highway'
        gummihose 'plastic pants' (Clahsen et al. 1992: 239)

With some other children the default form is *-n*. The examination of their compounds led to the expected results: they did not use the default form in their compounds.

These empirical findings provide evidence in favour of Kiparsky's level-ordering hypothesis. In German, adult/child language does not allow -s plural forms within compounds. Clahsen et al. suggest that Kiparsky's hypothesis requires an additional condition on affixes: 'default (regular) affixes cannot serve as input to compounding processes' (p. 226).

SUMMARY

In this chapter a few questions related to the morphological development of children were addressed. It has been shown that the acquisition of regular and that of irregular forms represent two different mechanisms: regular inflection is linked to specific rules and representations of the computational component, whereas the acquisition of irregular forms relies on an associative memory system.

Children tend to overgeneralise the regular pattern of inflection to irregular forms and to extend an irregular pattern of inflection to other regular forms because, for memory reasons, they cannot retrieve the appropriate form stored in the lexicon.

It has also been shown that choosing a regular or an irregular pattern of inflection for a new lexical item is mainly determined by the grammatical structure of words.

Children seem to have tacit knowledge of the ordering in which morphological rules can apply and they create or interpret compounds accordingly. In particular, they can distinguish between regular (or default) and irregular morphology.

Experimental data have been used as evidence that children are not rote learners of (inflectional or derivational) morphology and that, in the creation of new words, they are guided by more general principles.

Further Reading

Focussed: For more about the way in which children use innovative words, read Clark (1993).

Advanced: If you are willing to find out more about the acquisition of morphology and the link between the formation of Noun-noun compounds and complex-predicate formation read Snyder (1995).

Textbooks: If you want a concise introduction to morphological development in another textbook, read Chapter 3 in Goodluck (1991).

102

4

THE ACQUISITION OF SYNTAX

MODELS OF SYNTACTIC DEVELOPMENT

MODELS OF SYNTACTIC DEVELOPMENT

'Before they grow so big, the baobabs start out by being little.'
'That is strictly correct,' I said. 'But why do you want the
sheep to eat the little baobabs?' He answered me at once,
'Oh, come, come!' as if he were speaking of something
that was self-evident. And I was obliged to make a great
mental effort to solve this problem, without any
assistance. (Antoine de Saint-Exupéry – The Little Prince)

KEY POINTS:
In this chapter you will learn about:
- **the way in which generative acquisitionists account for the differences between child and adult speech**
- **different explanations of how child speech turns into the correct target adult speech**
- **the advantages/disadvantages of various hypotheses with respect to syntactic development**

1. Introduction

It is generally assumed in the literature dealing with first language acquisition that there is an orderly progression of stages in first language development. This property associates linguistic development with biologically programmed behaviour, which exhibits a pattern of ordered stages.

There seems to be consensus in the literature that child speech goes through a succession of stages, illustrated in (1):

(1)   0 – 12 months: **prelinguistic stage**   *oogh*
       12 – 18 months: **single word stage** (SWS)   *apple*
       18 – 24 months: **early multi-word stage** (EMWS) *(I) want apple*
       24 – 30 months: **later multi-word stage** (LMWS) *I want to have*
                                                          an apple.

During the prelinguistic stage, that of babbling, the child produces only vocalisations to which no meaning is assigned and which gradually become more varied, finally turning into syllables such as /ba/, /ma/, etc. The baby focuses on the acoustic information in the language stream, which helps him/her to 'segment complex non-linguistic events into what will be linguistically relevant units at the next phase' (Hirsh-Pasek and Michnick – Golinkoff 1996: 165). As early as a few days, babies are able to discriminate between their mother tongue and a foreign language from a different class and at about 4 or 5 months they can distinguish their own language from a foreign language in the same rhythmic class (Spanish vs. Catalan or English vs. Dutch, for example) (Jusczyk et al. 1992). Also, it seems that as early as two weeks, babies are able to discriminate between voiced and unvoiced consonants (Crain and Lillo-Martin 1999), a sign that they are on their way towards distinguishing phonemic boundaries.

The SWS is the stage of words uttered in isolation. The first words are names for things or persons in the environment. Studies of early vocabularies point out that almost half of the words used during this stage are names for objects and that quite often these words are actually used with the meaning of whole sentences.

Linguists have access to evidence which shows whether children have/ do not have knowledge of parameter values only when children begin to utter two word utterances. It is possible that some parameter values have already been set before this stage, but this is a hypothesis which cannot be tested[1].

Beginning with the EMWS, the child begins to string words together and to form simple 'reduced' sentences. The average vocabulary at the beginning of this stage is of about 50 words (Nelson 1973) and sometimes the child may begin by simply reproducing rote-learned structures whose meaning they may not know. Take for example the constant use of 'Ce crezi?' ('what do you think?') used by a monolingual Romanian-speaking child (B., aged 1; 5 – 1; 9) only to signal the wish to speak to an adult, or the wish to look at the pictures in a picture book, etc. But, in spite of this, the vast majority of corpora reveal that the child is able to use a variety of semantic relations during this stage: agent-action, action – theme, action-location, etc. (O'Grady 1997). New words are assigned to the different word classes. (Overt) grammatical formatives or functional categories seem to be either absent or rarely used. For example, in English, children omit determiners, auxiliaries and complementizers:

(2)   *baby* [is] *talking*
       Mummy [has] *thrown it*
       [the] *bunny* [has] *broken*[its/the]*foot*
       want [to] *go out* (Radford 1990)

In Romanian, they omit auxiliaries, pronominal clitics and weak pronouns, the indefinite article and complementizers:

(3)   [a] *cădut pe jos*
       [has] fallen on the ground
       Moş Nicolae [le-][a] *adus*
       Saint Nicholas [them][has] brought (Avram and Coene 2001)

But, in spite of the fact that functional categories seem to be systematically omitted (at least in some languages), children do not totally lack knowledge of these classes. There is experimental evidence that, if functional items are replaced with nonsense words which have the same rhythmic properties, sentence comprehension and sentence memory are negatively affected (Gerken and McIntosh 1993).

Since the properties of functional categories have been assumed to be relevant for the syntactic compartment, we expect the lack of functional elements to be reflected at the syntactic level as well. In English, yes-no questions are often signalled only by intonation at this stage:

(4)   *Fraser water?*
       No eat?   (Goodluck 1991)

Wh- questions at EMWS are illustrated in (5) below.

(5)   a. *Where Kitty?*
       b. *Where horse go?* (Goodluck 1991)
       c. *What this?*
       d. *Who that?*
       e. *What colour is these?*   (Radford 1990)

---

[1] But see Wexler (1998) for a more radical point of view according to which children are assumed to have set parameters correctly before entering the two-word stage.

The vast majority of early questions are *where* and *what* questions and are often formulaic (Radford 1990). When a copula is used, there might be agreement errors, as in (5e).

The LMWS is associated with longer utterances and the correct use of grammatical formatives. At the beginning of this stage, the child has a vocabulary of approximately 400 words and a Mean Length of Utterance (MLU)[2] of 1.75. At the end of the stage their vocabulary measures approximately 900 words and the MLU is about 2.25 (Crain and Lillo-Martin 1999). Obviously, individual differences do exist, vocabulary size and MLU varying from one child to another.

Yes-no questions are no longer signalled by intonation alone (6) but Subject-auxiliary inversion may still be absent in wh-questions (7):

(6)   *Can I have a piece of paper?*
(7)   *Why Kitty can't stand up?*   (Goodluck 1991)

•   Linguists also agree that certain grammatical morphemes are acquired in a certain order, which may differ cross-linguistically. A child whose target language is English, for example, will go through the following stages:

(8)

$$\left\{ \begin{array}{l} -\text{ing} \\ -\text{plural } -s \\ -\text{copula} \end{array} \right.$$

$$\left\{ \begin{array}{l} -\text{auxiliary} \\ -\text{participle} \end{array} \right.$$

$$\left\{ \begin{array}{l} -\text{irregular past tense forms} \\ -\text{regular past tense forms} \\ -3^{rd}\text{ pers.sg. } -s \\ -\text{possessive} \end{array} \right.$$

(Goodluck 1991)

The existence of an orderly progression of stages raises the question of why language development follows a particular course and of how this course is related to UG. For generative first language researchers the availability of UG for the acquirer is biologically given. However, there is no consensus with respect to the way in which UG functions in the process of acquisition and hence on how developmental facts could be accounted for. The literature offers a wide range of detailed descriptions of those acquisition facts which are used as empirical evidence in favour of one model of development or the other. As each model aims to explain how the child manages, in the end, to attain adult knowledge of his/her target language, learnability facts play an important part in the evaluation of the various hypotheses.

In this chapter the following questions related to the course of language development will be addressed:

(i)   is UG (fully) available to the child from the onset of acquisition?
(ii)   if UG is available from the onset of acquisition, how can one account for the differences between child speech and adult speech ?
(iii)   is child grammar qualitatively different from adult grammar?
(iv)   why do children use non-adult structures and how do they get rid of them?

Recently, there has been considerable debate as to whether UG is fully available from the onset of acquisition (in which case, child grammar would not deviate from adult grammar in a radical way) or whether it is engaged gradually (in which case child and adult grammars would be qualitatively different since UG would not be fully available from the start). Three main positions have been taken with respect to the availability of UG at the onset of language acquisition:

---

[2] Mean Length of Utterance (MLU): the average number of words which are used in the utterances recorded in the speech sample of a child.

(i) The Strong Continuity (or the Full Availability) **Hypothesis**, according to which all the principles and parameters of UG are available from the very beginning of the acquisition process. This hypothesis has two versions. The radical one assumes that the representations of child grammar observe both UG principles and the values of the parameters of the target language. According to the weaker version[3], the child's representations obey UG principles but need not obey the parametric values of the target language (Borer and Wexler 1987, Weissenborn 1992, Whitman, Lee and Lust 1991, Whitman 1994, etc.);

(ii) The Discontinuity (or No-Continuity) **Hypothesis**, associated with maturation, according to which UG is not accessed from the start. It becomes available in the course of development in a gradual fashion, perhaps biologically driven (Felix 1984). The child's early representations violate UG constraints;

(iii) The Weak Continuity Hypothesis, according to which some (or all) functional projections may be missing at the onset of acquisition but some (or all) the principles are in place. The early representations may be deviant from the target system but are constrained by principles of UG[4] (Lebeaux 1988, Radford 1990, Powers 1996, etc.).

> The Strong Continuity Hypothesis: all the principles of UG and all the functional projections of the target language are present and operative from the onset of acquisition.

2. The Strong Continuity Hypothesis

2.1. Main assumptions

Within the Strong Continuity approach to language development, the child is assumed to have full access to UG from the onset of acquisition. The syntactic phrase structure of the child is identical to the syntactic phrase structure of the adult (Crain and Fodor 1987, Pinker 1984, Boser et al. 1992, Poeppel and Wexler 1993, Lust 1994, Schütze 1995, Thornton and Crain 1998, among many others). In other words, all the principles of UG and all the functional projections (or at least the ones which exist in the target language) are present and operative in the child's grammar from the very beginning. The early phrase marker is identical to the adult one:
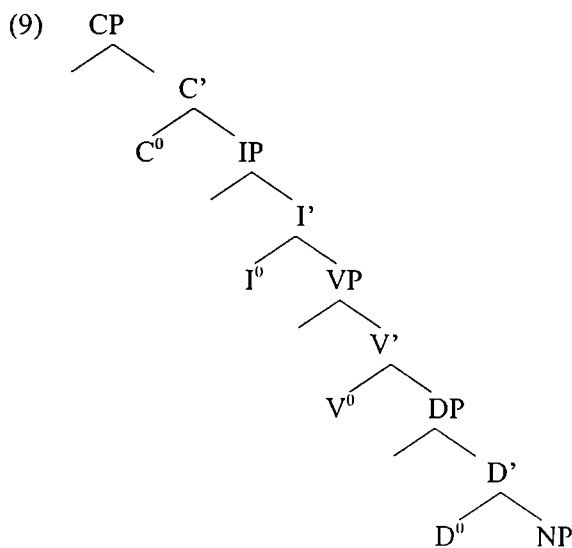
> The Strong Continuity Hypothesis: the differences between child and adult speech are explained in terms of processing limitations, lack of relevant lexical, pragmatic or real world knowledge, perceptual considerations or underspeci-fication of functional heads.

(9)
```
        CP
       /\
         C'
        /\
      C⁰   IP
           /\
             I'
            /\
          I⁰   VP
              /\
                V'
               /\
             V⁰   DP
                  /\
                    D'
                   /\
                 D⁰   NP
```

---

[3] This position has been labelled the Weak Continuity hypothesis in other works (see, for example, Weissenborn, Goodluck and Roeper 1992). I have chosen to treat this line as a weaker version of the Strong Continuity Hypothesis taking into account the fact that it assumes that UG is available and its principles are all observed from the onset of acquisition. i.e. there is strong continuity in this respect.

[4] This is the reason for which I consider that such a position is not a discontinuity one. On such a view, UG is available from the very beginning. There is continuity with respect to UG. For a different point of view, see Weissenborn, Goodluck and Roeper (1992).

110

Child grammar can depart from adult grammar only in ways in which adult grammars can differ from each other. Hence, no «wild» grammars which violate the principles of UG are possible. The mistakes which children make represent (minimal) violations of rules which constrain only the target language, but which represent choices available in UG. For example, it has been noticed that children acquiring non-null subject languages (like English, German or Dutch) occasionally produce null subject sentences during early stages of language development. Such sentences deviate from their target language but represent an option which UG makes available: there are null subject languages.

The fact that children's productions differ from adult grammar is explained as a reflex of lexical learning, of processing limitations, of perceptual considerations, of pragmatic knowledge or of real world knowledge. For example, longitudinal corpora of child speech reveal that young children acquiring English as their first language do not use complementizers of the type *that* or *whether* during early stages. This omission has been interpreted within this model as the result of a gap in the lexicon: the child has not acquired these items yet and hence cannot use them. Moreover, the absence of overt complementizers is not taken as a proof that the child lacks knowledge of the syntax associated with these items.The German complementizer *dass* 'that' is also acquired relatively late. However, lack of this complementizer in early German does not mean that the German-speaking child does not have knowledge of embedded clauses. Experimental data show that children know about the complementary distribution between *dass* and the finite verb at a stage when the complementizer is not yet spontaneously produced (Weissenborn et al. 1998). Such explanations, however, raise the question of why complementizers and not adjectives, for example, are acquired so late (O'Grady 1997: 333).

Pinker (1984) explains the production of incomplete utterances as the reflex of processing limitations; the child's representation of the meaning of a grammatically incomplete sentence is, according to him, complete:

(10) a. *Mummy* [eat] *apple.*
    b. *I sit* [on] *chair.*

A «processing bottleneck» is assumed to intervene between this meaning representation and the syntactic structure which encodes it, acting like a filter which allows only two-word utterances, three-word utterances, a.s.o. As the child grows older, his /her processing limitations decrease, the constraint is relaxed and the sentences which he/she produces are complete. But such an account also leaves the problem mentioned above unsolved: why does the bottleneck constantly «block» the same type of elements? What exactly modifies the 'bottleneck' so as to make it allow longer utterances?

Weissenborn (1994) relates early grammar deviations from the target language to the child's strategy of avoiding those structures which 'force their computational capacities to their limits' (p. 238). It is however important to notice that, on this view, children's incomplete or simplified utterances are constrained by the so-called Local Well-Formedness Constraint. They involve all the steps of the adult derivation, minus one/some. Thus, early surface strings are seen as the result of incomplete derivations: '[...] the child sometimes fails to complete the derivational process and the premature structure surfaces' (p. 235). Children have knowledge of the full set of operations involved in the derivation (sometimes, correct forms are used in alternation with incompletely derived ones) but they optionally choose to use simpler syntactic structures which require less computational effort.

Another explanation for the differences between child and adult grammars relies on the role of the linguistic input: the changes in the child grammar are interpreted as reflecting changes in the input (Brown and Hanlon 1970, Wexler and Hamburger 1973). Deprez and Pierce (1993) suggest that the child's analysis of the input changes over time, i.e. in the beginning, the child does not analyse the data in the input correctly or he/she does not analyse it at all.

Perceptual considerations have also been invoked as the cause of the lack of certain lexical items or certain structures. The underlying idea is that unstressed morphemes (markers of tense, aspect, agreement) are acquired later than stressed ones (Slobin 1985). The fact that children acquire the preposition *for* before the complementizer *for* (Nishigauchi and Roeper 1987) or the preposition *to* before the infinitival particle *to* (Pinker 1984) have been explained along these lines: the infinitival particle and the complementizer are instances of unstressed morphemes.

Hyams (1996), examining what she calls the 'optional specificity stage' (i.e. the stage when Tense and determiners may be absent) adopts the view that the full set of functional categories is available from the onset of acquisition and proposes that some functional heads are underspecified, in the sense that they must be interpreted deictically. Within such an account, the difference between child and adult grammars is not strictly syntactic but the result of differences between the pragmatic system of the child and that of the adult. The child has to resort to discourse strategies in order to interpret the underspecified elements. Linguistic development involves a restructuring of the mapping between grammar and pragmatics.

One of the main advantages of the Strong Continuity Hypothesis is that, postulating a minimum of difference between child and adult speech, one does not have any difficulty explaining how early grammars turn into adult grammars. The LAD is not assumed to change (or to change in a radical way) and the acquisitionist does not have to attribute 'ad hoc grammars' to the child (Clahsen 1992:56). But it fails to explain the systematic lack of articles, complementizers, (certain) prepositions or verbal morphology in early speech.

2.2 Arguments in favour of the Strong Continuity Hypothesis

One main argument in favour of the Strong Continuity Hypothesis: the availability of movement in early grammar.

Arguments in favour of the Strong Continuity Hypothesis are usually based on the early presence of syntactic movement of lexical elements to functional nodes. The absence of functional elements in overt syntax is not taken to be evidence that the child's phrase marker lacks one or several functional projections. Within such an approach, the overt morphological realisation of functional structure is taken to be preceded by the existence of functional structure.

The theoretical assumption on which such arguments rest is that a maximal projection is legitimate even if its head is not filled with overt material; if an element has moved to the Specifier position of the projection (to check its features in an agreement relation with the abstract features of the head) the projection is justified (Grimshaw 1993, Speas 1993). Re-interpreted from a minimalist perspective, such a view leads to the hypothesis that features can be checked from the onset of acquisition since all the functional projections are assumed to be present. Also, since items come fully inflected from the lexicon, with a set of formal features which need checking and thus cause movement, the lack of overt morphological markers cannot automatically imply that the functional projections associated with those markers are missing. Given that feature checking drives movement, the proponents of this hypothesis have tried to prove that there exists movement during the early stages of language development. If one can prove that early child grammar has movement, this will represent evidence that the phrase marker contains those functional projections which serve as landing sites in the process.

2.2.1 The Null Auxiliary Hypothesis

Boser et al. (1992) examine the properties of the complementizer (CP) system and the acquisition of V2 in early German with a view to providing evidence that the child demonstrates knowledge of verb grammar in German very early (contra those hypotheses which claim that the early categorial inventory of child language is an

impoverished version of that of the adult, Clahsen 1990, Meisel and Müller 1992). Their main assumption is that examples (10a) and (10b), which represent child utterances, are structurally identical to the corresponding adult sentences:

(11)   a. Jem want [$_{IP}$ Mummy [$_I$ e [$_V$ take] it out]
         b. [$_{CP}$ [$_C$ e] [$_{IP}$ [$_{NP}$e][$_I$ e][$_{VP}$ doing what there]]]?

(10a) and (10b) are assumed to contain functional heads and their projections. They differ from their adult counterparts in that the head and the specifier nodes of some projections may remain empty at S-Structure. The theoretical implication would be that maximal projections of functional categories in child speech are allowed even when both the head and the specifier are empty, i.e. null projections are allowed in child grammar:

(12)

```
        XP
       /  \
    Spec   X'
     ∅    /  \
        X⁰    YP      ────────→        XP is allowed
        ∅
```
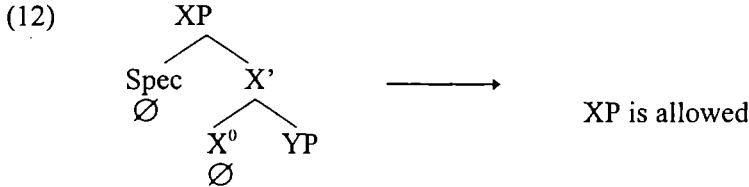
The corpus they use includes recordings of 30 children (aged 21–34 months), whose natural speech was studied in detail, and the results of two experimental elicited imitation studies on 40 children (aged 2–4 years). The target language is German. The samples prove the availability of head movement, in particular of V to C (in 12 below the finite verb has raised from VP), as well as of topicalization (i.e. movement of a DP or an Adverb to CP) at a very early age:

There is evidence that V-to-I-to-C movement is available in early German.

(12)   a. *Hab ein hier.*
            have one here
         b. *Das geht da.*
            that goes there
(13)   a. *Da ist der.*
            there he is
         b. *Mit der papa fahrt Anita.*
            with the papa goes Anita (Boser et al. 1992: 53-54)

Topicalizations are present in 6%–34% of the utterances in the sample which they analysed, throughout all ages.

In between 20% and 66% of the utterances which contain a finite moved verb are questions. Given the fact that in questions the verb moves to C (as shown in 14), these data represent evidence that the child's grammar has V-to-I-to-C movement:

(14)

```
              CP
             /  \
          Spec   C'
                /  \
              C⁰    IP
              Vᵢ   /  \
     I-to-C      Spec   I'
                      /  \
                    I⁰    VP
                  — tᵢ   /  \
                       Spec   V'
                             /  \
              V-to-I       V⁰...
                           tᵢ
```
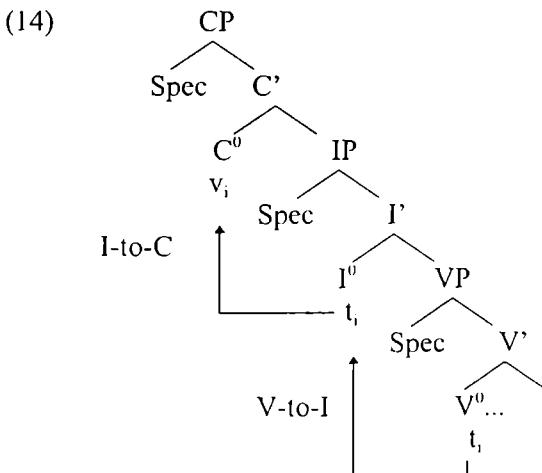
In (15) below *ist* has raised to I and then to C:

(15) *Ist der Bar da?*
      is the bear there

Finite verb movement to C, as well as the wide range of auxiliaries (*haben* 'have', *sein* 'be', *tun* 'do'-dialectal) and modals which always appear in V2 position in the corpus, suggest that IP and CP are available from early stages. The syntactic representation of the child is claimed to be structurally identical to that of the adult throughout development. V-to-I-to-C raising exists in early child grammar, providing evidence that the targeted functional projections are available at this early stage.

But sentences like the ones in (16), though not very frequent, seem to question this proposal:

(16) a. *der eine Hose anziehen*
         he a pants on-put-inf
      b. *nur die Buch mal sehen*
         only the book once see-inf
      c. *Reh gelauf*
         deer run (participle)

The verb is non-finite and occurs in sentence final position, in spite of the fact that it is used in a context in which a finite form is required in the target language. This suggests that the lexical verb has not moved[5,6].

Boser et al. (1992) propose that this early pattern contains a non-overt auxiliary in C at S-Structure. Whenever the lexical verb is non-finite and sentence final it occurs as the complement of a (null) auxiliary which occupies C. This is the so-called *null auxiliary hypothesis* defined as follows:

> (17) *In those structures which contain a non-finite verb form (infinitive or participle) and no overt tensed auxiliary, C is occupied at S-Structure by a null auxiliary moved from its position in V or I, whose phi-features (including tense and agreement features) are recoverable under licensing conditions for null pronominals (in this particular case by Spec-head agreement).*

Arguments that null auxiliaries are licensed by Spec-head agreement are closely linked to the presence of the subject in all the null auxiliary utterances. This allows the null auxiliary, which has moved to C (18), to check its phi-features in a Spec-head agreement configuration whose specifier position is occupied by the overt subject:
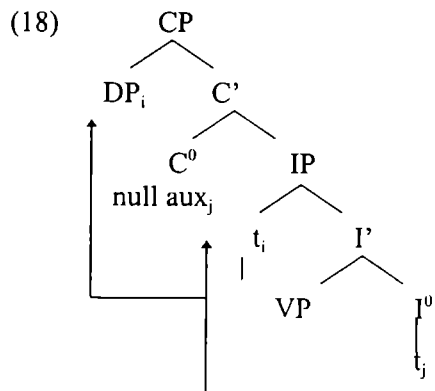
The null auxiliary hypothesis: early non-finite structures have the functional architecture of adult clauses but contain a null auxiliary which has moved to C.

(18)

114

(19)

```
          CP
         /\
       Spec    CP
     Subject  /\
            C⁰   IP
          null aux
```
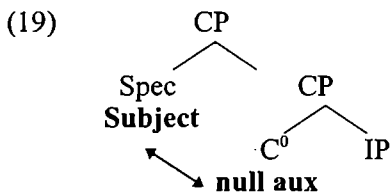
When the topicalized element is a non-subject topic moved to Spec CP, no agreement relationship can obtain between the null auxiliary and the moved element:

(20)

```
            CP
           /\
        Spec    CP
    No Subject  /\
             C⁰    IP
            null aux

        No agreement
```
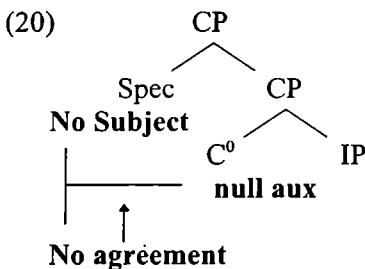
How does the child get rid of the non-adult null-auxiliary utterances? The authors of the study suggest that obligatory realisation of overt auxiliary involves lexical learning. Since lexical realisation of auxiliaries is language-specific, it cannot be derived from UG; the child will have to learn that the auxiliary must be overtly realised and how on the basis of positive evidence.

One advantage of this approach[7] is that the child's grammar does not have to change from no or optional I to C movement to obligatory I to C movement.

A few problems seem to have remained unsolved though. Why do children systematically omit auxiliaries and not other classes of verbs? With Boser et al., the term auxiliary also includes modals, which have a rich semantic content, which means that lack of substantive content (which has often been invoked) cannot be a viable explanation. The null auxiliary hypothesis does not answer this question.

Further arguments against the null auxiliary hypothesis are related to the predictions it makes. If all the clauses in early child language are full CPs, we should come across infinitival wh-questions. But it seems that this prediction is not borne out cross-linguistically. Data from early Dutch (Haegeman 1995), early German and early French (Crisma 1992) show that such utterances are unattested in these early grammars.

One more prediction is that null auxiliaries and hence infinitival constructions should be dependent on the existence of a filled Spec of CP, the landing site of the subject DP. But empirical data disconfirm it. Subjectless infinitival structures as well as infinitival structures with an object or an adverbial in initial position (21) have been attested in child German:

(21)   *das auch mone hol(en)*
        this also (si)mone get
        auch baby essen
        also baby eat (Weissenborn 1994: 219–220)

2.2.2 The Full Competence Hypothesis

Poeppel and Wexler (1993) provide evidence in favour of what they call the full competence hypothesis, a variant of the strong continuity hypothesis, on the basis of empirical data from child German. Within their approach, the child has the adult grammar, in particular:

---

[7] For a discussion on how the null auxiliary hypothesis can answer questions related to the optional infinitive stage see Chapter 6.

115

(i)   the child knows the difference between finite and non-finite forms

(ii)   movement is available, which means that the targeted functional projections are also available

(iii)   word order in child German suggests that the functional projections IP and CP are available at a very early stage.

Their main arguments are related to the position of finite and non-finite verb forms and the status of sentence-initial elements in early child German.

The corpus they examined is the one provided by the transcript of Andreas (age 2; 1, monolingual) from the CHILDES database (MacWhinney and Snow 1985).

The representation of German clauses assumed in the analysis is the one in (22):

(22)

```
                CP
              /    \
           Spec    C'
                  /  \
                C⁰    IP
                     /  \
                  Spec   I'
                        /  \
                      VP    I⁰
                     /  \
                  Spec   V'
                        /  \
                      NP    V⁰
```
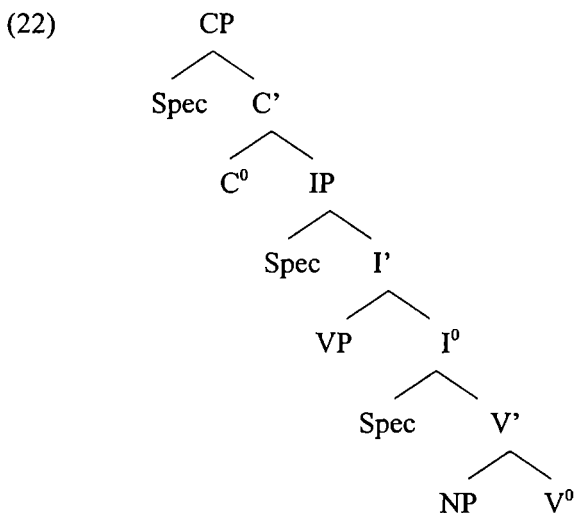
Since German is a verb-second language, when the verb is finite, it moves to I and then to C (V-to-I-to-C movement) and the Specifier position of CP must host an element which has moved to this sentence initial position. This element can be a DP subject, a DP object or an adverb:

(23)

```
                 *CP
               /     \
           Spec       C'
           DP/Adv.   /  \
                   C⁰    IP
                        /  \
                       I'
                      /  \
                    VP    I⁰
                   /  \
                  V'
                 /  \
               DP    V⁰
              finite verb
```
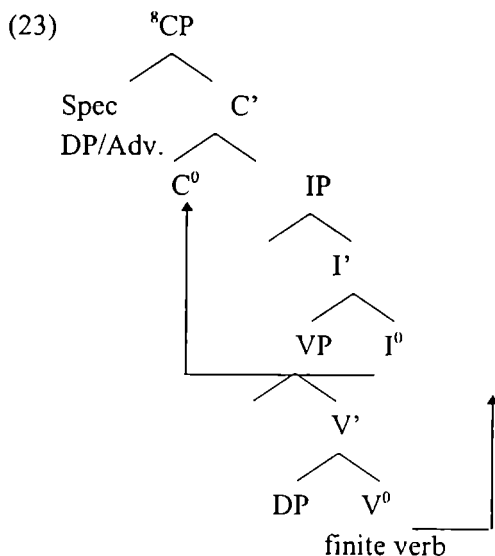
But if the verb is non-finite, it will remain in its sentence-final position:

_____

^ᵏ Poeppel and Wexler use this representation for the German phrase-marker in order to capture the word order O-V.

(24)

```
          CP
         /\
           C'
          /\
        C⁰   IP
            /\
              I'
             /\
           VP   I⁰
          /\
        V'
       /\
     DP  ┌─────────────┐
         │ V⁰          │
         │ non-finite verb │
         └─────────────┘
```
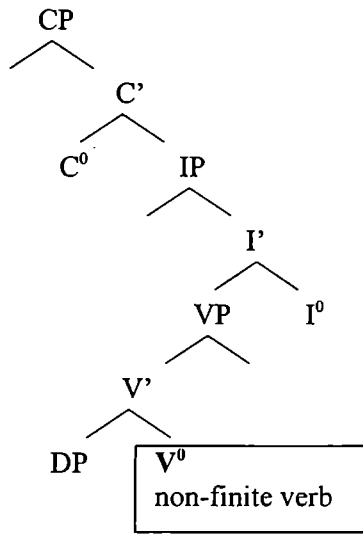
On this model, child and adult German are identical. Hence the prediction is that we should find the alternation finite-verb in C^0 – non-finite verb under the VP in the matrix clauses available in samples of early German.

Poeppel and Wexler examined 282 indicative declarative sentences present in the corpus. The empirical data show that there is contingency between the position of the verb and its inflectional status, as seen in Table 1 below:

Table 1

	+ Finite Verb	– Finite Verb
Verb Second	216 utterances	7 utterances
Verb Final	15 utterances	44 utterances

(Poeppel & Wexler 1993: 6)

Andreas places the finite verb in verb second position most of the time, which indicates availability of verb movement at this stage of linguistic development. After the first screening, all the two-word utterances were eliminated (since in such sentences the second position was also the last position). The results are not different from the ones in Table 1. Out of 282 declaratives, only 251 sentences were at least three-word utterances. The examination of the data reveals the same consistent and systematic distinction between finite/non-finite verbs at this early stage, as can be seen in Table 2:

Table 2

	+ Finite Verb	– Finite Verb
Verb Second	197	6
Verb Final	11	37

(Poeppel & Wexler 1993: 7)

The consistent contingency between the inflectional status of the verb and its placement in the sentence is taken to represent solid proof that verb movement is available and that the functional projections targeted by verb movement (IP and CP) are present in the child's phrase marker at this early stage. In spite of the fact that overt complementizers are not present, the availability of head-to-head movement of the verb shows that the functional projection associated with complementizers is present. The same movement proves that the phrase marker contains an IP, in spite of the fact that Andreas may occasionally use the infinitival form of the verb in matrix clauses.

Further evidence in favour of the Full Competence hypothesis comes from the analysis of the status of the element which occurs in sentence-initial position in those utterances in which the verb has moved out of the VP. The key idea is that if we only came across DP subjects in sentence initial position we would not have clear evidence that the verb moved as high up as C^0. Sentence-initial DP-subjects could have raised to

> The Full Competence Hypothesis: all the functional projections of the adult phrase marker are available from the onset of acquisition; movement is also available.

117

Spec IP in which case the verb could have landed in I⁰. But if other elements (DP objects or adverbs) are found in sentence initial position, this will provide convincing evidence that the verb is in C⁰. Andreas' corpus contains 180 sentences with overt subjects out of which 50 have a non-subject element in sentence-initial position. This proves the availability of both IP and CP. The conclusion Poeppel & Wexler reach on the basis of these data is that the grammatical system of the child is in place from the onset of multiword speech.

Though providing evidence that the early inflectional system in child German is identical to the adult grammar, the study does not answer the question raised by the infinitival forms used in 'finite' environment in early child grammar: why are such forms used in matrix clauses, if the child can systematically distinguish between finite and non-finite forms?

2.2.3 Minimalist Arguments

Overt morphological markers are omitted in early grammar because the child tries to avoid incorrect forms.

Most proponents of the (Strong) Continuity Hypothesis, though providing evidence in favour of movement to functional projections, cannot account in a direct way for the systematic absence of overt functional material in early child grammar. Borer and Rohrbacher (1998) argue that it is precisely the absence of this overt material «which provides evidence FOR, rather than AGAINST, the existence of functional structure in the early grammar» (p. 4).

According to their scenario, the child will constantly and systematically avoid using functional material in an attempt at avoiding incorrect forms whose morpho-phonology he/she has not acquired yet. Functional projections are present from the onset of acquisition but the child has no knowledge of the corresponding functional morphemes.

Arguments in favour of this view are mainly theory-internal and they are discussed within the framework provided by the early Minimalist Program (Chomsky 1993). According to this model, each lexical item (verbs included) comes fully inflected from the lexicon, i.e. each item which enters the Numeration carries formal features and is inserted in the syntactic structure fully inflected. These features are checked, in the derivation, via overt or covert movement, against the content of functional heads. For example, a verb comes fully inflected from the lexicon (with tense and agreement markers), it carries a set of V-features and is inserted into V. The subject DP carries a set of N-features and is inserted in the specifier position of VP. Inflection, in its turn, has a set of V-features and a set of N-features. The subject DP moves to the specifier of IP, where its N-features are checked against the N-features of I, and the verb moves to I, where its V-features are checked against the V-feature of Inflection. If all the features match (as in 25), they are eliminated and the derivation is legitimate:

(25)   IP
      Spec   I'
               I⁰   VP
      NPᵢ   Vₖ   I   tᵢ   tₖ
      She *dances* N-f V-f
      N-f   V-f   ~~3SG~~ ~~3SG~~
      ~~3SG~~ ~~3SG~~-PRES ~~─~~
             ~~PRES~~
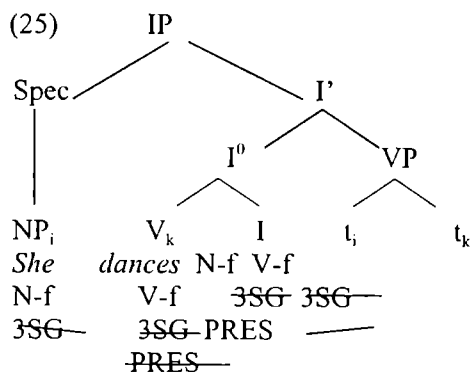
If one of the features of Infl conflicts with one of the V-features of the verb (as the ones bolded in 26) or with one of the N features of the noun, the derivation will crash at PF:

(26)   *IP

```
            *IP
          /      \
    Spec /        \ I'
    NP_i         /    \
              I⁰       VP
             /  \     /  \
           V_k   I   t_i  t_k
        I  dances N-f V-f
        N-f  3SG  1SG  1SG
        1̶S̶G̶  P̶R̶E̶S̶
```
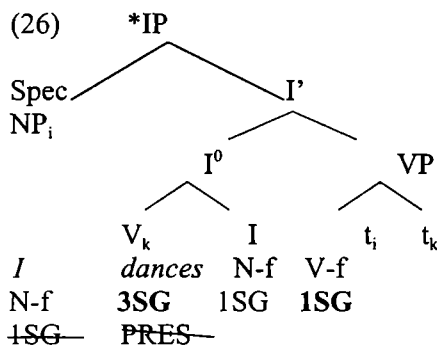
What makes (26) ungrammatical is precisely the presence of Inflection which has features that do not match with those of the verb. This fact shows that in the absence of a functional projection IP, nothing would prevent, according to Borer and Rohrbacher, a sentence like (27):

(27)   *I dances.

Without IP, the features of the inflected forms could not be checked and hence syntactically inappropriate forms could not be ruled out.

The prediction for language acquisition would then be that children would use inflected forms randomly if their phrase marker did not have an IP. Empirical data support the Strong Continuity hypothesis. When morphemes are used, they are used correctly, which means that they are subject to adult-like checking and consequently the child's phrase marker must contain the same functional projections (relevant for the checking process) as the phrase marker of adult grammar. For example, when tense and agreement morphology is used in early English, it is used correctly (Harris & Wexler 1996). When German-speaking children use agreement markers, they use them correctly (Clahsen & Penke 1992). In child Greek there are no unambiguous agreement mistakes (Varlokosta, Vainikka & Rohrbacher 1996). Finally, agreement mistakes are rare in French (Pierce 1992), Italian (Guasti 1994), Spanish and Catalan (Torrens 1995)[9].

On such an account, language development is reduced to the acquisition of morphological markers, a conclusion which falls nicely within the general minimalist assumption that morphology is the locus of language variation. The child is endowed with UG, which is active from the onset of acquisition; what the child has to learn is the morphology of his/her target language.

Borer & Rohrbacher (1998) also claim that there exists empirical evidence which shows that lack of functional projections leads to random usage of inflected forms. They compare child language to the speech of agrammatic aphasic patients, which has been argued to reflect the loss of functional structure. The inflected forms are always used correctly in child language, while studies of agrammatic aphasic patients (whose native language is French, Italian or Hebrew) reveal that they produce a substantial number of tense and agreement mistakes[10]. Within the minimalist framework adopted in their study, the random use of morphological markers can only be explained as the reflex of the absence of functional projections. The features of the fully inflected items cannot be checked against a relevant syntactic environment. The conclusion they reach is the

---

[9] But see *Accounts of the Optional Infinitive Stage* for empirical data from child English which contradict this generalisation.

[10] Sentences (i) and (ii) below illustrate the type of mistakes they make:

(i)   *Poi ritorna la mia casa.*
       then return3SG to my house
       'Then I return home'.

(ii)   *Le loup demande au où il va.*
       the wolf asks to-the where he go-3SG
       'The wolf asks Little Red Riding Hood where he is going' (Borer & Rohrbacher 1998: 14–15)

119

following: 'While the random behaviour of agrammatic patients is entirely compatible with the loss of functional projections, the contrast between agrammatic patients and children strongly supports the claim that in the early grammar, these functional projections are present.' (p.16).

At least one problem remains unsolved: if, under minimalist assumptions, all the items come fully inflected from the lexicon, what exactly in early grammars allows the child to take some items bare from the lexicon before he/she acquires the morphology of the target language? One possible solution would be to question the strong lexicalist assumption of the Minimalist Program according to which all the items come fully inflected from the lexicon. The mistakes which one comes across in child language may suggest that some morphology (agreement on the verb, for example) cannot come straight from the lexicon but is filtered by syntax. One would need to assume that there is access, in the computational system, to morphology after (Bonet 1991, Chomsky 1995) or before (Avram 1998) Spell-Out. The child's access to this component may be delayed by lack of knowledge of the paradigm, i.e. certain items cannot be always retrieved when needed, as well as by the heavy computational load they may involve.

> The Disconti-
> nuity Hypo-
> thesis: UG is
> not available
> from the onset
> of acquisition;
> early grammar
> is fundamen-
> tally different
> from adult
> grammar.

3. The Discontinuity Hypothesis

3.1 Main assumptions

At the other extreme, acquisitionists claim that early stages in language development are not constrained by principles of UG. Within such an approach, the child's phrase marker is fundamentally different from the phrase marker of adult grammars and there is discontinuity in development from child to adult grammar. The early grammar is constrained only by those principles that have matured, but may violate those UG principles which have not been subject to maturation yet. The child can produce structures which represent violations of UG, i.e. wild grammars are possible.

Maturation plays an important part in the explanation of the orderly progression of stages which is hypothesised to be driven by a biologically determined timetable and which is, to a certain extent, independent of experience.

In spite of the fact that discontinuity approaches rely mainly on maturation to accommodate developmental facts (Felix 1988, 1992), maturation should not be necessarily associated only with this model of syntactic development. There are studies which invoke maturation as a possible explanation but which argue in favour of one form or the other of the continuity hypothesis. Borer & Wexler (1987) and Wexler (1992) propose what they call a UG-Constrained Maturation, a hypothesis which 'casts the study of Universal Grammar solidly within a biological framework, where maturation is central to development' (1992: 148). On such a view, child grammar is governed by UG principles at every stage (the very early ones included) but certain structural descriptions (made available by UG) are maturationally unavailable to the child until a certain age. Wild grammars are impossible under such a hypothesis. Tsimpli (1991) puts forth the idea that maturation affects only the acquisition of functional categories, not the principles of UG, which are, according to her, available from the onset of acquisition. Stevenson (1992) provides data from binding theory as evidence in favour of the continuity view and maturation.

> Language
> acquisition is
> driven by
> biologically
> determined
> mechanisms.

3.2 Language Acquisition as a maturational process

One of the proponents of the discontinuity hypothesis, Sasha Felix, put forth the idea that language acquisition is a process driven primarily by internal, biologically

determined mechanisms. According to Felix (1984, 1987,1992) the principles of UG are not fully available and active from the very beginning of the language acquisition process; they emerge successively, in a specific order, determined by a maturational schedule:

> *Although the set of universal principles is fully and exhaustively specified by the child's genetic program, each of these principles is somehow 'latent' up to a specific point in time after which it will start to operate and thus constrain the child's knowledge of what may be a humanly accessible language.* (Felix 1978:114)

He opposes 'maturationism' to what he calls 'perceptionism' (according to which child grammars fall completely under the constraints of UG), arguing that 'UG is not the only [...] component that controls language development, but rather that -in addition to UG- there is an innate maturational schedule which, loosely speaking, determines what the child will do at what time.' (Felix 1992: 27). Such a hypothesis seems to render the innateness hypothesis even stronger since it proposes that the child is not only endowed with UG (though not operative from the beginning) but also with a biological mechanism, which is responsible for the successive ordering of stages in the process of acquisition.

> Early grammar generates structures which violate principles of UG.

Felix's main argument is that early child grammars do generate structures that violate principles of UG in different domains. The only possible explanation is, according to him, the inoperativeness of the relevant principle(s) at that particular stage. For example, during the earliest two-word stage, English-speaking children produce utterances like the ones in (28):

(28) a. *Mummy bathroom* (for 'Mummy is in the bathroom")
  b. *sit lap* (for 'want to sit on Mummy's lap')
  c. *throw daddy* (for 'throw it to Daddy')
  d. *slipper doggie* (for 'Put the slipper on the doggie') (Felix 1992:30)

According to Felix (1992) such utterances represent headless maximal projections which violate X-bar theory according to which a maximal projection must have a head. Children's language seems to be structured entirely on the basis of semantic categories and semantic relations are directly mapped to surface expressions without any intervening syntactic level. The child will know the correct order of lexical heads and their complement(s) as soon as the maturational emergence of X-bar principles has occurred.

During early stages, children also frequently produce noun+noun constructions in a subject-object relationship, as illustrated in (29):

(29) a. *baby milk* (for 'the bay wants the milk glass')
  b. *cat more meat* (for 'the cat needs more meat')
  c. *girl dress* (for 'the girl is wearing a dress') (Felix 1992:32)

In such constructions, the verb is constantly omitted, which means that there is no theta-role assigner in the utterance, in violation of theta-theory. The only possible explanation would be that the Theta-criterion[11] is not available yet. The child will abandon such verbless structures as soon as this principle emerges.

Further arguments that child grammar violates principles of UG come, according to Felix, from the domain of Case theory, which is responsible for explaining constituent order constraints in natural languages. Sentences like the ones in (30) below are taken as indicative of the children's lack of knowledge of Case theory:

(30) a. *balloon throw* (O-V)
  b. *Mommy hit Kendall* (O-V-S)

The word order in (30a-b) is taken to be a violation of UG. However, such utterances cannot represent instances of wild grammars, since OV and OVS are allowed in other languages. They represent deviations from the target grammar, not from UG.

---

[11] The Theta criterion states that each argument in a sentence must bear a thematic role (Agent, Patient, Theme, Experiencer). The verb is a prototypical theta-role assigner.

In Felix (1984, 1987) the developmental sequence of child German is analysed along the same lines. It is argued that the German-speaking child begins with a stage during which the order of constituents is randomly used, in violation of X-bar theory. The transition from this early stage to the next one, when the word orders SOV and SVO are no longer randomly used, is accounted for by assuming that X-bar principles mature some time before the second stage[12].

Placing maturation at the core of language development, such a discontinuity approach enhances the view that language is part of our biological endowment and is in line with studies of the development of other innate biological systems. Also, the claim that there are critical developmental points for various properties of UG (see also Borer and Wexler 1987) can explain why certain structures emerge in a certain ordering along the developmental process. However, it fails to provide an explanation for how the child can search within the huge hypothesis space with no constraints to help him/her.

4. The Weak Continuity Hypothesis

4.1 Main assumptions

> The Weak Continuity Hypothesis: in early grammars some (all) principles of UG are available, but some (all) functional projections are missing.

The proponents of this model of language development take the absence of overt inflectional morphemes as the reflex of the absence of those functional projections associated with the missing markers. If the head of a particular projection is not overtly realised, there is no maximal projection and hence no possible landing sites for any related movement. Unlike the proponents of the Strong Continuity Hypothesis, those who argue for a weak version of continuity do not allow empty projections. A projection must have its head filled with lexical material, i.e. the affixes associated with that particular projection have to be overt or, according to less radical proponents, a projection is justified if its head is either filled with lexical material or contains abstract features (in which case, the Specifier position must be filled). This less radical assumption subsumes the principle of economy of representation as stated in Chomsky (1989), Grimshaw (1993) or Speas (1994).

Within this approach, the child's phrase marker deviates from the adult phrase marker (one or several functional projections may be missing at an early stage) but the utterances produced by the child do not violate UG at any point. Wild grammars are not allowed.

The Weak Continuity Hypothesis can be said to fall into two main variants:

(i) **The No Functional Projection Model**, which goes rather radical in holding that there are no functional projections at all at the onset of acquisition (Guilfoyle and Noonan 1988, Lebeaux 1988, Radford 1990, Platzack 1990, Powers 1996, a.o.). The total lack of functional categories may qualify this approach as a discontinuity one. However, most of the studies arguing in favour of the weak continuity hypothesis do not deny the availability and operativity of some or all UG principles. On the contrary, some of them explicitly show that child utterances are constrained by theta-theory or X-bar theory.

(ii) **The Truncation Structure Model**, which holds that lower functional projections are available from the start, whereas the higher ones are acquired at a later stage (Meisel & Müller 1992, Rizzi 1993/1994, Weissenborn 1994, Ingham 1998). Some truncation studies assume that there is one single, underspecified functional projection available at the early stages of acquisition (Clahsen 1991, Hoekstra, Hyams & Becker 1996).

The developmental accounts proposed across the two variants of the Weak Continuity Hypothesis are quite different from one another. Several positions have been taken

---

[12] For a critical discussion of Felix's analysis of the German data see Clahsen (1992).

122

with respect to how the missing functional projections emerge in the course of acquisition. One position argues that they develop gradually (Tsimpli 1991, Vainikka 1993/1994, Powers 1996). The other position supports the view that all the functional projections appear at once (Radford 1990). The role of maturation in the growth of the phrase marker is invoked by some acquisitionists (Radford 1990, Tsimpli 1991, Rizzi 1993/1994) but denied by others (Vainikka 1993/1994, Powers 1996).

In what follows a selection of studies representative for each main position will be presented.

4.2 The No Functional Projection Model

4.2.1. The lexical theta-subtree account

On a no-functional-projection model, at the SWS, child speech lacks all functional elements. The child's first structures are claimed to be lexical.

Lebeaux (1988) is one of the first proponents of the hypothesis that early grammar is purely lexical, a mere representation of argument structure. Its content is determined by X^0 (lexical) elements; an utterance like *eat,* for example, would have the following representation:

> The No-Functional Projection Hypothesis: early projections are purely lexical.

(31)

```
          V
        /   \
 (agent)     V
           /   \
          V    (patient)
         eat
```
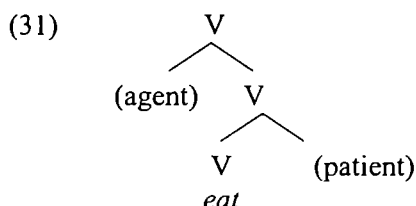
The theta-grid of each word is represented in a tree-form in the lexicon. The tree is not a maximal projection since it is not formed through projection. At the SWS, there is no syntax in the child's speech. But words are not used in vacuum; they are associated with a theta-grid which is not overtly realised. This is a lexical stage, during which words (or single word utterances) are a representation of pure theta-relations.

The theoretical implications of this view are manifold. On the one hand, the theta-grid is allowed real syntactic status. On the other hand, the demarcation between lexicon and syntax is weakened: they both use the same type of formal representation (i.e. tree structures). From the point of view of acquisition, Lebeaux's view suggests that theta-relations are analytically prior to other types of primitives (such as case-theoretical primitives, for example) and, in supporting the view that the child starts with a lexical-looking grammar he actually argues in favour of the semantic bootstrapping hypothesis (Pinker 1989, 1994, Grimshaw 1989).

What developmental story does Lebeaux suggest? How does the child build the adult phrase structure in the end within this approach? He puts forth the following hypothesis: since the Projection Principle[13] plays a crucial role in the adult grammar, it would be odd to think that it plays no part in early grammar as well. It should be construed, Lebeaux argues, as a continually applying rule Project α, which holds at all levels of representation. In the course of acquisition, it behaves as a rule which matches the lexical tree to the syntactic tree, i.e. which generates the phrasal syntax from the lexical syntax and binds the two together:

---

[13] One possible definition of this principle could be: Lexical information is syntactically represented.

(32)   V   Project α   VP
       /\   ────────→   \
         V   V'
        /\   /\
     see   ( )   see   ball
Lexical entry (at SWS)   Syntactic projection (at EMWS)
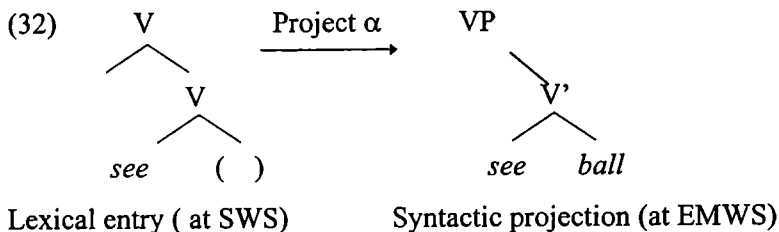
The lexical representation projects itself into the phrasal syntax, retaining the structure of the lexical entry. The information encoded in the lexical entry is faithfully projected. The output of Project α includes both the lexical information and the syntactic one. As can be noticed in (32), at the EMWS the phrasal system is not complete yet. Functional elements are still absent.

At the LMWS, functional elements emerge; evidence in favour of their emergence is presence in the surface string, their overt realisation:

(33)   LMWS *see (the) ball*
        VP
       /\
          V'
         /\
       V^0 DP
       see   (the) ball
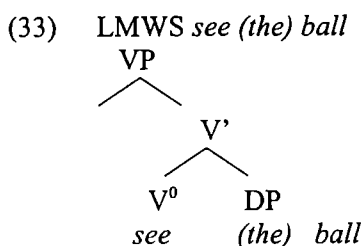
Lebeaux proposes that levels of grammatical representation correspond to the output of acquisition stages (the so-called General Congruence Principle), an idea which is at the core of any structure-building account of language development[14].

4.2.2 A radical approach

Radford (1990) is one of the most radical proponents of the No Functional Projection Hypothesis. According to his developmental model, the syntactic structures found in early child English differ from those found in adult English in two respects:

(i)   child sentence structures lack functional elements altogether, being projections of lexical heads (N, V, A, P) only;
(ii)   child sentence structures represent lexical categories bound together by thematic relations.

Just like with Lebeaux (1988), during the SWS, child speech is assumed to be purely lexical. Radford (1990), though, goes more radical. At this age, he claims, child speech is also acategorial. Words have phonological and semantic properties, but they lack categorial ones[15]. For example, the child knows that *cat* has the phonological form /kæt/ and he/she associates it with a certain constant meaning; but he/she does not know that *cat* is a common countable noun. That is why Radford calls this stage the *precategorial stage*.

---

[14] Some researchers treat Lebeaux's acquisition model as an instance of the Discontinuity Hypothesis: 'Clearly, the Lebeaux's proposal instantiates a discontinuity hypothesis regarding UG, because it fractionates grammars in terms of levels of representation. In the adult grammar, in contrast, levels of representation cannot be dissociated from each other' (Lust 1994:89). However, we have seen that early representations do not violate all the principles of UG and hence Lebeaux's proposal cannot be interpreted as support in favour of the Discontinuity hypothesis (at least, not as it has been defined in this chapter).

[15] This proposal can also be found in Atkinson (1985), who argues against the child's access to a system of syntactic representation at the SWS or in Berman (1988), where the one-word phase of language acquisition is described as largely 'agrammatical'. For a different point of view, according to which child speech is categorial, see Powers (1996).

Categorisation emerges in child speech once there is clear evidence that inflectional morphemes are used selectively, contrastively and appropriately. Empirical data suggest that at the EMWS (possibly around the age of 20 months), the child grammar produces word combinations which look very much like maximal projections:

(34)   a.*Cup tea.*
        b.*Big plane.*
        c.*Open box.*
        d.*Want Teddy.* (Radford 1990)

At this stage, syntax is organised in terms of grammatical classes and grammatical relations. The structures are no longer acategorial, they turn into categorial-thematic structures, i.e. their constituents have both a categorial and a thematic function:

(35)

```
           VP
          /  \
        NP    V'
              / \
             V   NP (Patient)

Agent        V   NP (Patient)

Baby        eat  cookies
```
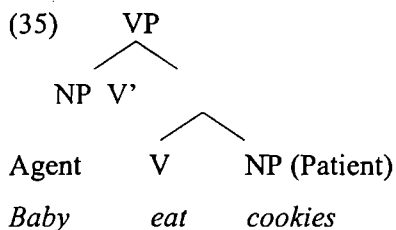
Categorisation and projection become operative at the same time since projection is seen as an inherently categorial process: 'Once we have evidence that children have developed the four lexical word categories N, V, P and A we also find evidence that they «know» how to project them into the corresponding phrasal categories NP, VP, PP and AP, and thus have developed an N-system, V-system, P-system and A-system' (Radford 1990).

As can be seen in (35) above, child speech still lacks functional categories. This stage is called, in Radford's model, the *lexical stage*. The child's phrase marker deviates from the adult's in that the grammar does not project functional categories yet:

(36)

```
    ┌──────────────────┐
    │  CP              │ ──────→ absent
    │   /\             │
    │     IP           │
    │     /\           │
    │  Spec   I'       │
    │        /\        │
    │      I⁰   VP      │
    └────────┘  /\
               V'
              /  \
            V⁰    DP ──────→ absent
                  /\
                 D'
                /  \
              D⁰    NP
                    /\
                   N'
                   /\
                  N⁰
```
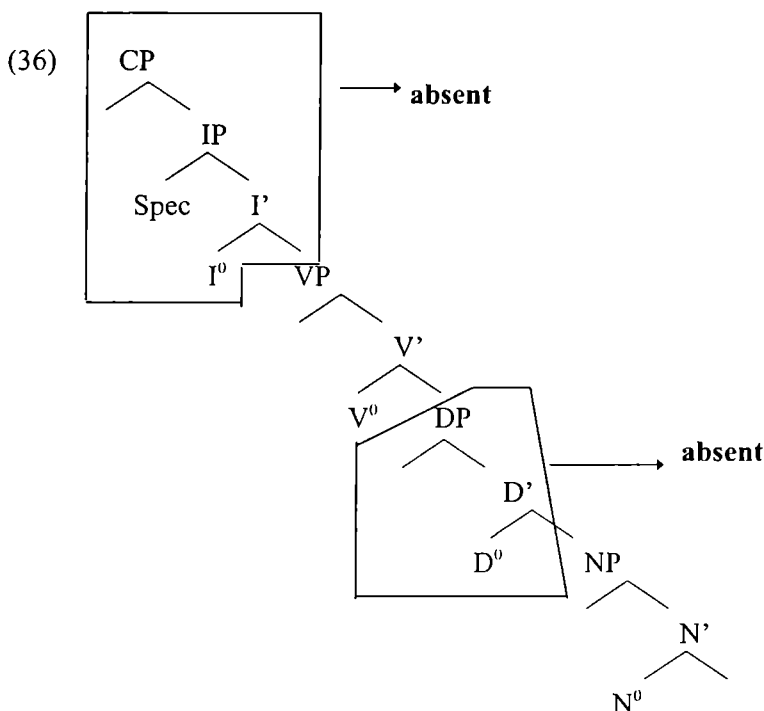
But lexical categories, available at this stage, project according to X-bar theory' and the tree also reflects the thematic relations between the constituents of the phrase:

(37)   *Baby eat cookies.*

```
                    VP
                   ╱╲
           NP          V'
                      ╱╲
    Agent  ←— V⁰          NP
                           Patient
```
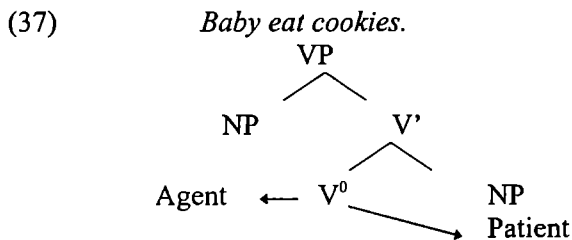
In this respect, child's grammar is identical to the adult's.

Evidence in favour of the lack of functional categories at this early stage comes from the Determiner domain, the Inflection domain and the Complementizer domain.

The systematic absence of articles or any premodifying determiners is taken as the most obvious proof that children use nominals which lack a syntactically projected D-system in contexts where adult grammar requires DPs:

(38)   a. *Where helicopter?*
        b. *Stick gone.*
        c. *Reading book.*
        d. *Want ball*

Possessive '*s* is also absent from child speech:

(39)   a. *That Kimmy ball.*
        b. *Mommy shoe.*
        c. *Kathryn sock.* (Radford 1990: 106–107)

Given that the I-system is absent, the prediction will be that children utterances should not contain modals[16], auxiliaries or Tense and Agreement affixes. The prediction is borne out by empirical data. At this stage children systematically omit modals, both in spontaneous speech and in imitation tasks (40), the auxiliaries *have, be* or *do* are not productive (41) and negative sentences do not contain auxiliaries (42):

(40)	Adult model sentence	Child's imitation
	a. *Mr Miller will try.*	*Miller try.*
	b. *I will read the book.*	*Read book.*
	c. *I can see a cow.*	*See cow.*
(41)	a. *Daddy gone.*	
	b. *Tractor broken.*	
(42)	a. *Man no go there.*	
	b. *no lamb have it* (Radford 1990)	

During the lexical stage, children use tenseless/agreementless verbal forms in contexts which require a verb inflected for tense and agreement [17]:

(43)   a. *Mommy go.*
        b. Adult: *What did you draw?*
           Child: *Hayley draw boat.*

Infinitival *to* is also absent:

---

[16] Radford adopts the current GB view that the English modals are base-generated under Inflection.

[17] Ever since Pollock (1989) Tense and Agreement are distinct categories, which head their own projection. From the point of view of acquisition, on a structure-building model, this implies that one is acquired after the other; there might be a stage when Tense has been acquired, for example, but when Agreement is still absent. This hypothesis has been proved correct in some studies, as for example in Ingham (1998) where it is argued that there is a stage in English-speaking children's language development when Tense but not Agreement is present. The other way round, one might take the acquisition data as support in favour of the existence of two distinct categories: Tense and Agreement.

126

(44)   a. *want go out*
       b.*want Daddy get chocolate*

Given the fact that early child English shows no evidence of acquisition of the morphosyntax of those elements associated with Inflection, we also expect child grammar to lack Nominative Case assignment. Moreover, Case is a property of DPs. Since the D-system is absent at this stage, Case plays no role and the Case Filter cannot be operative.

The C-system, associated with elements which are both functional and non-thematic, is also missing at the lexical stage. Children's complement clauses lack overt complementizers (45),   Subject-Auxiliary inversion does not apply (46) and Wh-movement is not productive (47):

(45)   a. *want hat on.*
       b. *want baby talking*
(46)   a. *Fraser water ?*
       b. *Chair go?*
       c. *Mommy eggnog?*
(47)   Adult model   Child's imitation
       a.*Where does daddy go?*   *Daddy go?*
       b.*Where shall I go?*   *Go.*

Children continue to misanalyse initial wh-expressions in copula construction as subjects even at a later stage:

(48)   a. *What colour is these ?*   -
       b. *What's those?*

They also give inappropriate replies to wh - questions:

(49)   a. *Who did you play with? Me.*
       b. *What's he doing? Daddy.*

The empirical data in (45) – (49) are taken as strong evidence that children's early grammar lacks a C-system.

Radford's hypothesis is that, at this stage, children's utterances are adult small clauses (defined as in Stowell 1981). They begin with the acategorial stage, then enter the lexical stage (when lexical categories are projected as in adult grammar but when functional categories are still conspicuously absent) .The linguistic system of the child has to mature before he/she is able to produce full syntactic trees, which contain both lexical and functional projections. At about the age of 24 months, Radford argues, the child enters the functional stage.

Radford's theory has been adopted as a framework in many subsequent studies which tried, however, to be less radical. Radford himself adopts a structure-building model of development in Radford (1996), within which functional projections emerge gradually: 'one layer at a time' (p. 66).

4.3 The truncation model

A more moderate approach to the absence of functional categories in early child language is the one in terms of truncation.

Rizzi (1993/1994) assumes that in adult grammar the phrasal structure is always a CP and the principle in (50), the axiom of the system, is always operative:

(50) root clause = CP

Truncation theory: children start with truncated utterances in which the higher layer (TP and above TP) is missing.

127

Children start with a slightly unspecified UG: certain principles, namely the axiom in (50) are not operative from the onset of acquisition. When (50) is not operative, the child may take other categories as legitimate roots, and will produce truncated utterances in which the CP layer may be missing. This theory opens up the possibility that the child take any maximal projection as the root: VP, AgroP, AgrsP or CP. If a projection is truncated at a certain point, all the projections dominating that particular point will also be missing.

The axiom in (50) is claimed to be subject to maturation since some principles can «be triggered, or mature later in the mind» (Rizzi 1993/1994: 373). The moment the axiom matures, the child will 'know' that every root clause has to be a CP and truncated structures will be banned.

This account has great explanatory power and it predicts a number of generalisations with respect to properties of the so-called optional infinitive stage, when children optionally use non-finite structures in contexts which require finite verbal forms in the adult grammar. On this view, early infinitival structures are due to the fact that higher projections are still missing, and are defined as bare VPs or AgroPs. Since CP is missing, we do not expect infinitival wh-questions to occur at this stage. Thus, the truncation approach can elegantly explain why sentences like the ones in (51)-(52) are not attested in child French and child German but leaves open the question of why similar infinitival wh-questions are allowed in child English (Bromberg and Wexler 1995) (53):

(51)   *Où maman aller?
       where mother go-INF (Crisma 1992)
(52)   *Was Hans essen?
       What Hans eat-INF (Weissenborn 1992)
(53)   Where go?

Further evidence in favour of this theory comes from the acquisition of Dutch weak pronouns. In Haegeman's (1996) analysis, object clitics in Dutch are argued to emerge late because, as predicted by the truncation hypothesis, certain higher functional projections are missing at this stage. She proposes that the clausal domain in West-Germanic SOV languages contains (at least) three zones:

(54)   C [Zone 1] adverb [Zone 2] Neg [Zone 3] V finite

Zone 1 is the domain between the complementizer and the highest sentential adverbial, and it hosts the definite subject, clitic objects, weak pronoun objects and some scrambled objects. Zone 2 is the domain of Object Shift and it contains sentence adverbials, strong pronouns and definite DPs. Zone 3 is the domain between Negation and the finite verb. The rarity of object clitics in root infinitives in child Dutch follows straightforwardly from this description of the phrase structure and the truncation theory. Object clitics are assumed to occupy a position in Zone 1, i.e. higher than TP and AgrP:

(55)   CP>FP>TP>AGRoP>NEGP>PREDP>VP

FP, being higher than TP, is absent at this stage and hence there is no position to which the object clitic could move. As soon as the child 'knows' that every root clause is a CP, FP will be available and clitics will be appropriately used.

Many acquisition studies show that auxiliaries are often omitted during early stages of linguistic development. Since auxiliaries have been analysed as related to Inflection (more often than not either as base generated in or moved to the Tense projection), their omission follows straightforwardly from the hypothesis that the Tense projection is absent at this early stage. Utterances like the ones in (56) are unattested:

(56)   *avoir mangé
       have –INF eaten

128

être venu
be-INF come
gekauft haben
bought have-INF (Rizzi 1993/1994: 380)

Rizzi's model does not differ in a radical way from the one proposed in Clahsen (1990) or Clahsen et al. (1996), where it is claimed that at an early stage in the development of child German the child's lexicon contains elements categorized as [+F (inite)], such as modals and the verb suffix -*t* (which could be, according to Clahsen, an aspectual marker). [+F] is underspecified with respect to its syntactic category and its interpretation does not involve subject agreement. What Rizzi's and Clahsen's models share is the idea that early representations are incomplete versions of the adult ones and that child grammar is, somehow, underspecified.

The highest projection is, at this stage, on Clahsen's model, a projection of F:

(57)
```
              FP
             /\
               F'
              /\
         [+F]    VP
                /\
             Neg   VP
                  /\
                    V'
                   /\
               V⁰ ...
```
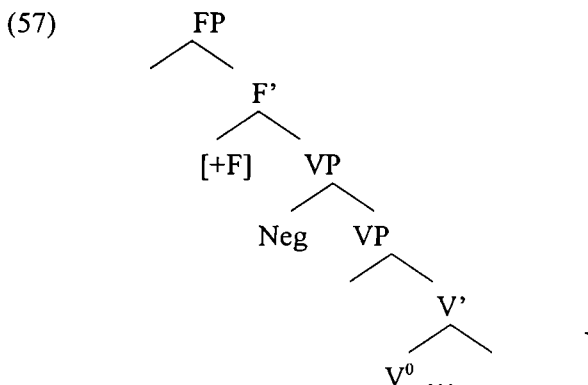
But, if modals do indeed occupy the F projection and if F stands for finiteness, this highest projection seems to be less underspecified than claimed. Ingham (1998) correctly points out that within Clahsen's approach there is a stage when the child «knows» Tense; what the child grammar seems to lack is an agreement system and a C-system.

The truncation approach adds to the No Functional Projection Hypothesis the assumption that the child's phrase marker does not necessarily have to be stripped off of all functional projections. Some projections may be absent at the very beginning; some others may be present but may be underspecified. This model development is somehow at the borderline between weak continuity models and full competence ones.

SUMMARY

In this chapter, the main models of syntactic development have been presented:

A. The Strong Continuity Hypothesis

Radical version   Weaker version

B. The Discontinuity Hypothesis

C. The Weak Continuity Hypothesis

The No Functional Projection Hypothesis   The Truncation Model
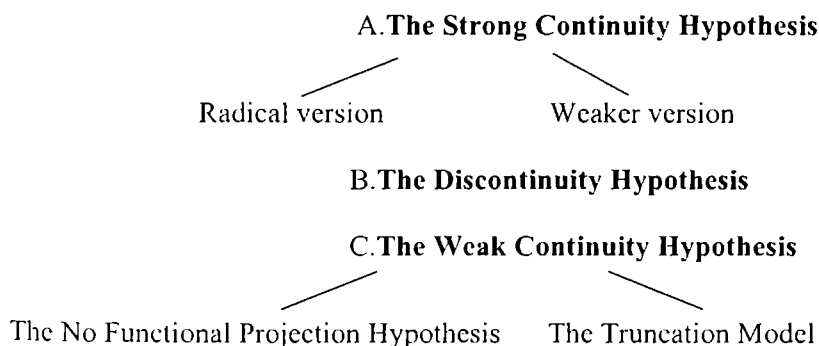
The core assumptions of these three main models with respect to the availability/non-availability of UG principles and parameters as well as with respect to the structure of early phrase markers are summarised in the table below:

	STRONG CONTINUITY	WEAK CONTINUITY	DISCONTINUITY
Availability of UG Principles and parameters at the onset of acquisition	All the principles and parameters are available and operative in the early grammar. The early representations need (radical version) /need not (weaker version) obey the parametric values of the target language	Some (all) UG principles constrain the child's representations from the onset of acquisition.	UG principles are **not** operative from the onset of acquisition.
Functional projections in early grammar	The child's phrase marker is identical to the adult phrase marker; all the functional projections are available from the start, serving as landing sites for moved elements.	Some (The truncation model) /No functional projections (The No Functional Category Model) are available at an early stage. The phrase structure starts 'lexical' and then either 'grows' gradually or emerges at once.	Constituents project in violation of UG. The child's phrase marker is different from the adult one.
Explanation of the differences between child and adult speech	In terms of: processing limitations, lack of lexical knowledge, lack of pragmatic knowledge, lack of real world knowledge, perceptual considerations, underspecification of functional heads.	The early phrase marker is 'smaller' than the adult phrase marker.	UG principles are not operative in early child grammar.
Explanation of the developmental shift from child to adult grammar	See above	Functional categories emerge gradually/ at once. Maturation is occasionally invoked.	UG becomes gradually available, biologically driven. Maturation is invoked.

Further Reading

Advanced: Weissenborn, Goodluck and Roeper (eds.) (1992) is a good choice if you want to read more about the various theories of syntactic development.

Textbooks: Part II in O'Grady (1997) provides an excellent presentation of theories of syntactic development.

ACCOUNTS OF THE OPTIONAL INFINITIVE STAGE

ACCOUNTS OF THE OPTIONAL INFINITIVE STAGE

[...] I succeeded in making my first drawing [...]:
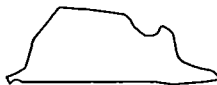
I showed my masterpiece to the grown-ups, and asked them whether the drawing frightened them. But they answered: 'Frighten? Why should anyone be frightened by a hat?' My drawing was not a picture of a hat. It was a picture of a boa constrictor digesting an elephant.
(Antoine de Saint-Exupéry - *Le Petit Prince*)

KEY POINTS
In this chapter you will find out about:
- **cross-linguistic evidence that there is an early (optional) non-finite form stage in child language**
- **the possible causes of this phenomenon**
- **possible accounts of the shift from this stage to the adult target grammar**

1. The Phenomenon

1.1 Cross-linguistic data

A large number of acquisitionists have established that there is an early stage in language development when child grammar allows two forms of declarative sentences: one with the finite form of the verb (i.e. the adult form) and one (deviating from the target grammar) with a non-finite form:

> There is an early stage when children use both finite and non-finite forms in contexts which require finite predicates.

(1)   *gras eten*   (Dutch) (Haegeman 1995)
      grass eat-inf
(2)   *Michelle dormir*   (French) (Pierce 1989)
      Michelle sleep-inf
(3)   *Thorstn das hab'm*   (German) (Wexler 1994)
      Thorsten that have-inf
(4)   *He tickle a feet*   (English) (Brown 1973, CHILDES)
(5)   *Mama spat'.*
(6)   Mummy to sleep   (Russian) (Brun et al. 1999)

This developmental stage varies from language to language. In languages like English, Dutch, Swedish, Danish, Norwegian, Faroese, Irish, Russian, Czech, Brazilian Portuguese, Icelandic or French the infinitival form of the verb is optionally used instead of the finite form (Wexler 1998). This is why this developmental step has been labelled *the optional infinitive* (Wexler 1994) or *the root infinitive* (Rizzi 1993/1994) stage. In languages like Italian, Spanish, Catalan, Tamil, Turkish, Modern Greek or Romanian,

> Root infinitives occur in the early grammar of non-pro drop languages or of languages in which finiteness is expressed exclusively by number.

root infinitives are absent or, at the most, extremely rare (as for example in Italian, Guasti 1993/4). This led to the conclusion that early root infinitives exist only in non-*pro* drop languages. Rhee and Wexler (1995) provide evidence in favour of this generalisation showing that it even holds within one and the same language. In Hebrew, root infinitives do not emerge in that part of the inflectional paradigm which allows null subjects but have been attested in that part which does not.

The existence /lack of root infinitives has also been related to the way in which finiteness is expressed (Hoekstra and Hyams 1998). If a language expresses finiteness exclusively by number morphology (the case of Dutch, for example) we expect to find root infinitives in early grammar. If finiteness is expressed by tense morphology (the case of Japanese) or at least by person morphology (the case of Italian, Spanish or Catalan), root infinitives will not occur in child speech.

Other studies have revealed that there is an equivalent non-finite stage for children acquiring languages which do not have an infinitive construction (Modern Greek, for example). This suggests that the notion of «root infinitive» is too narrow and that a more appropriate term for this phenomenon would be «early non-finite form» (Varlokosta, Vainikka and Rohrbacher 1997).

1.2 Overview of the figures

Root infinitives are used with a relatively high frequency, though the amount of infinitival forms at this stage may vary from language to language as well as from child to child and it obviously decreases with age. In the French production data examined by Pierce (1989), the Nathalie corpus of 291 sentences (gathered between age 1; 9; 3 – 2; 0; 1) contained 70 finite sentences (i.e. 24%) and 221 non-finite sentences (infinitival and participial clauses) (i.e. 76%), the Phillippe corpus of 494 sentences (gathered between age 2; 1; 3 – 2; 2; 2) contained 365 finite sentences (i.e. 74%) and 129 non-finite ones (infinitival and participial forms) (i.e. 26%), while in the Daniel corpus of 247 sentences (gathered between age 1; 8; 1–1; 9; 3) there were 99 finite (i.e. 40%) and 148 non-finite (participial and infinitival forms) sentences (i.e. 60%). It has also been noticed that in the case of the French-speaking children the number of non-finite utterances decreases with age.

Haegeman (1995) examined the distribution of finite and non-finite (root infinitives) clauses in the Hein (a Dutch-speaking child) corpus (gathered between age 2; 4–3.01) and the results showed that out of 14,580 total utterances 84% were finite and 16% were root infinitives.

Platzack (1990) reported that, in the Swedish production data which he examined, 61% of the utterances contained a finite verb and 39% a root infinitive.

Radford (1990) reports that root infinitives are relatively frequent in child English and Boser et al. (1992) and Weissenborn (1990, 1994) reach the same conclusion with regard to child German.

1.3 Root infinitives and early syntax

When used, the infinitival form occurs in the appropriate structural position. Investigations of child Dutch (de Haan 1986, Jordens 1991) and child German (Meisel 1990, Jordens 1991, Weissenborn 1991) have pointed out that root infinitives are appropriately placed in clause final position. In Scandinavian languages, they correctly occur after the negative adverb and in French to the right of the negative particle *pas* (Verrips and Weissenborn 1992). It is also worth mentioning that, during this stage, when the child uses the finite form, he/she uses it correctly in terms of morphological markers.

134

These data suggest that the child recognises the infinitive as a grammatical construction different from the finite form of the verb, and places it in the appropriate structural position. What the child does not seem to know yet is that root infinitives are disallowed in those contexts which require a finite form.

The syntax of root infinitives interferes with some systematic properties of child speech at this stage:

(i) in non-null subject languages, null subjects are allowed in both finite and non-finite utterances (Hyams 1996). Data from child English (CHILDES, MacWhinney and Snow 1989; Brown 1973) (6a) and child French (Rasetti 2000) (6b) provide evidence that, during this stage, children acquiring a non null subject language may produce null subject infinitival constructions:

(7)   a. *drop bean/ fix Mommy shoe*
         b. *est pour Marc*
           is for Marc

The examination of the distribution of overt subjects in child Dutch (the Hein corpus, age 2; 4 – 3; 1) (Haegeman 1996) leads to the conclusion that overt subjects tend to be more frequent in finite clauses (68% of the finite clauses in the corpus had an overt subject). Only 15% of the root infinitives had an overt subject. This points to the fact that during the optional infinitive stage children whose target language does not license null subjects do produce null subject utterances with a clear *tendency of dropping the subject more often in non-finite constructions.*

(ii) *root infinitives are rarely negated* (Friedemann 1993/1994, Haegeman 1995, Jonas 1995). In child Dutch, for example, negative root infinitives are not used very frequently. The examination of the Hein corpus (Haegeman 1995) shows that out of 721 root infinitives only 38 are negated. Negated optional infinitives seem to be rare in child French (Friedemann 1993/1994).

(iii) *wh-questions are not attested in non-finite utterances* in early Dutch (Haegeman 1995), early French (Crisma 1992) or early German (Weissenborn 1992, 1994). Crisma (1992) examined data from child French and found practically no root infinitives in wh-questions. However, they *have been attested* in child English (Roeper and Rohrbacher 1994, Bromberg and Wexler 1995).

(iv) in languages which allow *subject clitics* (such as French), these clitics *are absent in non-finite structures* (Pierce 1989). The findings in Hamann et al. (1996) with respect to child French are extremely telling: out of 278 subject clitics present in the corpus (of a monolingual French-speaking child) which they analysed, only 5 (i.e. 1.8%) occurred in root infinitives.

(v) *object clitics are absent* in root infinitives in early Dutch but they *are present* in early French and early Spanish (Torrens and Wexler 1995). Haegeman (1996) found one single object clitic in the Hein corpus, the Niek corpus (CHILDES 1985) and the Thomas corpus (CHILDES 1985). Object clitics are present in finite clauses though. The difference across languages with respect to the presence/absence of object clitics at this stage may be linked to the fact that object clitics occupy different positions in the structure of these languages.

(vi) though auxiliaries may appear in finite clauses they never occur in root infinitives. Haegeman (1996) noticed that in child Dutch all the verbs in root infinitives are lexical verbs. *Modal auxiliaries and aspectual auxiliaries are entirely absent.*

(vii) *Case on the DP subject may be Nominative, Accusative or Genitive.* English-speaking children may produce wrongly cased DP subjects (Accusative or, occasionally, Genitive) at this stage.

> Root infinitives cannot be related to the lack of knowledge of inflection.

(8)   *me go*
(9)   *My can do this.*

Interestingly, regardless of the morphological Case assigned to the DP subject, this will always occur in pre-verbal position.

All these properties as well as the fact that the child seems to differentiate between non-finite and finite forms in terms of structural position during the same stage suggest that root infinitives cannot be simply interpreted as the result of lack of knowledge of inflection.

1.4 Early root infinitives vs. adult root infinitives

During this stage, child grammar deviates from adult grammar in allowing a non-finite form to be used in those contexts where finite forms are used in adult speech, on the one hand, and in allowing two forms (the finite and the non-finite one) for apparently the same meaning, since children can optionally use one form or the other in matrix sentences. Actually, as will be pointed out immediately, it is not at all clear whether children use the two forms with exactly the same meaning.

Also, it is not clear either whether root infinitives in early grammar are different from the ones which exist in adult speech. In Dutch, for example, they occur with imperative force (9) or in the so-called 'mad magazine sentences' (10) (Haegeman 1995, 1996, Wijnen 1996):

(10)   *Hier geen fietsen plaatsen!*
        Here no bicycles place-inf
(11)   *Jan met mijn zus trouwen?! Dat nooit.*
        Jan my sister marry-inf?! That never.

In English, root infinitives are used in the so-called mad magazine sentences (Avrutin 1997, Schütze 1997):

(11)   a. *John dance. Never in a million years.*
        b. *My brother marry John. Over my dead body!*
        c. *Herman eat bean sprouts. Why?*

Root infinitives are also allowed in Italian adult grammar (Rizzi 1993/1994) in specific contexts:

(12)   a. *Io fare questo? Ma!*
        me do-inf that? never!
        b. *Partire immediatamente!*
        leave-inf immediately

In adult German, such constructions are used as answers to an immediately preceding question which contains a modal:

(13)   Person A: *Was willst du jetzt machen?*
                what want-2nd pers.sg. you now do-inf
        Person B: *Kuchen essen.*
                cake eat-inf   (Ingram and Thompson 1996: 114)

Do the empirical data in (9)–(13) provide evidence that early and adult root infinitives have the same feature(s)?

According to Hoekstra and Hyams (1998), they share at least the feature [-realised]:

> *Jussives are closest to the kinds of RIs used by children. Like most of the children's RIs, they involve deontic modality. The category of Mad Magazine sentences likewise denotes non-realized eventualities. The possibility of the*

eventuality is mentioned, which is then commented on in the next statement. So we maintain that the modal interpretation of children's RIs is determined by the inherent quality of infinitives as being marked [-realized]. And this is a feature of adult RIs as well (Hoekstra and Hyams 1998:103).

But, according to a different trend of analysis, children's root infinitives seem to be different from the ones used in adult grammar. Firstly, in adult speech they are always associated with a special register, whereas children use root infinitives in those contexts in which a finite form should be used. In adult German, omission of the subject is compulsory in root infinitives. In (13) the presence of the subject in Person's B answer will result in ungrammaticality. In children's root infinitives, the subject is not always omitted:

(14)   a. Nicole: *Nicole wurst haben.*
             Nicole sausage have-inf
      b. Dorothy: *Bebi haye machen*
             baby sleep make-inf
      c. Katrin: *Katrin machen.*
             Katrin do-inf
           (Ingram and Thompson 1996: 114)

> The interpretation of early root infinitives differs (i) cross-linguistically; (ii) from adult root infinitives.

The interpretation of root infinitives is also more generous in child speech. Children seem to interpret these non-finite structures as having both *realis*, descriptive meanings (usually describing a present ongoing activity, but also past or future events, Behrens 1994, Wexler 1994) and *irrealis,* modal meanings (often associated with volition)(Hoekstra and Jordens 1994 for Dutch, Plunkett and Strömqvist 1990 for Swedish, Meisel 1990 for French). The prevalent interpretation of optional infinitives seems to differ from one language to another. It has been noticed that in English the use of optional infinitives to describe past situations is quite frequent (Wexler 1997) but modal meanings are also attested. The results of a comprehension experiment (Shönenberger, Pierce, Wexler and Wijnen 1995) proved that English speaking children also tend to interpret root infinitives as describing present on-going activities (see also Hyams 1996 for a similar conclusion with respect to the interpretation of root infinitives in early English). In Dutch, however, the modal interpretation seems to be prevailing (Wijnen 1994, Haegeman 1996); still, the on-going activity reading has also been attested. It also seems that the descriptive reading is more frequent in earlier parts of the data examined. In German, the meaning is often modal (see Ingram and Thompson 1996). In Russian, root infinitives are used to denote present, past or future events (Brun at al. 1999).

Examination of child corpora also reveals the existence of a certain correlation between finiteness/non-finiteness and the aspectual class to which the verb belongs: root infinitives tend to be mainly associated with non-stative verbs[1] (Ferdinand 1996 for French, Wijnen 1996 for Dutch, van Gelderen and van der Meulen 1998 for Russian). Such data lead to the conclusion that the interpretation of children's root infinitives differs cross-linguistically but also from the interpretation of adult root infinitives.

1.5 A few questions

Various theories have been proposed to account for this cluster of properties, often with the aim of finding an answer to the following questions:

(i)   why is optionality allowed in child grammar during this stage?
(ii)   why is the non-finite form allowed in «finite» contexts in spite of the fact that children know the relevant finite forms which they use in the appropriate structural position?

---

[1] For more on possible correlations between aspectual classes of verbs and early temporal-aspectual structures see **5.2**.

why do root infinitives occur in some languages but are absent in others?

| Root infinitives have been analysed as:
-bare VPs;
-truncated clauses lacking Tense;
-full clauses with some underspecified functional projections;
- full clauses with a null auxiliary. | Most acquisitions agree that the optional infinitive stage does not reflect lack of knowledge of morphological inflection. Some argue that it reflects *a syntactic deficit* of some kind, others that it can be explained as *a processing failure* or as the child's *tendency of using economic forms*, which do not require a heavy computational process.
   The accounts that have been proposed rely on one model of language development or the other, adopting either the continuity view or a variant of the weak continuity model. However, one can notice that very often (especially within the grammar deficit accounts) the key problem seems to be related to the assumed absence/presence of some functional projections in the child's phrase marker or to some underspecification of features associated with functional projections. Radford (1990) and Vainikka (1994) among many others analyse *root infinitives as bare VPs*, i.e. as lacking any functional projection. With Rizzi (1993/1994) and other supporters of the truncation theory only some functional projections are missing, in particular Tense and all the projections higher than TP. With Hyams (1996) some functional projections are underspecified, whereas with Boser et al. (1992) *root infinitives are full CPs*, containing all the functional projections of adult grammar but also a null auxiliary. |

2. Syntactic accounts of the optional infinitive stage

2.1. *Tense is optional*

Wexler (1990, 1994) was the first to systematise the phenomenon, which he called *optional infinitive*. He noticed that, at an early stage in their language development, children optionally produce finite and non-finite forms in matrix clauses (phenomenon discussed in detail for the first time in Poeppel and Wexler 1993). Since in English there is no clear difference between the infinitival form and the uninflected present tense form, the status of non-finite utterances in child English seemed a less clear case. Thus, Wexler documented the optional infinitive stage with data from a variety of Romance and Germanic languages, where the infinitive form can be morphologically distinguished from the form used in most of the present-tense paradigms:

(15)   a. *pas manger la poupée*   (French)
            not eat-inf the doll
        b. *Zahne pussen*   (German)
            teeth brush-inf
        c. *pappa schoenen wassen*   (Dutch)
            daddy shoes wash-inf
        d. *det ikke vaere*   (Danish)
            it not be-inf

Such cross-linguistic data provide support that there is a developmental stage during which children use both finite and infinitival forms in matrix clauses in various languages. The attested optionality clearly distinguishes child grammar from adult grammar and points to the fact that the former allows both adult-like and non-adult-like constructions simultaneously.

Wexler accounts for the optional infinitive stage within the Strong Continuity model. The core idea of his hypothesis is that children have a problem with Tense, which can be optionally omitted. Omission of Tense will result in infinitival structures used in contexts requiring finite forms. UG is assumed to be available from the outset of acquisition; consequently, children know the processes of movement at this early stage (before age 2), when they optionally use finite and non-finite forms. Since movement is

138

interwoven with Inflection, the existence of movement at this stage is taken as strong evidence that the full functional structure is in place.

Wexler's argument that there is movement in child grammar at this stage relies on data from child French. In adult French, finite verbs always move to Inflection, around the negative particle *pas* (as in 16a, where the finite verb occurs to the left of *pas*), whereas non-finite verbs are not required to move and remain in situ (as in 16b, where the non-finite verb occurs to the right of *pas*) (Pollock 1989):

(16)   a. *Jean n'aime pas Marie.*
          Jean not loves *pas* Marie
       b. *ne pas sembler heureux*
          not *pas* seem happy

Data from child French show that children make the distinction finite/non-finite: if the verb is finite, *pas* is always placed in post-verbal position (finite verb + *pas*) (17) whereas it is placed in pre-verbal position if the verb is non-finite (pas + non-finite verb) (18):

(17)   a. *marche pas*
          goes *pas*
       b. *est pas mort*
          is *pas* dead
       c. *trouve pas*
          finds *pas*
(18)   a. *pas manger la poupée*
          pas eat-inf the doll
       b. *pas tomber bébé*
          pas fall-inf baby
       c. *pas attraper une fleur*
          pas take-inf a flower

On the basis of the French data[2], Wexler reaches the conclusion that there is an early stage during which:

(i)   finite and non-finite forms are in free variation
(ii)   the finite forms have moved to Inflection

This conclusion is extended to child language in general and the following theoretical implications are tested cross-linguistically:

(i)   at the optional infinitive stage the child knows the possibility of head movement, in particular verb movement;
(ii)   the child knows that verb movement is forced in the finite clause;
(iii) the child knows the Principle of Economy which implies that infinitival verbs do not move;
(iv)   the child does not know that non-finite verbs cannot appear as main verbs.

The examination of the available data from child German, child Dutch, child Swedish, child Danish and child Norwegian prove, according to Wexler, that (i) – (iv) above are true. By analogy with the Germanic languages that have been examined, it is predicted that the English-speaking children also produce the infinitive when they do not

---

[2] Atkinson (1996) points out that the French data are not as compelling as Wexler suggests. All the infinitive examples used to illustrate that non-finite verbs do not move are *-er* infinitives. Or, this form is homophonous with the French past participle as well as with the 2nd pers.pl.form of the indicative present,, which can also be used as an imperative. *Less ambivalent examples backing up the quantitative data might have included common French verbs such as voir 'see', venir 'come', dormir 'sleep', prendre 'take' and faire 'do'* (Atkinson 1996:460).

add -*s* to the verb. This view contradicts the traditional assumption that young children acquiring English alternate between the verb stem and the finite form for 3rd person singular present tense. Certain properties follow:

(i) the non-finite form should be optional;
(ii) non-finite negative sentences should be of the form Negation + non-finite verb:

(19)   *Mary not play football.*

Both properties are found in the available empirical data. English-speaking children use both the finite and the non-finite form in matrix clauses during this stage. The finite form is produced more frequently as they get older. With respect to negation, there is evidence that there is an early stage at which children acquiring English produce sentences in which negation is placed in « medial » position (Klima and Bellugi 1966):

(20)   a. *He no bite you.*
         b. *I no want envelope.*

> During the optional infinitive stage, Tense is optional. When Tense matures, the child's grammar shifts to the adult pattern.

The examination of corpora of child English (Harris and Wexler 1994) shows that in these sentences, the 3rd person singular -*s* appears only rarely. Stromswold's (cited in Wexler 1994) data prove that there are very few cases when the verb in medial negation sentences is inflected. The data from the domain of negation are taken as evidence that the child distinguishes between finite and non-finite forms. Stromswold's data also confirm that at this stage children know agreement, since they do not use -*s* in contexts where the subject is other than 3rd person singular, which leads to the conclusion that their root infinitives cannot be the reflex of their not knowing agreement.

Wexler proposes that Tense is optional at this stage[3]. Children have the concept of time but they do not always make the appropriate grammatical distinction. They use root infinitives in both present and past contexts. The child does not interpret inflection, in particular the values of T are not known yet:

> [...] *the child does not distinguish values of T. If values of T are not distinguished, then there is no semantic role for T to play at LF... The child may not know tense, but that says nothing about the understanding of time. Tense is a formal syntactic notion; time is not.* (Wexler 1994: 338).

When Tense is present in the phrase marker, the verb raises to Tense. Tense and Agreement are both present. When Tense does not exist in the phrase marker, the verb will be treated like an infinitive, there will be no raising and tense and agreement markers will not appear on the verb. Wexler also argues that the syntactic derivations with/without Tense are equally costly, hence optionality is allowed. Children will stay in the optional infinitive stage as long as they do not use past tense forms. The shift from child grammar to adult grammar (where Tense is not optional) is explained as the result of the maturation of the values of Tense.

Wexler's optional tense theory can account for many syntactic properties of the optional infinitive stage such as (i) the absence of subject and object clitics in Dutch or the absence of subject clitics in French (which have been analysed as occupying a position higher than Tense); (ii) the absence of non-finite wh-questions in Dutch and German (where, if the verb has to move to C it will first have to move to I, i .e. it results in finiteness) but the possibility of having non-finite wh- questions in English (where the presence of a wh-element in Spec of CP does not require the verb to move to C; English

---

[3] In more recent studies, Wexler claims that optional infinitives have AGR or Tense (or both) missing (see, for example, Wexler 1997).

140

is not V2) and (iii) the presence of null subjects in non null subject languages (if Tense is underspecified or optional null subjects will be allowed).

There are, however, some empirical problems with this account. Thornton (1998) points out that in her Aurora corpus there are 11 instances of medial negation preceding an inflected, i.e. finite, verb (21). Recall that Wexler's prediction is that such constructions should occur with non-finite verbs.

(21)   a. *This not goes here.*
        b. *This is not goes in trash can.*
        c. *That not works.*

At the core of Wexler's hypothesis stands the idea of optionality. It is, however, generally accepted that optionality is not allowed in adult grammar. Even if one accepted that child speech differs from the target with respect to optionality, it is difficult to see why optionality of Tense in particular is allowed during early stages of linguistic development. It has already been pointed out that empirical data suggest that root infinitives are associated with certain meanings, different from those of the finite form. This means that it is not at all clear that the child uses finite and non-finite forms in free variation. Moreover, what exactly makes the child finally realise that optionality is disallowed if the child can use the finite forms correctly during the root infinitive stage? In what way can we link maturation of Tense to the concept of optionality? Wexler's account does not answer these questions. Nor does it specifically say whether optionality of Tense means optional absence of the (whole) Tense projection or optional lack or optional underspecification of Tense features.

2.2 The Agreement/Tense Omission Model

Schütze and Wexler (1996) argue that during the optional infinitive stage child grammar allows either Tense or Agreement or both to be optionally omitted. Wexler's previous analysis, according to which only Tense is optional during this stage, is modified in order to allow a unifying account of early root infinitives and non-Nominative subjects that have been attested in child English non-finite constructions.

Such an analysis implicitly states that early infinitives are of three kinds:

(i)   AGR is present but Tense is missing;
(ii) Tense is present but AGR is missing;
(iii) both Tense and AGR are missing.

Each kind is related to different types of subjects. When AGR is present, the subject is claimed to surface as Nominative. When Tense is present but Agr is missing, the DP subject receives Accusative, taken to be the default Case in English. When both Tense and AGR are missing, the subject surfaces as Genitive.

One of the advantages of this analysis (though only when applied to English) is precisely that it tries to relate the optional infinitive stage to the existence of Nominative and non-Nominative subjects. Also, two of the puzzling questions with respect to the properties of root infinitives (assumed to be more or less truncated structures) are why and where the DP subject moves and from where it receives Case. The present account, by allowing Agr to be present in some cases, can explain why and where the subject moves in those structures which have Agrs, analysed as the projection responsible for Nominative Case assignment: the DP subject moves to the Spec of Agrs in order to receive/check Case, and it is assigned Nominative Case in a Spec-Head configuration with Agrs:

> During the optional infinitive stage Agrs, Tense or both are optionally omitted.

(22)

AgrsP
Spec   Agrs'
DP$_i$-Subject
        Agrs   VP
            Spec   V'
            t$_i$
                V
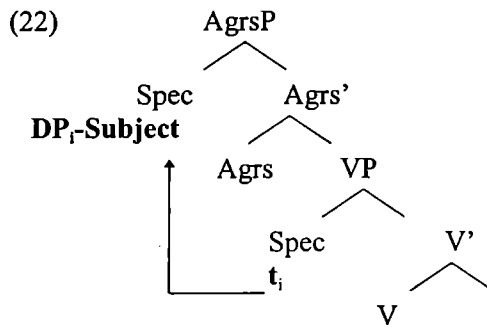
The result is a sentence of the type *he play*.

But the model is less convincing with respect to Accusative and Genitive DP subjects. In particular, the explanation of why Accusative is assigned is at least vague: [...] *if no case feature is specified on the subject (since AGR is not present), then only the ACC form of the pronoun (which has no case features specified on it in English) will be consistent with the representation, and this ACC form will be inserted.* (Wexler 1998:49)

One puzzling question is related to the cause of such a generous optionality in early grammar: what exactly makes the child omit Tense at some time, at some other time Agr and at some time both? Also, no explanation of why root infinitives occur in some languages but not in others is offered.

2.3 The Unique Checking Constraint

Wexler (1998) revisits the Agreement/Tense omission model from a minimalist perspective (Chomsky 1995) in an attempt at explaining, in a more appropriate way, why subjects move in early infinitive constructions and why the optional infinitive stage has been attested in some languages but not in others.

During the optional infinitive stage the Unique Checking Constraint may prevent the system from checking the D feature of the subject DP more than once.

One crucial theoretical assumption on which the new analysis relies is that DPs are allowed to move to higher projections even when they do not receive Case there. Movement can be driven by categorial features, such as D (Determiner) features, associated both with the DP and with the functional projection TP. Wexler extends this property to the Agreement projection, such that both TP and AgrP have a D feature: *Both AGRS and TNS have a D feature which must be eliminated by checking against the D-feature of a DP which raises up for checking* (Wexler 1998:51).

The D features of Tense and Agr are assumed to be strong and, consequently, must be eliminated by checking. Thus, in a finite clause, where both Tense and Agr have been projected, the D-feature of Tense will attract the subject DP first and then the D feature on Agrs attracts it to the Spec of Agrs:

(23)

AgrsP
Spec   Agrs'
        Agrs   TP
                Spec   T'
                        T   VP
                        Spec   V'
                        DP
Checking 2 of D
        Checking 1 of D   V
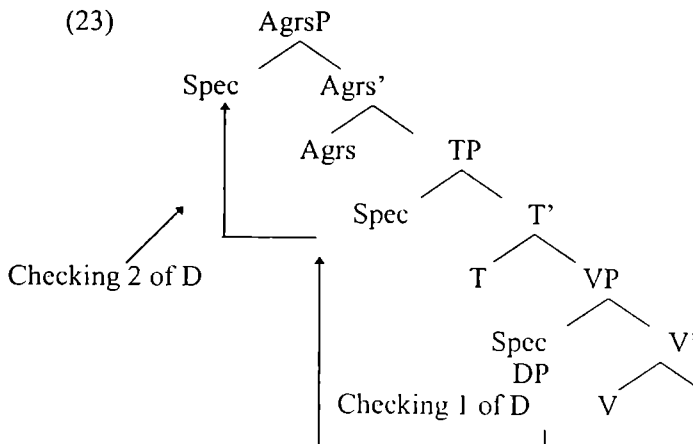
In a finite clause, then, the D feature on a DP is checked twice. Recall that, according to the model proposed in Schütze and Wexler (1996), either Agrs or Tense may be optionally omitted[4]. According to Wexler (1998), when Agrs is present, the subject DP is attracted by the D feature of Agrs and raises to Spec of Agrs (as in 22). When Tense is present but Agrs is missing, as in (24) below, the DP is attracted by the D feature of Tense and raises to the Specifier of TP:

(24)
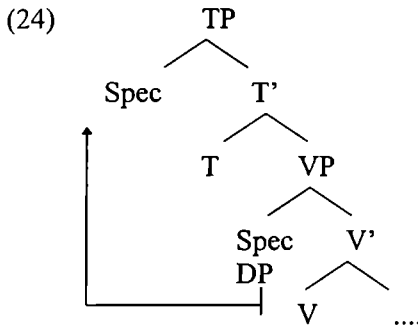
Tense is not a Case assignor and hence default Case (Accusative) is spelled out by the morphology. The result will be an infinitive construction of the type *him play*.

Notice that such derivations depart from the double checking derivation in adult syntax, represented in (23). Why are they allowed in child syntax? Wexler proposes that the child has problems with checking the D feature twice. The claim is that in early grammar, during the optional infinitive stage, a genetically-specified Unique Checking Constraint (UCC) may sometimes disallow the D feature on a DP to be checked more than once, i.e. against more than one single functional category. The UCC is taken to be a property of early grammar, whose role is to constrain the computational system of child syntax. Optionality of Tense/Agreement has been now replaced by optionality of the UCC, which sometimes constrains and sometimes does not constrain the derivation. When it does not, it allows for finite clauses (which have been attested) when double-checking is involved.

Properties of the optional infinitive stage are explained as derived from the UCC: whenever the constraint is at work, the D feature on the DP subject can be checked only once, leaving the other functional category with an unchecked [non-interpretable] feature. But a derivation with unchecked strong features cannot converge. In order to save the derivation, the child's computation will attempt a minimal-preserving change of the initial representation (25), which will allow either Agrs (26) or Tense (27):

(25)   Agrs [D] T [D] [$_{VP}$ DP V...]

two D features need checking

(26)   Agrs [D] [$_{VP}$ DP V...]
(27)   T [D] [$_{VP}$ DP V...]

The child knows that Agrs and T are required in finite clauses, but the UCC leads to the omission of one of them. On this analysis, the mechanism of convergence in child syntax is constrained by the same principles which govern adult grammar; what distinguishes early grammar from adult syntax is precisely the UCC.

This explanation encounters at least one problem. First, it does not take verb movement into account. In many null subject languages the verb is assumed to move to Agrs. In this case, the representation of a sentence in which the DP has moved to check the D feature of Tense could at best be the representation of a sentence with a post-verbal subject. In this case, the analysis fails to explain the movement of pre-verbal subjects.

---

[4] In Wexler (1998) the possibility of both Agrs and Tense to be missing is no longer discussed.

143

It is also the UCC which lies at the core of the explanation of why null subject languages do not allow an optional infinitive stage. According to Wexler, the difference between *pro-* and non *pro*-drop languages is related to the possibility of the UCC to apply. He argues that in null subject languages, Agrs is pronominal and consequently does not need a D feature (it *is* D). The representation would be the one in (28):

(28)   Agrs T [D] [$_{VP}$ DP V...]
                    ↓
Only one single D feature needs checking

The child knows the correct parameter setting for Agrs in his/her language. In a null subject language, with one single D feature to check, the UCC has no reason to apply otherwise but vacuously. This does not imply, however, that the UCC does not apply. It is present and it applies in other areas. For example, the early omission of auxiliaries is explained as deriving from the UCC. Auxiliaries are taken to have a D feature which needs checking, in which case the representation of a sentence containing an auxiliary will be the one below:

(29)   Agrs T [D] Aux [D] [$_{VP}$ DP V...]

The DP will first be attracted by the strong D feature on Aux. Then, by the D feature on Tense, in violation of the UCC. But, if the UCC holds, the strong D feature on Tense will remain unchecked and the derivation will crash. What will the child do in order to save the derivation? Recall that child syntax is constrained by the same principles of convergence as the ones at work in adult grammar. Wexler proposes that when the UCC holds, the auxiliary will be omitted in order to save the derivation.

Notice, however, that Wexler's account relies on the assumption that in null subject languages auxiliaries head their own projection (as proposed for Italian in Belletti 1990) lower than Tense. Under other analyses, auxiliaries are taken to occur under Tense or Agreement, which would pose a serious problem for Wexler's account.

> Root infinitives are allowed because the child's phrase marker is truncated. The child gets rid of the optional infinitive stage as soon as he/she realizes that every root clause is a CP.

2.4 The truncation theory

Rizzi (1993/1994) explains the optional infinitive stage within the truncation model, according to which root infinitives are defined as structures projected only as far as a bare VP or AgroP, i.e. where the Tense and the Agrs projections can be missing:

(30)   Root infinitives = VP / AgroP

Child grammar would allow the option (absent in adult grammar) of «stripping off» clausal projections, i.e. of optionally truncating structure (vs. adult grammar where every well-formed clause is a CP).

Rizzi's account predicts a number of generalisations with respect to root infinitives. For example French subject clitics have been analysed as occupying Agrs. The fact that these elements are absent in early root infinitives can be related to the absence of the relevant functional projection which could host them, i.e. Agrs.

Adopting the hypothesis in Zanuttini (1991), according to which there is a selection relation between Neg and T, and NegP is higher in the phrase marker than TP, Rizzi assumes that in the absence of Tense, we should expect few negated root infinitives. This prediction is supported by data from early Dutch (Hoekstra and Jordens 1991), for example. Dutch children tend to use *niet* (not) with finite verbs and modals, but *nee* (no) with the infinitival form of the verb. The latter may be identified as constituent negation. Data from child French are more contradictory. Pierce (cited in Wexler 1994) argues that there are many negated root infinitives in early French and that in this case *pas* precedes the non-finite verb.

144

Truncation can also account for the licensing of null subjects. Root infinitives are likely to occur with null subjects because the infinitive is a non-finite form, which lacks Tense, and hence it can license null subjects of the type PRO.

The absence of a root infinitive stage (or rarity of root infinitives) in languages with highly inflected morphology, like Italian, is explained as deriving from properties of the infinitive in these languages. In Italian, the infinitival form of the verb has been analysed as raising to Inflection (Belletti 1990). Consequently, truncation to VP would be impossible in this case.

One can notice that the absence or rarity of negated root infinitives can be accounted for within Rizzi's model only provided one also adopts the view that NegP dominates TP universally. Otherwise, one has to find a different explanation.

Also the explanation with regard to why root infinitives are absent or extremely rare in child speech whose target language is morphologically rich relies on Belletti's analysis of Italian infinitival clauses. Further research is needed either to find supporting evidence that the infinitive verb raises to Agrs in all *pro*-drop languages or to find a different explanation for the generalisation «if non-*pro* drop then root infinitive». Data from Romanian, where the infinitive never agrees with either the DP subject or the DP object, suggest that a different explanation is needed.

2.5. A deficient grammar-discourse relationship

Hyams (1996) explains the optionality of infinitives in early child language as the reflex of a deficient relationship between grammar, on the one hand, and semantics and pragmatics, on the other hand. On this view, child speech and adult speech would differ only with respect to the relationship between grammar and discourse. Children's grammar does not have to change during the process of acquisition, the phrase marker is assumed to contain all the functional categories which exist in the target grammar from the outset of acquisition. But root infinitives are allowed because some functional projections within Inflection are underspecified at this early stage.

Underspecification of Inflection is discussed by analogy with underspecification in the nominal domain. Finite morphology and determiners are taken to perform similar functions: tense 'anchors' the state of affairs denoted by the verb in time (relative to discourse time) and determiners 'anchor' discourse referents, marking temporal and, respectively, nominal specificity. At the syntactic level, both finite morphology and specificity trigger movement, which led to parallel analyses of N-to-D and V-to-C movement. Moreover, CPs and DPs have been treated as having similar properties. From the perspective of acquisition, this leads to the assumption that, at the stage when finiteness is absent, the child may also leave nominals unmarked with respect to specificity. Data from child English and child Dutch support this hypothesis:

(31)   a. *open door/Hayley draw boat* (child English)
        b. *Niekje ook boot maken* (child Dutch)
           Nickje also boat make-inf

The similarity between temporal and nominal domains suggests that specificity may play an important part in the emergence of the optional infinitive stage, which Hyams calls 'the optional specificity stage', during which specificity may be underspecified.

Temporal underspecification is explained in terms of Tense-chains, defined as containing a Tense –Operator (in C), a Tense projection (in the inflectional domain) and an event-role (provided by the lexical verb) (Guéron and Hoekstra 1995):

(32)   T-Operator

               T

           Lexical verb (event-role)

Children use the root infinitive with a present tense value because they do not know the rule which blocks temporal co-reference when it leads to the same interpretation as anaphoric tense.

145

The index of the T-Operator and that of the complex V+Inflection may be identical, in which case the temporal interpretation will be 'present'; when the two links are contra-indexed, a past temporal interpretation results. Indexing is associated with morphological markers of tense, i.e. with finiteness, which makes the T-chain visible.

In child speech, the complex V+Inflection does not bear an index. This is the case of root infinitives, which lack morphological tense markers and hence are not indexed. Tense has the status of a free pronoun and gets interpreted discursively. The V+Inflection complex is interpreted in a pragmatic way, as anchored in the here and the now, i.e. as present. According to this analysis, root infinitives denote present on-going events. Their temporal interpretation is assigned via temporal co-reference, by analogy with nominal co-reference (Reinhart 1983, Grodzinsky and Reinhart 1992). In adult language, nominal co-reference between two nominals is allowed only when the resulting interpretation is different from the one with bound anaphors. For example, (33a) is ruled out because (33b), a case of bound anaphora, means the same thing:

(33)   a. *John$_i$ likes him$_i$.
        b. John$_i$ likes himself$_i$.

Temporal co-reference is constrained by a similar rule: it is blocked if temporal anaphora leads to the same interpretation. Hence, in adult grammar, root infinitives cannot be interpreted as denoting a present state of affairs because, in this case, their interpretation would not differ from that of the anaphoric present tense. They can only be used with a modal value. But children's root infinitives can be interpreted as descriptive, with a present tense value, because children do not know the pragmatic rule which blocks temporal or nominal co-reference (Chien and Wexler 1990, Grodzinsky and Reinhart 1992). They allow both root infinitives with a present tense interpretation and sentences like (33a) because they cannot yet access the pragmatic principle which bars co-referentiality.

The old intuition that children's speech is linked to the here-and-the-now is captured in allowing early Inflection to be underspecified. Once the child has acquired the principle which blocks co-reference, Inflection is indexed and temporal reference is assigned in an adult-like manner.

The predictions which follow from this account are borne out by empirical data. Since Inflection is assumed to be underspecified, i.e. it has no tense or agreement features, it is non-finite and, consequently cannot assign Case. Thus, null subjects should be allowed with root infinitives but not in finite contexts. The examination of the occurrence of null subjects with inflected forms of the verb *be* in the Eve, Adam and Nina files (CHILDES, MacWhinney and Snow 1989, Brown 1973, Suppes 1973) shows that children tend to use null subjects infrequently with *am/are/is*. However, null subjects have been found in sentences with the verb morphologically marked for past tense, i.e. in finite contexts. Hyams proposes that, at this stage, the *-ed* form is ambiguous between a finite and a participial value. By hypothesis, it will co-occur with null subjects only when it is taken to be the past participle of the verb:

(34)   a. *goed on that way* (the subject = the cow)
        b. *dropped a rubber band* (the subject = I) (Hyams 1996:102)

Such sentences would be analysed as sentences in which the auxiliary has been dropped.

The account also predicts that modal verbs and *be,* which are linked to finite Inflection, should be omitted in root infinitives. Child corpora in CHILDES prove that, indeed, *be* is often omitted in obligatory contexts, and modal verbs usually occur with overt subjects (Valian 1991).

In spite of its explanatory power, Hyams's (1996) account cannot be extended to other languages since it fails to explain why root infinitives (at least in other languages)

can denote not only present, but also past and future situations. The data are also contradictory with respect to the interpretation of root infinitives in child English, where it seems that it is not restricted to present on-going situations.

2.6 What happens at the end of the optional infinitive stage?

Ingham (1998) argues that the route out of the optional infinitive stage goes through a stage when Tense is available but Agreement is still absent. The claim is that the [+Tense, −Agr] option is available to the child and it follows the period when Tense is absent, i.e. the root infinitive stage. The implication for the analysis of root infinitives is that they represent structures in which both Tense and Agreement are missing, with Tense being acquired earlier.

An important theoretical assumption on which Ingham's study relies is that -*s* is a pure agreement marker in English (Kayne 1993, Bobaljik 1997) and hence its presence/absence stands for presence/absence of an agreement projection and not for presence/absence of Tense.

The data come from a case study of a British child, Sophie (age 2; 6 to 2; 9).

The predictions of this hypothesis are that at a stage which immediately follows the optional infinitive stage:

(i) the verbal forms will not show agreement with the subject DP;
(ii) the verbal forms will be used appropriately in terms of Tense and
(iii) unmarked verb forms, i.e. bare verbs, will not be used in past tense contexts.

All these predictions are borne out by the Sophie corpus. The examination of the declarative present sentences in the corpus showed that only four tokens of a verb affixed with -*s* were obtained. In over 90% of the utterances, the agreement marker was omitted. Negative and interrogative sentences with a 3rd pers.sg. subject and which used *do* support also showed a complete absence of agreement markers; not one of them contained the correct form *doesn't*:

(35)   a. *My baby don't feel well.* (2; 8)
        b. *That don't go there.* (2; 10)
        c. *Her don't feel well.* (2; 10)   (Ingham 1998: 61)

In wh-questions the agreement marker −*s* was also absent:

(36)   a. *Where do that one go?* (2; 7)
        b. *How do that start?* (2; 7)   (Ingham 1998: 62)

When Sophie uses the inflected auxiliary forms *is, are, has* or the copula *be* agreement contrast is systematically ignored:

(37)   a. *What are me singing Mummy?* (2; 7)
        b. *Is me going a bed?* (2; 7)
        c. *Is our having supper?* (2; 7)
        d. *What are that called?* (2; 8)
        e. *Is those men? (*2; 7)
        f. *What are that man?* (2; 9)
        g. *You's not a big girl any more.* (2; 7)
        h. *Has you got red one?* (2; 6)
        i. *Have you got some paper?* (2; 7)   (Ingham 1998: 63-64)

The data in (37) above provide evidence that at this stage agreement features for verbs have not been acquired yet.

147

One syntactic reflex of the lack of knowledge of agreement and hence of the lack of the agreement projection from the phrase marker should be the lack of Nominative case subjects. According to Chomsky (1993), Tense raises to Agrs for Nominative case assignment; if Agrs is missing we expect the child's grammar to use non-Nominative subjects since the mechanism for case assignment is not in place yet. An examination of Sophie's subject pronouns reveals that most of her pronoun subjects are in the Accusative. She used *I* in subject position once, whereas *me* was used in subject position in 321 utterances. *She* appeared in only two sentences while 163 sentences displayed *her* in subject position. The data is robust enough to support the view that Nominative case and subject position are not associated at this stage.

The Sophie corpus also provides evidence that Tense is in place at this developmental stage. A possible syntactic reflex of the functional category Tense is the presence of syntactic modals. Sophie's corpus contains a significant number of modals. By age 2; 8 eight different modals had appeared in the sample at least twice: *can, can't, could, should, shall, will, won't, must*:

(38)   a. *Will you do those letters?* (2; 7)
       b. *Shall me finish Sophie?* (2; 7)
       c. *Jack can't go upstairs.* (2; 7)
       d. *Me won't sit mon your 'cording machine.* (2; 7)   (Ingham 1998: 67)

While Sophie's earlier negative utterances used *not* in front of the verb (as in 39) by age 2; 8 *do* support was always used in negative sentences in the absence of a modal (35):

(39)   a. *Her not play piano.* (2; 5)
       b. *That not live downstairs.* (2; 5)   (Ingham 1998: 67)

Most importantly, the distribution of *do* and *did* points to a clear distinction between past and present temporal reference; the presence of unambiguous past tense forms (*went, gave, came, broke, fell*) also shows that the verbal forms were used appropriately with respect to their temporal value.

One more important piece of evidence which brings further support that Sophie has knowledge of Tense at this stage comes from the use of root infinitives. At age 2; 7, approximately one third of the verb forms were infinitives. The examination of the data reveals that bare verb forms are almost always used with a present temporal value. For past tense situations morphologically marked past tense forms are systematically used.

The results of the study clearly show that TP is present at this stage. What is still missing is the Agr projection. Such an analysis also shows that the optional infinitive stage is followed by a stage with TP but without agreement, i.e. by a stage during which the child's phrase marker is still truncated. This time, it is truncated above TP. Theoretically, it supports the view that Tense and Agreement are distinct projections in UG. From the point of view of learnability, it suggests that the structure-building model of language development is a valid hypothesis.

| Root infini- |
| tives are fully |
| represented |
| finite clauses |
| in which |
| merger of the |
| verb with |
| inflection has |
| been delayed |
| due to |
| processing |
| limitations. |

3. Performance/processing accounts

3.1. A competence-performance account

Phillips (1995) puts forward a different account of the optional infinitive stage. The leading idea is that root infinitives are fully represented finite clauses, in which merger of the verb with inflection has been delayed, i.e. Tense and Agreement markers have not attached to the lexical verb. The child's phrase marker is identical to the phrase marker in adult grammar (in this, Phillips adopts the Strong Continuity model). With him, the child's phrase marker has the full panoply of adult functional projections; no

148

category is either underspecified or absent. Root infinitives cannot be interpreted as the result of lack of morphological knowledge because when children at this stage use inflectional morphology they use it right. He provides empirical arguments from child German and child Italian to show that children's early speech shows a strong contrast between the incorrect use and the omission of agreement affixes. Case substitution errors are also rare in languages with overt case marking on DPs (Russian or German). In particular, he argues against Wexler's optional tense hypothesis, showing that root infinitive usage does not correspond to any lack of knowledge of tense. He relies on data from Behrens (1993) to prove that knowledge of tense morphology is in place during the optional infinitive stage.

Phillips also challenges the generalisation that the optional infinitive stage emerges only in the child languages whose target is a non-null subject language. Empirical data from Italian seem to suggest that children whose target language is morphologically richer will use fewer root infinitives and will emerge from the optional infinitive stage earlier. The factor which causes the optional infinitive stage is claimed to exist in any language.

Cross-linguistic data also reveal that there is no correlation between proportion of root infinitives and inflection errors, i.e. children who use root infinitives more frequently do not make more inflection errors. The conclusion reached on the basis of these data is that «what is delayed in children learning languages with more impoverished inflectional systems appears to be a factor influencing *use* of their morphological knowledge, rather than a delay in the knowledge of it.» (Phillips 1995: 337).

To summarise, Phillips starts from the assumption that children have good knowledge of the morphology of their target language at a very early stage. They sometimes fail to use this knowledge because it is not yet «an overlearned, automatic process» (Phillips 1995: 326). The difference between child language and adult language is seen as a difference in their processing abilities.

Revisiting data from the literature on root infinitives (mainly, the interaction of finiteness and wh-questions and null subjects during the optional infinitive stage) Phillips reaches the conclusion that these data actually support the view that root non-finite clauses are not allowed in child speech. All declarative clauses are «finite and contain appropriate tense and agreement features, even when they are Spelled-Out as root infinitive clauses. Root infinitive clauses contain all the elements of an adult finite clause» (p. 346) in which some features are unrealised. When the verb cannot move to Inflection, the features of Inflection cannot be spelled out because there is no verbal host. In this case, the verb is spelled out as a default form, an infinitive. The representation of a root infinitive is the one in (40):

(40)

		V	Object
the cat	3rd pers.sg.	like	the fish (Syntax)
the cat	0	like	the fish (Spell Out)
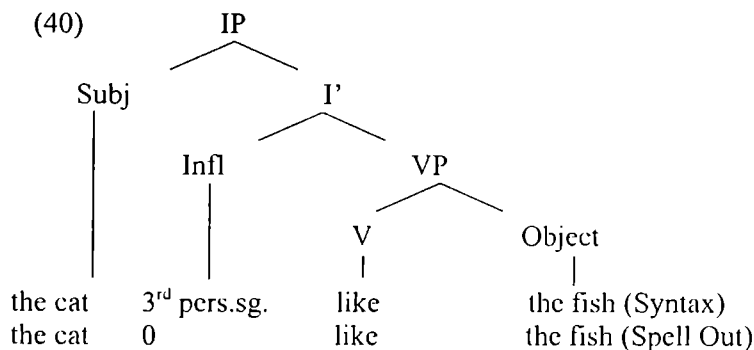
The transition from the root infinitive stage to adult grammar is a gradual shift from controlled to automatic access to morphological knowledge.

Why does child grammar allow two optional forms? In particular, why does it allow root infinitives to be used in finite contexts? Phillips starts from the following theoretical assumption: syntactic derivations can be ruled out when they violate ·some grammatical requirement or because of competing derivations which are more highly valued and hence preferred. Overt movement of V to I can be avoided by children unless

149

it is forced by some requirement. For example, in languages like German or Dutch, if a wh-element has moved to the Specifier position of CP, the verb will be forced to move to C via I. That can explain why in these languages root infinitives are absent in wh-questions. But, in principle, V to I movement does not seem to be an absolute grammatical requirement. In English subject wh-questions the verb does not have to move, for example. Such a view raises the question of why adults apply V-to-I movement more consistently than young children. Phillips suggests that the derivations which involve overt V-to-I movement outrank those with delayed V-to-I movement for two reasons:

(i) overt V-to-I movement facilitates more complete spell-out of features (in those languages where inflectional features can only be spelled out when they have a host)

(ii) in English, inflectional features can be realised on the verb or by *do* insertion; overt merge is more economical than insertion of a dummy element, and hence favoured.

Thus, the conclusion is that overt merger is favoured and hence V-to-I movement is reliably applied in adults. For 2 year olds the same process has not become automatic yet and the cost of accessing the inflectional form is greater. The transition from the root infinitive stage to adult grammar is seen as a gradual shift from «controlled to automatic processing of the task of accessing morphological knowledge» (Phillips 1995: 360).

The advantage of this account is that it can nicely explain why the number of root infinitives decreases gradually; the child's process of accessing morphological knowledge is gradually becoming automatic, most probably on the basis of frequency in the input. It can also explain why children use inflected forms correctly when they do use them: morphological knowledge is there, but sometimes they fail to access it for processing reasons.

This account can also solve the puzzle of why the optional infinitive stage is so short and «meagre» in rich morphology languages: a child acquiring a highly inflected language will encounter inflected forms in the input very frequently, which may speed up the transition to a non-controlled access to morphological knowledge.

What this account cannot solve, however, is the problem of the optional infinitive stage in languages like Modern Greek or Romanian, where the default form seems to be an inflected form (the *-i* form in Modern Greek and most probably the past participle form in Romanian), i.e. within the theoretical framework adopted by Phillips, the verb has already moved to one functional projection and merger with the inflectional affix which heads the projection has taken place.

Also, the analysis of root infinitives relies on a Distributed Morphology framework, where the verb comes bare from the lexicon and merges with inflectional affixes via head-to-head movement. Within a minimalist approach, where the verb is assumed to come fully inflected from the lexicon, the delayed-merger-hypothesis can no longer explain the emergence of root infinitives.

3.2. A «limited processing resources» account

Avrutin (1997) explains the emergence of root infinitives in early child speech as the reflex of limited processing resources, a learnability explanation identical to the one put forth in Phillips (1995) but reached via a different route. According to him, root infinitives do not violate any syntactic requirements. They occur cross-linguistically in adult speech, which means that they are a UG compatible option. When the child opts for a root infinitive, he/she does not make a syntactic error.

Avrutin defines root infinitives as representing a non-syntactic presuppositional introduction of an event file card into discourse. The child may opt for a root infinitive

> Root infinitives are used in early speech because the amount of processing resources necessary for the introduction of an event file card through a non-syntactic presupposition (the root infinitive) is cheaper.

because the amount of resources necessary for the introduction of an event file through presupposition is «cheaper».

His analysis of root infinitives in both adult and child grammar adopts Heim's (1982) file change semantics, according to which (indefinite) DPs are represented in discourse by file cards. Each file card must have a number, therefore each DP bears an index. He then extends it to events proposing that not only DPs but also eventualities (both states and events) can be represented by file cards. The discourse representation of a sentence like the one in (41) will be as in (42):

(41) *John ate an apple.*

(42)

```
┌─────────────────────────────────────┐
│   ﹀      Event #                     │
│  /...................../ (t #)        │
│                                      │
│  ┌──────────┐  ┌──────────┐          │
│  │ John#    │  │ apple#   │          │
│  │ AGENT    │  │ THEME    │          │
│  └──────────┘  └──────────┘          │
└─────────────────────────────────────┘
```
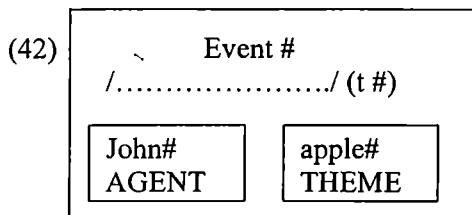
As can be seen in (42), the event file card contains (i) a time interval (t), during which the event holds and (ii) two individual file cards which represent the participants in the event. In order to derive the LF interpretation that an event holds during t, the event variable and Tense must be co-indexed since Tense and the event are links of the same temporal chain (Guéron and Hoekstra 1995). If only one link in the chain bears an index, the absence of an index on the other one will count as contra-indexing. When Tense bears an index it has a «referential potential» in the sense that it is able to denote a time interval. Against this theoretical background, Avrutin also adopts Hyams's (1996) proposal that Tense in an infinitival clause has no index.

Three types of infinitival structures used in adult speech are analysed within this framework: Russian root infinitives, illustrated in (43), English headlines, illustrated in (44) and English mad magazine sentences, illustrated in (45):

(43)   *Carevna xoxotat*
       princess laugh-ing
       'the princess started to laugh '
(44)   *Clinton to visit Russia*
(45)   *John dance ! Never in a million years !*

The sentences in (43) – (45) are taken to share the following properties:

(i)   their Tense is not indexed
(ii)   their event variable is not indexed
(iii) their interpretation is possible by resorting to an element in the discourse.

According to Avrutin, an event file card can be introduced in the discourse (and hence its interpretation is made possible) either through the instantiation of the index of the event or through two other mechanisms: the event file card is projected by another card (and the event is consequently interpreted as the result of the event in the projecting card) – this seems to be the case of the Russian root infinitive constructions- or the new event file card is introduced by a presupposed event. This seems to be the case of the English mad magazine sentences.

Root infinitives in child speech have similar properties to the mad magazine sentences. The only crucial difference between the two is that the range of pragmatic circumstances when this discourse representation is possible in child speech is larger than in adult speech. Root infinitives are taken to represent a special strategy of introducing an event file card into discourse.

Such an analysis of optional infinitives makes several predictions. When Tense must bear an index, root infinitives should be impossible. Auxiliaries are part of the Tense-chain (Guéron and Hoekstra 1995) and consequently they must bear an index. The prediction is that the auxiliaries which occur in child speech should always be tensed, i.e. they cannot occur in root infinitives. This prediction is supported with data from various child corpora.

Also, recall that Avrutin's assumption is that root infinitives in child speech are like root infinitives in adult grammar, so we expect them to have the same properties. In adult grammar, root infinitives cannot appear in embedded contexts. By analogy, Avrutin extends this property to child grammar. Though this may be difficult to test (during the optional infinitive stage complex phrases are rare if not absent), Thornton (1998) provides some examples from early child English which cast doubt on this prediction:

(46)　a. *I want Aurora swing.*
　　　b. *I want jump baby.*
　　　c. *I want play.*

Another prediction is that stative verbs should not occur in root infinitives. The subject of a state predicate is not as prominent as the subject of a non-stative (eventive) predicate and hence it is difficult to access in the discourse. This prediction seems to be borne out by the data, at least for child Dutch. Avrutin invokes the results of an experimental study (Wijnen 1997 cited in Avrutin 1997) which demonstrate that eventive verbs appear in both finite and infinitival clauses at this stage whereas stative verbs appear only in finite contexts.

Optionality during the root infinitive stage is explained in terms of processing resources. The amount of processing required for the introduction of an event file through presupposition (in English) is claimed to be « cheaper » than the amount of processing required for the introduction of the same file card through syntactic operations (a finite sentence implies indexing of Tense, of the event variable and of the participants in the event). The English child may optionally choose the less costly operation because his/her processing resources are still limited.

However, there are a number of questions which cannot be staightforwardly accounted for in terms of the analysis put forth by Avrutin. One of them addresses the assumption that root infinitives evince the same properties in child and adult grammar. Haegeman (1995, 1996), comparing adult Dutch and child Dutch infinitival constructions argues that in adult grammar the root infinitive is a CP, whereas in child grammar it is a truncated structure (Rizzi 1993/4).

Also, one cannot ignore the difference of register which is also discussed in Avrutin's study. If the only difference between child and adult root infinitives is one of register, should we reach the conclusion that the child could get out of the optional infinitive stage once he/she has acquired register variation?

The explanation in terms of processing resources raises questions with respect to adult grammar. If it is cheaper to introduce an event file card in the discourse through presupposition why do languages choose the more costly mechanism in the end instead of setting for the cheaper mechanism and rely only on pragmatic means of introducing event file cards in the discourse? We would expect languages to (generally) choose cheaper strategies.

3.3. *The null modal hypothesis*

German root infinitives have a modal value.

Ingram and Thompson (1996) present data from child German to argue for a modal account of root infinitives in early speech. The framework of their study is provided by what they call the Lexical/Semantic Hypothesis according to which early syntactic acquisition is lexically and semantically determined. In particular, early

inflected forms are claimed to be first acquired as lexical items and not as roots plus affixes[5]. Another important assumption is that the forms which children produce at an early stage cannot represent reliable evidence that they have syntactic knowledge; children produce what they heard in the input.

Within this framework, early root infinitives are argued to be used with a clear modal meaning, which distinguishes them from the finite forms used during the same stage. On this account, choosing the infinitive or a finite form of a verb does not seem to be a matter of optionality at all.

The Modal Hypothesis states that: «German children in their early stages of acquisition use infinitives as main verbs in sentences that contain a modal interpretation, i.e. that some activity will, can or should occur.» (p.102).

In order to test this hypothesis, they examined the data from four German subjects. The infinitive form was analysed as having a modal interpretation if one or more of the following criteria was/were met:

(i)   a modal appeared in the infinitival construction
(ii)   parental input showed a modal :

(47)   Mother: *Was möchtest du haben?*
            what want-2nd pers.sg. you have-inf
        Child: *Steft haben?*
            crayon have-inf (Ingram and Thompson 1996: 106)

(iii)   if the transcription gave a modal expansion or interpretation to the child's utterance, as for example in (44):

(48)   Katrin: *Haben?*
            have-inf
            (*willst du die Stifte haben?*)
            want you the crayon have (Ingram and Thompson 1996: 106)

(iv)   if a modal was present in the parent's response :

(49)   Katrin: *Stift haben?*
            crayon have-inf
        Mother: *Ach, du mochtest einen Stift haben.*
            yes, you want-2nd pers.sg. a crayon have-inf

The results of the analysis strongly support the Modal Hypothesis. Most of the time, when children use a root infinitive, they use it with a modal interpretation. The assumption is that these constructions contain a null modal.

The same criteria were applied to the analysis of the finite forms in the four samples. The results point that the finite verbs are used significantly less frequently with modal interpretation, which suggests that children use finite and non-finite forms with different meanings, i.e. root infinitives with a modal interpretation[6] and finite forms with a non-modal, descriptive interpretation. The choice between the two is not optional. Such linguistic behaviour observes the Principle of Contrast (Clark 1987) according to which every two forms contrast in meaning, i.e. different forms are associated with different meanings.

Children use root infinitives, it is argued, because they tend to simplify structure. There are performance limitations on sentence production at this stage. Their use of root infinitives will decrease in time, as the production and processing capacities of the child improve.

---

[5] For a similar proposal, see, among many others, Aldridge (1989) where it is argued that children take a verb plus its inflectional affixes as an unanalyzed whole.

[6] Further evidence in favour of the modal account comes from the history of German. The German infinitive was first a case marker for verbal nouns which then evolved into a purposive marker and then into the present-day infinitive. It seems that the infinitive itself may create a modal interpretation, rendering the German children's root infinitives *irrealis*.

The idea that an auxiliary is missing in root infinitives is also defended in Boser et al. (1992) and Whitman (1994). In spite of the different assumptions and in spite of the different arguments presented in the two studies, they share the key idea: root infinitives represent structures containing a null auxiliary. Boser et al. (1992) explain the emergence of root infinitives in child German within the Strong Continuity Model. Since in child German whenever a non-finite form is used it occurs in sentence final position, just like in adult structures with auxiliaries, we can say, by analogy, that the auxiliary is absent or null in the child's infinitival construction. Crucially, child grammar is assumed to license an empty auxiliary in subject-initial sentences. Their hypothesis is interesting because they extend the null auxiliary analysis (where the term auxiliary is a cover term for modals and other «dummy» auxiliaries) from infinitival to other non-finite constructions, such as participial constructions. They argue that children 'know' that auxiliaries select different forms of non-finite verbs and that «different auxiliaries have distinct lexical content» (p. 89). This means that when they use a certain non-finite construction, which is the complement of one particular auxiliary, they use it with a particular meaning. And this is exactly what Ingram and Thompson propose: children use the infinitive with modal meaning because it is the complement of a null modal.

The account in Boser et al. (1992) could provide a unifying frame of analysis for all the non-finite forms which are attested in early child language, both in null subject languages and in non null subject languages. Since it is assumed that children have to learn the overt realisation of Aux, i.e. the elements which exhibit cross-linguistic variation, one may expect non-finite forms in child speech to be subject to language variation (infinitives in some languages, participle in others). Also, if in non-finite constructions an auxiliary (whose lexical content is known to the child) is missing, the only possible conclusion is that finite and non-finite forms are not optionally chosen. Again, this is the conclusion which Ingram and Thompson reach in their study.

Speculating in guise of conclusions, one may say that these two studies which argue for a null or missing element in root infinitives may open a new track of inquiry which may reach the conclusion that, on the one hand, one cannot speak of an «infinitive» stage (the default may differ from one language to another) and, on the other hand, regardless of the name of the stage (infinitive, non-finite, participial, etc.) choosing between the finite and non-finite form may not be optional after all. Such a conclusion would be in line with assumptions about our linguistic computational system, which is defined as avoiding optionality, as well as with the continuity hypothesis: the child's grammatical system is in place but, either for processing reasons or for gaps in his /her lexicon some elements are still omitted.

Unfortunately, in spite of its explanatory power, such a view raises, however, many questions, the most important of which is linked to an account for the cluster of the properties which are analysed as going hand in hand with the emergence of early root infinitives.

Equally important, the account fails to answer the old question of why auxiliaries or/and modals are the ones which are systematically omitted at this stage.

SUMMARY

In this chapter cross-linguistic data have been discussed with a view to showing that there is a stage in language development when non-finite forms are used in contexts which require the use of finite forms in the target grammar. These non-finite forms, which seem to be, in many languages, the infinitive, evince a number of characteristic properties (both structural and interpretative) which distinguish them from the root infinitives which occur in adult speech:

- child root infinitives do not require a special context

- the interpretation of child root infinitives is more 'generous' than the one of the root infinitives used in adult speech
- there is a link between early root infinitives and the aspectual class the predicate belongs to, link which is absent in adult grammar.

Various answers to the question with respect to the possibility, available in child speech but absent from adult grammar, of optionally using the finite and the non-finite form of the verb in root contexts have been presented. Children use root infinitives at this stage because of:

A. a competence deficit:

- early representations are purely lexical, functional categories (Tense and Agr in particular) are not yet available (Radford 1990).
- the child cannot distinguish the values of (syntactic) Tense, which is optional at this stage (Wexler 1994).
- Agrs, Tense or both are optionally omitted (Schütze and Wexler 1996)
- the so-called Unique Checking Constraint prevents the computational system from checking the D feature of a DP more than once; in order to save the derivation, the child chooses to omit either Tense or Agrs (Wexler 1998)
- early grammar lacks both Tense and Agreement (Ingham 1998)
- the child does not know that every clause must be a CP and may project truncated structures (VPs or Agr_oPs), which lack Tense and all the projections above Tense (Rizzi 1993/1994).
- the child does not know the (pragmatic) rule which blocks co-reference when the temporal interpretation reached via co-reference is the same as the one reached via bound anaphora.

B. processing limitations

- root infinitives occur in early speech because merger of the verb with inflection can be delayed for processing reasons (Phillips 1995).
- root infinitives represent a 'cheaper' strategy of introducing an event file card into discourse (Avrutin 1997).
- root infinitives are structures that contain a null modal, omitted because of processing limitations (Ingram and Thompson 1996).

Cross-linguistic empirical data provide evidence that root infinitives do not exist in all languages. Several explanations are available:

- root infinitives can only occur in non-null subject languages (Rhee and Wexler 1995).
- root infinitives can only occur in those languages in which the UCC applies non-vacuously with respect to the checking of the Agrs feature (Wexler 1998)
- root infinitives occur in languages in which finiteness is expressed exclusively by number (Hoekstra and Hyams 1998).

Further reading

Advanced: Most of the papers briefly presented in this chapter require some background in generative syntax. But you will certainly benefit by going to these papers yourself and get your own picture of the various analyses. If you want to read a more general paper, Schönenberger, Pierce, Wexler and Wijnen (1995) offers a good introduction to the accounts of root infinitives.

155

HOW SUBJECTS EMERGE

HOW SUBJECTS EMERGE

Grown-ups never understand anything by themselves, and it is tiresome for children to be always and forever explaining things to them. (Antoine de Saint-Exupéry –*The Little Prince*)

KEY POINTS:
In this chapter you will find out how children cope with subjects. In particular, about:
- why they occasionally drop the subject during early stages, even when the target language is a non *pro*-drop one
- why they occasionally case mark subjects in a deviant way
- links between subject omission, wrongly cased subjects and other properties of early grammar

1. The Phenomenon

1.1 Subjectless sentences in early grammar

1.1.1 Cross-linguistic data

Work on early language has revealed that child grammar may start with a stage when subjects are optional, not only in *pro*-drop languages[1], like Italian (1) or Modern Greek (2), but also in languages like English (3), Danish (4), German (5) or French (6), where the value of the *pro*-drop parameter is negative:

(1)   a. *tanti ocattoli porta*
          many toys brings
      b. *pendo chetta*
          take-1st pers.sg. this
      c. *la vado*
          there go-1st.pers.sg. (Schaeffer 1990)

(2)   a. *kani padhl*
          makes puzzle
      b. *ehi sokolata*
          has chocolate
      c. *thelis tili*
          want-2nd pers.sg. cheese (Hamann & Plunkett 1998)

> Subjects are occasionally omitted in early grammar.

---

[1] In linguistic theory, it has been noticed that in some languages lexical subjects may be omitted whereas in others null subjects are disallowed. The parameter responsible for this difference is the so-called *pro*-drop parameter, where *pro* stands for the empty subject. The parameter has a positive value in *pro*-drop languages, such as Italian, Romanian, Spanish or Modern Greek, in which the subject can be omitted, but a negative value in languages like English, French, German or Mainland Scandinavian, where the subject cannot be omitted in usual environments. For a more detailed discussion on the *pro*-drop parameter and its implications for the structure of language, see Cornilescu (1995), Haegeman (1991/1997) or the studies in Jaeggli & Safir (1989).

(3)   a. *throw away*
        b. *make a house*
        c. *sit on piano*
        d. *outside cold* (Hyams 1986)

(4)   a. *se, blomster har*
         look, flowers have/s
        b. *ikke kore traktor*
         not drive tractor (Hamann & Plunkett 1998)

(5)   a. *Brauche nich lala.*
         need not pacifier
        b. *Macht das.*
         does it
        c. *Esse pudding.*
         eats pudding   (Weissenborn 1992)

(6)   a. *boit café*
         drinks coffee
        b. *faire un autre*
         make another one
        c. *est tombé*
         is fallen   (Pierce 1989)

Early subjectless sentences are the result of a competence deficit.

1.1.2 Possible approaches to the phenomenon

While analyses converge on pointing out that early child grammar produces subjectless sentences (most probably cross-linguistically), there is a split in the literature with respect to the cause of early missing subjects as well as with respect to their syntactic status. Some acquisitionists assume that they are *the result of some grammatical deficit*. Their accounts reflect the position that they adopt with regard to language development. Supporters of the Weak Continuity Hypothesis link the occurrence of missing subjects to the lack of functional projections which could host the subject DP or which could provide the appropriate configuration for Nominative Case assignment.

Advocates of the Strong Continuity Model have proposed that, since children also use overt subjects at this stage, their grammar seems identical to the grammar of *pro*-drop languages like, for example, Romanian, Italian or Spanish, where both overt and null subjects are allowed in adult grammar. On such a view, early subjectless sentences do not represent violations of UG; they are the result of the mis-setting of the *pro*-drop parameter: children adopt a positive value for this parameter, regardless of its value in their target language (Hyams 1986). They would begin with a *pro*-drop-like grammar and switch off to the target grammar later. Evidence in favour of this hypothesis comes from the considerable number of early French utterances, which contain a postverbal subject (Friedemann 2000). The two examples below are both taken from Friedemann (2000):

(7)   a. *a chanté Victor.*
         has sung Victor
        b. *fait du bruit la voiture.*
         makes noise the car

Early subjectless sentences are the result of a processing/ performance deficit.

Not only does this empirical fact suggest that the early grammar has properties associated with *pro*-drop languages (which allow both null subjects and postverbal ones) but it also raises the question of whether the two phenomena should be indeed treated together in early syntax. A survey of the available files indicates that child speech gets rid of null and postverbal subjects around the same age (Friedeman 2000), which means that the two phenomena could be traced to the same cause.

160

Other acquisitionists link the optionality of overt subjects in early child language to *pragmatic factors* (Greenfield and Smith 1976), to *limitations on processing factors* (Bloom 1990) or on *performance factors* (Valian 1990, 1991). Others provide a *prosodic explanation* (Gerken 1991) or try to *integrate grammatical and discourse-based approaches* (Rizzi 1994, Hyams 1996, Hamann & Plunkett 1998).

As already discussed in the previous chapter, there is a connection between the existence of null subjects and the optional use of the infinitive and between the child going out of this infinitive stage and his/her correct use of an overt subject, where required by the target language. This raises the question of whether the two phenomena are connected and, if they are, whether the relation is a cause-effect one. However, linking the occurrence of null subjects exclusively to properties related to the optional infinitive stage overlooks the fact that early null subjects are attested in finite sentences as well. It is true that the survey of the data reveal a strong tendency of null subjects to occur in infinitival constructions, but they also occur, in sufficient number, with inflected verbs during the same stage (Bromberg and Wexler 1995 for English, Rasetti 2000 for French). This raises doubts with respect to those explanations that relate early missing subjects to the lack of the Tense projection. It also poses the question of whether null subjects have the same properties in the two contexts in which they are attested: finite and non-finite. Bromberg and Wexler (1995) argue that there are actually two types of early null subjects: one that occurs with the infinitive and one that can occur with both a finite and a non-finite form of the verb.

1.1.3 The syntactic status of early null subjects

The syntactic status of early null subjects has also been a matter of debate. On the one hand, they have been assimilated to the null subjects of *pro*-drop languages. Along this line, they have been treated as *pro* (Hyams 1986) and as a null topic similar to null subjects in Chinese (Hyams 1992). On the other hand, they have been compared to the null subjects available in non *pro*-drop languages. On this account, an English utterance containing a null subject will not represent a deviation from the target, since early null subjects are like adult null subjects.

| Early null subjects = *pro* |
| Early null subjects = (Chinese-like) null topics. |

The fact that a considerable number of missing subjects are attested in infinitival constructions pointed to the possibility of assimilating them to PRO[2] (Sano and Hyams 1994, Rasetti 2000), which is allowed in adult non-finite sentences. This hypothesis can be best accounted for within any developmental model which treats root infinitives as bare VPs. In this case, the verb is assumed to remain *in situ*, it has no inflection (or minimal inflection), and consequently it cannot assign Case to the DP subject, just like in adult non-finite constructions.

| Early null subjects= PRO. |

This analysis, however, cannot explain why null subjects are also used with inflected verbs. This is why other researchers try to relate missing subjects in child syntax to missing subjects in finite contexts in languages which are not *pro*-drop. In languages like

---

[2] PRO represents the non-overt subject of non-finite clauses. It has been defined as an NP with the feature matrix [+anaphor, +pronominal]. Its interpretation can be either controlled by an antecedent (in which case it behaves like an anaphor) or free (in this case it behaves like a pronoun):

    (i)   I tried [PRO to go].
    (ii)   I told John [PRO to go].
    (iii) It is easy [PRO to translate this text].

In (i) and (ii) the antecedent of PRO is available in the main clause; the subject in (i) and the object in (ii) control the interpretation of the non-overt subject of the infinitival clause. In (iii), there is no antecedent in the main clause and PRO receives an arbitrary interpretation, i.e. it refers freely.

The most important difference between overt subjects and PRO is that the latter is not assigned Case. Its occurrence is restricted to those contexts in which it cannot receive Case. This explains why PRO and overt subjects do not alternate.

French or English, the subject can be omitted in finite clauses in special contexts, such as diaries (8), short notes (9) or in casual spoken language (10). All the examples below are taken from Haegeman (2000).

(8)   *Cried yesterday morning: as if it were an hour of keening: why is crying so pleasurable.* (Sylvia Plath, 10.1.1959, 288)

(9)   *Wish you were here.*

(10)   *He said: Does the name Farriner mean anything to you? Can't say it does.*
What happened to Mary? Went away for a while.
Told you so.

This led to the conclusion that child null subjects can be assimilated to such missing subjects attested in adult speech. With Haegeman (1990), Bromberg and Wexler (1995) and Weissenborn (1992) they are treated as null topics, with Rizzi (1994) and Haegeman (2000) and, from a slightly different perspective also with Radford (1996) they are defined as an empty category (a null constant) which has the features [– pronominal, – anaphoric, – variable]. On such a view, early subjectless sentences are not deviant from the target grammar, which also allows topic dropping. The only difference between child and adult speech would be related to the number of contexts in which such subjects are allowed: *Young children are less discriminating than adults as to the variety of pragmatic contexts in which they will allow null topics* (Bromberg and Wexler 1995:244).

1.2 Non-Nominative subjects in early grammar

1.2.1 The Data

Besides null subjects, early child grammar may also produce non-Nominative subjects, i.e. DPs inflected for the Accusative (or Objective)/ Genitive may occur as subjects. Though usually treated together as instances of wrongly cased subjects, they do not occur with the same frequency cross-linguistically nor within one and the same language. While Accusative subjects have been attested in several child languages, Genitive subjects have been found only in child English. Moreover, the examination of corpora of child English reveals one more asymmetry between the two types of 'wrong' subjects: instances of all Accusative personal pronouns have been detected in subject position (11) whereas *my* is much more frequently used than any other Genitive pronoun as a subject (12):

(11)   **me talk / me do it** (Radford 1996)
him bad dog/ them *eyes* (Gruber 1967)
us *able to make two trees* (Huxley 1970)

(12)   *my caught it/my cut it/ my cried in the bed* (Vainikka 1993/1994)

As the data in the table below (taken from Radford 1998:120) show, many English speaking children use only *my* and/or *her* (more rarely) as subjects:

Table 1

Recorded examples of Genitive subjects

Child	Age	MY	HER	OTHERS
Peter	2;0–2;8	39	0	0
Eve	1,6–2;3	13	5	0
Nina	2;1–2;5	12	114	0
Naomi	2;0–2;5	4	2	0

However, other Genitive pronouns have been occasionally attested in child English (Fletcher 1985, Brown 1973):

(13) *our play that on floor/ can our do it again* (Fletcher 1985)
      its can't fit with dis / its opens/why its flies all by itself? (Brown 1973)

Vainikka (1993/1994) argues that it might be the case that young children use a wider variety of Genitive subjects than usually assumed. This discrepancy would be due to the fact that some of the data may have been mis-transcribed. Thus, what is usually transcribed as *you're/it's/they're* could actually have been uttered *your/its/their*.

An opposite point of view is put forth in Radford (1998), where the very existence of a Genitive-subject stage is denied.

Regardless of the position one might side up with, the fact that English speaking children sometimes use Genitive subjects or what might look as a Genitive subject at first sight still needs an explanation, be it to merely show that they are not Genitive after all.

1.2.2 Possible approaches to the phenomenon

The question that such data lead to is to what extent Genitive and Accusative subjects can be treated in a unified way. This question is justified not only by the fact that Genitive subjects seem to be attested only in child English, but also by the fact that the use of different Genitive subjects can be (and has been) traced to different causes, i.e. Genitive subjects themselves could not be analysed in a unified fashion.

Leopold (1939) proposes that *my* subjects represent a misanalysis of the phonological sequence *am I* with a reduced vowel. This could explain the overwhelming majority of *my* subjects (vs. other Genitive pronominal forms) and also the cross-linguistic gap with respect to Genitive subjects, which have been attested only in child English.

> *My* subjects could represent a misanalysis of the phonological sequence *am I.*

Along similar lines, Radford (1998) argues that *my* is a lexical variant of *I*: it is misanalysed as the strong form of the Nominative pronoun *I*. Children would hypothesise, on analogy with the weak variants *'im* and *'em* of *him* and *them*, that *I* is the weak form of /m+ai/. On this view, *my* no longer represents an instance of a wrongly cased subject, but a strong Nominative pronoun used as a subject. The prediction would be that children should use *my* with uncontracted auxiliaries but never with contracted ones (sequences such as *my'll, my'd* should not occur), because contracted forms represent instances of cliticisation of a weak pronoun onto a weak auxiliary. Empirical data support the hypothesis:

> *My* subjects could be interpreted as the strong Nominative variant of *I.*

(14) *No, my am coming up to play in there.*
      My can't open it by myself.
      My will do it again.
      Should my make an airplane? (Rispoli 1995)

The use of *her* as a subject has been attributed to a gap in the early lexicon. Schütze (1997) argues that at this stage the child has not learned the form *she* yet but he/she knows the form *her*, which has almost identical features to the Nominative pronoun: 3rd person, feminine, singular. Consequently, whenever this set of features is intended, *her* will be used. This account predicts that *her* and *she* should not co-occur as subjects during the same stage. But, empirical data (like the ones in 15) show that not only do the two pronominal forms co-occur, but they can even be found within one and the same sentence (Huxley 1970, Pensalfini 1995) :

> *Her* subjects could be traced to a gap in the early lexicon.

(15) *Her is jolly strong, isn't she?*
      *She kept hiding our balls and I needed to shoo her away but **her** didn't go.* (Huxley 1970)

Radford (1998) points out that *her* represents both the Accusative and the Genitive form, which means that *her* subjects could be interpreted only as Accusative pronouns.

Other linguists argue that non-Nominative subjects are the reflex of a grammatical deficit, mainly affecting the mechanism of Case assignment. They usually focus on the question of whether children have knowledge of Case or /and of DP movement at this early stage. For example, the occurrence of Genitive pronominal subjects has been assumed to be due to the lack of subject raising (Deprez and Pierce 1993) in child grammar. Also, some default Case mechanisms have been invoked (Vainikka 1994, Bromberg and Wexler 1995).

An interesting explanation for the use of *my* as an early subject is the one in Hamburger (1980). Starting from the analysis of the data of an intensive longitudinal study of an English-speaking monolingual child (24 – 28 months), he reaches the conclusion that child utterances like the ones in (16) below are precursors of Restrictive Relative Clauses:

(16)   a. Adult: *What's this?* (pointing to yesterday's drawing)
         Child: *My did it.*
       b. *This my did.*
       c. *This is my did it.*
       e. *That may did it.*   (Hamburger 1980: 396-397)

Such sentences are interpreted, according to Hamburger's analysis, as 'This is a (my) thing such that I did it' (p. 398). Gradually, these constructions are replaced by sentences like those in (17):

(17)   a. *Look -a wy made.*
       b. *Look at what I made.* (Hamburger 1980: 411)

Other linguists propose that structures containing Accusative/ Genitive subject pronouns are better analysed as focus or topic structures. Gruber (1967) argues that Accusative subjects do not actually represent deviations from adult grammar; they are left-dislocated topics and consequently child grammar and adult grammar do not differ in this respect. Structures like the ones in (18) are analysed as manifestations of the topic-comment construction:

(18)   *me wanna truck*
       me take the wheel
       me draw
       him go right back
       no him no bike
       me show you? (Gruber 1967: 53)

Gruber points out that in the corpus he studied there is always a contrast in intonation pattern between such constructions and sentences with a Nominative pronoun ('unmarked' pronoun, in his terms). The Accusative subject has the intonation of a declarative sentence and is separated from the rest of the sentence.

Thornton (2000) argues that the *my* subjects in her Aurora corpus are limited to contexts of contrastive focus, more specifically when a grown up person offered to help the child, but she wanted to take charge herself:

(19)   Context: Mother explains that she needs to put the lid on A's cup.
       A: *No, my do that!* (Thornton 2000)

These focused subjects are argued to occupy a higher focus position, in the Spec of a Focus projection. The *my* subjects are very soon replaced by *I'm* in these contrastive focus contexts, which suggest that the earlier *my*-s represented an instance of metathesis (as argued in Leopold 1939):

164

(20)   Context: Mother offers to put toothpaste on her toothbrush for A.
       A: *No, I'm do it.* (Thornton 2000)

The analyses briefly presented above show that it is not clear whether various Genitive subjects, on the one hand, and Accusative and Genitive subjects, on the other hand, should be explained as rooted in the same clause. Schütze (1997), for example, proposes that they should be treated separately.

In spite of the fact that this intuition is essentially correct, in what follows Genitive and Accusative subjects will be treated together, given the fact that most of the studies which will be presented try to account for the two phenomena in a unified way.

2. Accounts of null subjects in early child language

2.1. Competence deficit accounts

2.1.1. The questions

Grammatical accounts (most of which within the framework provided by the Principles and Parameters framework, but also with minimalist flavour in more recent studies) propose that early null subjects represent a grammatical option, rooted in the properties of early grammar. A competence-deficit of some sort is responsible for the optional use of subjectless sentences at early stages of linguistic development. In spite of the different analyses or hypotheses put forth with respect to missing subjects, most of the studies analysing subjectless sentences in early child language as rooted in some competence deficit focus mainly on the following problems:

| | | Early null subject sentences reflect a competence deficit. |

(i)   how can one account for the cross-linguistic existence of null subjects in early grammars?

(ii)   what is the status of null subjects in child grammar? Are they different from missing subjects in adult grammar or from null subjects in *pro*-drop languages?

(iii) how are they licensed and identified?

(iv)   how do children get rid of subjectless sentences when their target language does not allow them?

2.1.2. The parameter mis-setting approach

Hyams (1986) represents the first attempt to apply the Principles and Parameters model to the study of first language acquisition. Though her claims have been disputed in many ways (she has constantly revised her analysis herself), one cannot deal with the problem of null subjects in early child language without going back to the first account of this phenomenon.

In her analysis of subjectless sentences in child language, Hyams adopts the approach to null subjects developed in Rizzi (1982), according to which null subjects are governed by a [+pronominal] Inflection, whereas in languages like English, Inflection cannot be specified as [+pronominal] and, consequently, null subjects are disallowed. She produces a modified version of this analysis, which takes as crucial the identity of the head of the Inflection projection. On her model, UG contains the following rules:

(21)   a. S → NP, I, VP
        b. I → (AGR)³, AUX

---

[1]Hyams (1986) uses AG for AGR; since AGR is more widely used, I will use this abbreviation instead of the one she does.

The rule in (21b) relies on the idea that Agreement (i.e. features of person, number and gender) may/may not be marked in some languages (Italian vs. Chinese, for example) or across constructions in one and the same language (finite vs. infinitival constructions in English, for example). Hence the optionality of AGR. AUX, on the other hand, is not optional, and it is assumed to contain at least Tense features. According to Hyams, Inflection can he headed by either AUX, when it contains lexical material (as, for example, the English modals), or by AGR. In languages like Italian or Spanish, which allow null subjects, AGR is identified with PRO[4] (AGR=PRO) and it licenses *pro* in subject position, whereas in languages like English or French, AGR cannot be identified with PRO (AGR ≠ PRO) and hence *pro* subjects are disallowed. Within her approach, *pro*-drop languages have their *pro* subject governed by AGR/PRO as can be seen in the representation of the Italian sentence in (22):

(22) *Parla.*
      '(He) talks'
      [$_{NP}$ *pro*][$_I$ AGR/PRO, AUX][$_{VP}$ ...]

<div style="border:1px solid">
The parameter mis-setting approach: the null subject parameter comes fixed at an initial setting; children start with an Italian-like grammar, where null subjects are allowed (regardless of their target language).
</div>

In early child English, lexical subjects are optional and expletive subjects are always omitted (23):

(23)   a.*Outside cold.*(= It is cold outside)
        b.*No more cookies.* (=There are no more cookies)
        c. *Yes, is toys in there.* (= There are toys in there) (Hyams 1986)

By assumption, early English would be like Italian or Spanish. The child acquiring English would start out with an Italian-like grammar and early null subjects would represent a grammatical option. Consequently, subjectless sentences do not represent violations of UG; they simply are the result of a parameter setting different from the target language. Hyams argues that *the Null Subject parameter comes fixed at an initial setting*, i.e. AGR = PRO. Children speak an Italian-like language at early stages and, on the basis of the information provided by the input, they will eventually change the initial setting and switch off to the grammar of their target language. The mechanism via which re-setting[5] takes place is dependent on the child's noticing the use of expletives (of *it* and *there* in the case of the English speaking children) in the target language. The presence of these elements in the positive data is taken to act as a trigger, which will switch the parameter to a different value, since *pro*-drop languages do no allow lexical expletives.

The theoretical implication is that UG provides a markedness ordering on the values of the Null Subject parameter, with the AGR=PRO being the unmarked value. For linguistic development, the implication is that the child initially mis-sets the value of the *pro*-drop parameter. According to the Parameter Mis-setting hypothesis, early null subjects are identical to *pro* subjects in languages like Italian.

However, there are a number of reasons to be sceptical of the claim that early subjects have the status of *pro* found in *pro*-drop languages. One is related to the identification of *pro*: in languages like Italian or Spanish, it is identified (i.e. its interpretation is made possible) by the rich inflection on the verb. But, in early child English, there is no overt manifestation of agreement morphology, which raises the question of how *pro* is identified in this case. The second is linked to the distribution of null subjects in early speech and in null subject languages. Early null subjects very rarely occur in *wh*-questions, whereas subjects can be dropped in this environment in languages like Italian (24) or Romanian (25):

---

[4] 'AG (i.e. AGR) in *pro*-drop languages exhibits all of the crucial properties of PRO, the element typically found in subject position of infinitivals, and is thus to be identified with PRO in those languages. It is in this sense that AGR is defined as 'pronominal'. (Hyams 1986:32).
[5] See Chapter 2 for a discussion on the re-setting of parameters.

166

(24)   a. *Dove vai?*
             where go-2nd pers.sg.? /
       b.   *Cosa fai?*
             what do-2nd pers.sg.

(24)   a. *Unde mergi?*
             where go-2nd pers.sg.
       b. *Ce faci?*
             what do-2nd pers.sg.

Early null subjects can only occur in main clauses (sentences like 26 below are unattested in child language, Hyams 1996), whereas in *pro*-drop languages they can occur in both matrix and embedded clauses (27)[6]:

(26)   *I said that went home.*
(27)   a. Italian: *Ho detto che andava a casa.*
       b. Romanian: Am spus că merge(a) acasă.
       'have-1st pers.sg. said that pro went-3rd pers.sg. home'

These empirical data provide evidence that there are significant differences between the distribution of null subjects in child language and in *pro*-drop languages.

For the acquisition of English, the prediction is that modals should be absent at the optional null subject stage and that the English-speaking children would acquire the modal verbs at approximately the same time when they (begin to) abandon subjectless sentences. But there is evidence that modals are used infrequently at this time and that there is no direct link between the emergence of modals and the end of the null subject stage (O'Grady et al. 1989, Radford 1996).

Empirical data also show that English-speaking children start using verbal inflection at the time when they shift from subjectless sentences (Guilfoyle 1984 among others), which may suggest that the two events are related. The account in Hyams (1986) fails to explain this relation. All these problems are addressed in Hyams (1992).

The analysis is problematic from a developmental perspective as well. The assumed process of parameter mis-setting poses non-trivial questions. Once the child has set the value of one parameter, it might be the case that, in a cascade-like process, other parameters will be automatically fixed (see, for example, Stromswold and Snyder 1997 where several linguistic phenomena are traced to the setting of one single parameter). On the other hand, there is evidence that children fix the correct value of parameters quite early.

Another question concerns the process of de-learning: how does the child switch off from one value to another? Can we accept the idea that parameter values can be re-set?[7]

Hyams (1996:97) acknowledges the problems of her previous analyses: "There can be no intermediate stage of development characterised as a parameter mis-setting since this would have been set on the basis of data which are compatible with both the correct value and the incorrect value for the target language" and proposes a different account.

In spite of the many problems raised by the 1986 account, Hyams's early analysis remains the first one that treated the early null subject phenomenon as rooted in a grammar deficit.

2.1.3. A morphological uniformity account

The linguistic account of null subjects adopted in Hyams (1992) is the one developed by Jaeggli and Safir (1989). Their analysis starts from the obvious empirical

---

[6] For more examples and a more detailed discussion, see Roeper and Weissenborn 1990, Valian 1991. Weissenborn 1992.
[7] See also 3.2.2.2 in Chapter 2 for a more detailed discussion on parameter mis-setting.

fact that null subjects are equally allowed in languages with rich morphology (such as Italian, Spanish or Romanian, for example) and in languages with no agreement morphology (such as Chinese). On the other hand, there are languages with morphological complex forms, in particular with overt markers of agreement (such as German or French), which do not allow null subjects. These facts can only lead to one conclusion: not all null-subject languages have rich inflection and rich inflection is not necessarily associated with null subjects. This raises the question of the identification of *pro*: if it is not rich inflection, in particular agreement morphology, which is responsible for its identification, how is this null element identified?

Jaeggli and Safir propose that the crucial property of a null subject language is what they call "morphological uniformity": inflectional forms in a paradigm must be either only underived or only morphologically complex. They state this condition as the Morphological Uniformity Principle:

> (28) Null Subjects are permitted in all and only those languages which have morphologically uniform inflectional paradigms.

According to this principle, languages like Italian or Romanian, with morphologically uniform inflectional paradigms (29), allow null subjects:

> (29) a. Romanian: *vorbesc/ vorbești/vorbește/vorbim/vorbiți/vorbesc*
> b. Italian : *parlo/ parli/parla/parliamo/parlate/ parlono*
> (I, you, he, she, we, they) speak(s)

Languages like Chinese, where the forms are never morphologically complex, will also allow null subjects. .

But in English, where morphologically complex (*speakS)* and morphologically simple (*speak*) forms coexist, null subjects are disallowed. The paradigm is, in this case, a mixed one.

However, there are languages like German or French which have morphologically complex forms (as the paradigms in 30 illustrate) and which are not null subject languages, thus posing a problem for their account:

> (30) a. French : parl*e*/parl*es*/ parl*e*/ parl*ons*/parl*ez*/parl*ent*
> (I, you, he, she,we, they) speak(s)
> b. German: arbeit*e*/ arbeit*est*/arbeit*et*/ arbeit*en*/arbeit*en*
> (I, you, he, she, we, they) work(s)

This is why Jaeggli and Safir resort to an explanation which draws a clear line between licensing and identification of *pro*. Morphological uniformity represents the licensing condition, i.e. it provides the context in which *pro* can occur. But *pro*, like any null category, must also be identified, i.e. its reference has to be available. On their approach, *pro* can be identified by: (i) local AGR (which must include Tense) or (ii) a c-commanding nominal or (iii) a topic.

In German and Icelandic, Tense features are separated from Agr features, since the former are located in the Complementizer projection. Hence, *pro* cannot be identified. In languages like Italian or Romanian, Tense and Agr features are located in Inflection; hence the identification requirement is met. Chinese resorts to (ii) or (iii) for the identification of its null subjects.

Let us see now how Hyams (1992) imports this analysis into the domain of acquisition. If a child acquiring English uses null subjects at an early stage, it means that he/she takes the target language as being morphologically uniform. Actually, at the same stage, child English *is* morphologically uniform, because children systematically omit verbal inflection, in particular agreement and tense markers. Hence, the licensing condition is met. When the child acquires the inflectional system of English and realises that it is a mixed one, null subjects will be banned. Empirical data support this view: it

168

has been noticed that children start abandoning subjectless sentences at approximately the time when they start using tense inflection in a systematic way (Guilfoyle 1984). Hyams's (1992) analysis can now account for the simultaneity of these two events.

What about the identification of null subjects in child English? Agreement is absent at this stage, which clearly distinguishes child English from child Italian, for example. Thus, if the English child does not start with an Italian-like grammar (as Hyams assumed in her previous study), how does his/her grammar meet the identification condition of null subjects? She adopts Huang's (1982, 1984) account of null subjects in Chinese and proposes that in early child English the null subject is identified as a topic. In this respect, she likens the English-speaking child to the Chinese one, i.e. early English is assumed to allow topic binding of null arguments.

On Huang's analysis, in discourse-oriented languages, such as Chinese, empty subjects are identified by a mechanism which he calls "topic-identification", and which allows the null subject (which is a variable within this approach) to be identified by an empty topic whose referential properties are derived from discourse. Hyams (1992) proposes that the null subject is a *pro* element in early grammar (departing in this respect from Huang's analysis) which English-speaking children would identify via a topic-chain, as in Chinese[8]:

> The morphological uniformity account: children start with a Chinese-like grammar, where null subjects are identified via a Topic chain.

(31) DISCOURSE
      TOPIC$_i$ [topic$_i$ [$_s$ pro$_i$ [INFL]....]]

The learnability implication of this new approach to null subjects is that uniformity (and no longer a positive value for the AGR=PRO parameter) is the child's initial assumption with respect to his/her morphological system. This will be in line with the Subset Principle (Berwick 1985) which states that if there is a choice between two parameter values, one which generates a language that is a subset of the other, the child will initially assume the value which generates the subset language. In this case, if the child assumes that his/her language has either morphologically complex or morphologically simple forms, he/she will start with the more restrictive hypothesis and, on the basis of input, he/she will extend the grammar so as to include the other type of form (if the target language is a morphologically mixed one).

In Hyams (1986) the optionality of missing subjects is related to a concurrent absence of the modals, the assumption being that the child will begin to use modal verbs when he/she abandons the use of null subjects. This assumption, however, was disconfirmed by empirical data. In Hyams (1992) the emergence of the English modals, of *be* and the infinitival *to* is no longer seen as a direct effect of the null subject parameter. Their emergence is the direct effect of the development of a +/- tense distinction in the child's grammar. This would explain why the use of auxiliaries increases only after the child uses tense inflections productively and systematically. Before that, during the uniformity stage, when tense is not specified, auxiliaries, which are associated with Tense, are also absent. However, Radford (1996) provides examples of subjectless sentences that do contain an auxiliary:

(32)   a. *don't know*
        b. *can't clock them down*
        c. *don't paint that* (= I didn't paint that)
        d. *don't work* (= it doesn't work)

Such sentences show that children may use auxiliaries during this stage; but as one can see in (32c) and (32d) Tense and Agreement inflections are not used systematically yet.

One more problem encountered by the proposal in Hyams (1992) is related to how she "imports" the findings and hypotheses in Huang (1984) to early English. Under Huang's analysis, Chinese allows both null subjects and null objects, which, he argues,

---

[8] For discussions on the account in Hyams (1992) see, for example, Atkinson (1992), Weissenborn (1992), Lillo Martin (1992), Radford (1996) or Hyams (1996).

cannot be *pro*. Hyams treats null subjects in early English as [+pronominal, – anaphoric], i.e. as *pro*. Also, null objects have only scarcely been recorded in child English. If the child did indeed start with a Chinese-like grammar, one would also expect dropped objects at this stage. Hyams (1986) herself claims that 'we do not find regular production of objectless sentences' (p. 97). Bloom (1990) compared the percentage of subject drop to that of object drop in the CHILDES transcripts of Adam, Eve and Sarah. The results provide evidence that there is asymmetry[9] between the two phenomena. Adam omits subjects 57% of the time but objects only 8% of the time. The same difference can be noticed in the case of Sarah, who omitted subjects 43% of the time and objects 15%, and in the case of Eve, who omitted subjects 61% of the time and objects only 6% of the time (Bloom 1990:500).

The underspeci- fication of Infl hypothesis: early null sub- jects have the status of PRO and are related to the lack of morphological features realised on the verb.

2.1.4 The Underspecification-of-Inflection Hypothesis

Adopting the view put forth, among others, in Wexler (1994), that early null subjects seem to be directly related to the optional infinitive phenomenon, Hyams (1996) abandons her previous mis-set parameter accounts and proposes that both early null subjects and root infinitives are derived from the underspecification of Inflection:

> *[...] the English child's null subjects are not the result of a mis-setting of a null-subject parameter, [...] but rather they are the effect of an independent aspect of child grammars, the optional underspecification of I, the same property that gives rise to root infinitives* (Hyams 1996:99).

Underspecification means, oversimplifying, that in early grammar Inflection may fail to bear a (temporal) index along the Tense-chain, which will result in the absence of morphological features realised on the verb and a pragmatic assignment of a temporal value directly from the discourse domain.

The status of the null subject would be, in this case, that of PRO[10], defined, following Chomsky and Lasnik (1993), as a minimal NP argument which bears null Case. On such an approach, null Case is the realisation of a relation of Spec-head agreement (just like Nominative Case) when Inflection lacks Tense and Agreement features, i.e.; when Inflection is non-finite. Since it is assumed that Inflection may be left underspecified in early grammar, i.e. that it may lack Tense or Agreement features, whenever Inflection is underspecified we have a licit context for PRO.

Thus, child grammar has the full array of functional projections from the onset of acquisition; early null subjects have the same status as null subjects may have in adult English, i.e. PRO, and they are assigned Case via a mechanism which is available in adult grammar as well. The only difference between child grammar and adult grammar is that the child may use non-finite clauses (infinitives) in contexts where adult grammar has to use finite forms. These 'illicit' forms are assigned temporal value directly from the domain of discourse. This would suggest, according to Hyams (1996), that "the locus of difference between the early and adult grammar is in the pragmatic system" (p. 104).

So, what the child has to realise in order to get rid of the inappropriate subjectless sentences is that root clauses are not the correct environment for a non-finite verbal form or for null subjects. Consequently, their interpretation cannot be derived directly from the discourse context. Hyams adopts an idea in Partee (1973), according to which the use of Tense parallels that of pronouns[11]. By analogy, a present tense form can be either anaphoric (when Inflection is indexed, and the Tense Operator in C and Inflection have the same

---

[9] However, Bloom (1970) and Radford (1990) claim that there is no subject/object drop asymmetry during the null subject stage.

[11] I simplify again here, but the reader is kindly invited to go to sections **2.4** in **4.2** for a more detailed account.

index) or it may enter into co-reference with the Tense Operator. The latter is the case of root infinitives. But, when the child realises that co-reference leads to the same interpretation as that of bound anaphora, co-reference will be ruled out (Reinhart 1983). Root infinitives will no longer be licit in main clauses and null subjects, lacking the appropriate non-finite context for null Case assignment, will disappear.

Summarising, the proposal is that, at an early stage, child grammar may resort to an interpretative rule which links underspecified Inflection directly to discourse. When the child realises that the same interpretation may result via a grammar rule, he/she will abandon the discourse-linked one. The shift to adult grammar would involve, in this case, "restructuring not of syntax proper, but rather of the mapping between grammar and pragmatics" (p. 115).

What are the predictions of this account?

Since null subjects are licit with an underspecified Inflection, we do not expect them to occur with finite verbs. Hyams uses the results in Sano and Hyams (1994) to support this hypothesis. The analysis of the co-occurrence of null subjects with inflected *be* in the analysed corpora of child English (from CHILDES, MacWhinney and Snow 1989) reveals that children use null subjects with inflected (uncontracted) forms of *be* very rarely, as can be seen in Table 1 below:

Table 1

The Proportion of Null Subjects in Sentences Containing Uncontracted *am, are, is*

	file	Age	Am	Are	is
Eve	01–20	1;6-2;3	0/4	0/36	0/109
Adam	01–20	2;3.4 – 3;0.11	0/1	0/71	13/114 (=11.4%)
Nina	01–21	1;11.16 – 2;4.12	0/0	0/19	2/50 (= 4%)

(Hyams 1996:100)

Another prediction (again borne out by data from child English) concerns the frequent omission of *be* during the optional overt subject stage. Hyams, following the line of Scholten (1987) or Moro (1993), defines *be* as an expletive verb, inserted in the derivation with the sole purpose of carrying Tense and Agreement features. Its semantic contribution to the sentence would be, within such an approach, null. The frequent omission of *be* will straightforwardly follow, in this case, from the assumption that at this stage Inflection is underspecified, i.e. Tense and Agreement features are absent. Data from the Brown corpus (CHILDES) show that *be* (both the auxiliary, as in 34, and the copula, as in 35) is indeed omitted in obligatory contexts:

(34)   *Adam laughing / I brushing/ Becca making a table*
(35)   *Mommy busy/ hand cold/ potty dirty* (Hyams 1996)

The English modals have been associated with finite Inflection. Under the assumption that during the optional infinitive stage Inflection may be underspecified, the prediction would be that null subjects should not co-occur with modals. Hyams makes use of the results in Valian (1991) concerning the proportion of null subjects which co-occur with modal verbs in the corpus of the 21 American children whom she examined, and which clearly show that modals occur exclusively with overt subjects, as illustrated in Table 2:

Table 2

The Proportion of Overt Subjects in Sentences Containing Modals

	group I	group II	group III	group IV
mean age/MLU	2;0/1.77	2;5/2.49	2;5/3.39	2;7/4.22
%	94	95	98	

(Valian 1991, cited in Hyams 1996: 101)

However, Radford (1996) provides 27 examples of subjectless sentences produced by a 2; 2 year old boy during a single 45-minute recording, out of which 7 contain modals, i.e. 25.9%:

171

(36)   *can't knock them / can't get it out / can't stroke me now/ can't* (x 3 times)
won't (response to 'Does it work?') (p. 49)

Obviously, this does not represent strong evidence against Hyams's prediction, nor is it meant to be. What I would like to point out is that maybe occurrence/non-occurrence of modals and null subjects does not represent as strong a piece of evidence as generally assumed in the literature. Most of the analyses have imported the idea that the English modals are uniformly generated under Inflection, or are associated, in some way, with Inflection. On different assumptions, however, like the ones in Avram (1998), where the English modals are analysed as occupying a position under VP as well (in particular deontic *can* and *will*, precisely the modals which are used in the subjectless sentences in Radford 1996), modals could co-occur with null subjects when occupying a position in the lexical domain of the clause. In this case, the prediction in Hyams (1996) would only concern those English modals which occupy a position in either the functional domain or at the borderline between the functional and the complementizer layers of the clause. The examples in Radford (1996) would no longer represent a challenge to her view.

Another prediction of the underspecification hypothesis is that null subjects should be excluded from utterances that contain verbal forms inflected with Tense and Agreement morphology. However, it is disconfirmed by the data, as Hyams herself acknowledges. Sano and Hyams (1994) report that young children frequently use null subjects with verbs inflected for Tense, as can be seen in Table 3:

Table 3

The Proportion of Null Subjects with Verbs Inflected with *-ed*

	File	Age	Proportion	%
Eve	01–20	1;6 – 2;3	9/40	22.5
Adam	01–20	2;3 – 3;0	13/23	56.5
Nina	13–21	2;2 – 2;4	3/16	18.8

(Hyams 1996: 102)

Empirical data also show that null subjects co-occur with verbs inflected with *-s*, though less frequently than with verbs inflected with *-ed*. This can provide strong evidence against the underspecification hypothesis, as against any hypothesis which constrains the occurrence of null subjects to non-finite contexts. What Hyams suggests, though, is that at this particular stage, verbs inflected in *-ed* are ambiguous between a finite and a non-finite participial form. When they are analysed as finite forms, null subjects are disallowed; but, when analysed as a participial form[12], they occupy a position inside the Aspect projection (like the Italian past participle in Belletti 1990) and hence carry no Tense specification. Thus, they are non-finite and can check null Case, which makes the context licit for null subjects.

One more prediction which follows from the account in Hyams (1996) regards the impossibility of early null subjects to occur in finite embedded clauses. Data from child English (Valian 1991), child German and child French (Roeper and Weissenborn 1990, Weissenborn 1992) confirm this prediction.

2.1.5. Null Subjects and Related Parameters

In Hyams (1989, 1992, 1996) the analysis of null subjects in early child language is closely linked to that of Inflection: null subjects are assumed to be produced at a stage when Inflection has properties which allow them and disappear once the child has realised which the properties of Inflection in his/her target language are. Thus, the

---

[12] On this assumption, *-ed* marks perfective aspect whereas *-s* marks participial number agreement, in the spirit of Kayne (1989), where *-s* marks only singular number and not person.

172

properties of Inflection appear as crucial in both allowing null subjects and in helping the child get rid of this non-adult structure.

Weissenborn (1992) argues that the acquisition of the properties of Inflection alone cannot help the child to set the correct value of the null subject parameter. This is possible only after another parameter, which he calls the wh-parameter, has been set.

The empirical data which support his claim come from child German (three children aged 21; 07 – 32; 15 months) and child French (three children aged 21; 19–33; 06 months), i.e. from two languages which, according to the hypothesis in Jaeggli and Safir (1989), are morphologically mixed and hence incompatible with null subjects.

The analysis of the corpora of child German and child French reveals that children continue to omit overt subjects at a stage when they have already acquired the properties of Inflection in the target language, as the examples in (37) illustrate:

(37)　　a. *Peux le faire.*
　　　　　can-1st Pers. sg. it do
　　　　b. *Ai mangé des quettes* (= crêpes).
　　　　　have-1st pers.sg. eaten pancakes
　　　　c. *Est sale.*
　　　　　is dirty (Weissenborn 1992: 280)

At this stage, the French speaking child is already aware of the difference between finite/non-finite clauses: the negative particle *pas* always follows the finite verb but precedes non-finite verbal forms.

Moreover, the corpus of child German shows that null subjects are used in the same contexts in which subject omission is allowed in adult language. In German, thematic lexical subjects can be omitted (under certain pragmatic constraints) in preverbal position in tensed matrix clauses (as illustrated in 38) and in contexts when an infinitival form is supplied as an answer (39):

(38)　　Q: *Was machte Hans, als do ihn sahst?*
　　　　　　'What was Hans doing when you saw him?'
　　　　A: *(Es) sah fern.*
　　　　　　'(He) was watching TV.'
(39)　　Q: *Was willst du jetzt machen?*
　　　　　　'What do you want to do now?'
　　　　A: *(Ich will) Kuchen essen.*
　　　　　　'(I want) to eat some cake.' (Weissenborn 1992: 273)

The subjectless sentences in the child language corpora (40-41) are taken to be all of the type in (38) or (39) above:

(40)　　a. *Backe kuchen.*
　　　　　bake cake
　　　　b. *Brauche seife.*
　　　　　need soap
(41)　　a. *Blumen giesse.*
　　　　　flowers to water
　　　　b. *Flasche trinken*
　　　　　bottle to drink (Weissenborn 1992: 274- 275)

Children can set the *pro*-drop parameter correctly only after they have learned the value of the wh-/C-parameter.

On the basis of these empirical data Weissenborn argues that, given the similar contexts in which the subject is omitted in child and adult German, omission of subjects in child German does not differ from the same phenomenon in adult speech. The theoretical implication is that early null subjects and null subjects in non-*pro*-drop languages have the same status.

173

Weissenborn (1992) proposes an alternative account, which should be able to explain what previous analyses failed to do: why subjects are still omitted after the acquisition of Inflection. The main idea is that, on the one hand, child language does not differ from adult language with respect to subject omission and, on the other hand, that an analysis of triggers should take into account both parameter interaction and pragmatic constraints.

The analysis relies on a well-known empirical fact: in early child language, subjects can be omitted in matrix clauses but are never omitted in wh-questions or in embedded clauses with overt complementizers. These data suggest two things. Firstly, null subjects in early language differ from *pro* subjects in typical *pro*-drop languages, where they can be freely used in both matrix and embedded clauses. In Italian (a *pro*-drop language) there is Subject-Verb agreement, just like in German. That rules out, according to Weissenborn, proposals like the one put forth in Clahsen (1991), where it is claimed that the German speaking child will give up using null subjects as soon as he/she has acquired Subject-Verb agreement and points to the fact that the German child needs some independent evidence that null subjects are disallowed. Secondly, in adult German, omission of subjects is not allowed in wh-questions or in embedded clauses with overt complementizer, just like in early speech. It follows that the presence of lexical material in CP is relevant for the presence/absence of null subjects.

The input which children receive with respect to subject omission in the target language is often misleading because non null subject languages occasionally allow null subjects. How can the child cope with this ambiguous input? Weissenborn proposes that there is an unambiguous trigger in the input, which allows the child to set the value of the *pro* drop parameter correctly. It can be found in embedded clauses with overt complementizers and in wh-questions, i.e. in those contexts where the complementizer projection is filled either by a complementizer or a wh-phrase. The presence of lexical material in CP blocks a null subject from being identified by a topic chain (as in Chinese, for example) and forces it to be identified from the only available identifier: Inflection. The child will be able to determine whether Inflection in his/her target language is weak/strong only after the wh-parameter has been set. If null subjects are allowed in wh-questions or in embedded sentences with an overt complementizer in the input, the child will set the value [+ *pro*-drop]. If no such null subjects appear in these contexts, the child will realise that Infl is weak and, consequently, set the value [– *pro*-drop] to the parameter.

Weissenborn (1992:293) summarises his scenario as follows:

> The child must find out whether the language to be learned has an overt CP, that is, whether the C-parameter is + or -. This can be done on the basis of simple input data, namely examples exhibiting, for example, overt wh-movement or overt complementizers. Thus the setting of the INFL-parameter (i.e. whether INFL licenses and identifies pro) is directly dependent on the setting of the C-parameter. Only after the first is set, can the child set the second.

2.1.6. Subjects and The No-Functional-Projection Hypothesis

Weak-continuity accounts start from the assumption that early child grammar lacks functional architecture; the child's grammar is described as consisting, at the onset of acquisition, of a bare VP, which is the direct projection of argument structure, and other lexical projections which can appear within the VP, i.e. NP, AP, and PP (Guilfoyle and Noonan 1989, Radford 1990, 1996, Lebeaux 1988). Given that Inflection, which is responsible for Case assignment, is missing, subjects may be either absent or wrongly cased. On such approaches, the status of null subjects in early grammars cannot be *pro*, both for licensing and identification reasons. Nor can it be PRO because children use null subjects in sentences in which the verb is inflected for Tense (as in 42) or in sentences that contain finite auxiliaries:

Weak-continuity accounts link early missing subjects to the lack of overt inflectional material.

(42)   *goed on that way/ dropped a rubber band/ slapped Becca and Rachel*
                                              (Radford 1996: 49)

(42) is finite and hence does not provide the appropriate environment for PRO, which is restricted to non-finite clauses.

Nor can the null subject be a variable, since variables presuppose binding by an antecedent and binding is a property of a D-system, i.e. of a system in which the category Determiner has emerged. On the assumption that functional categories have not been acquired yet, the D-system is absent.

In Radford (1990) omitted subjects are analysed as phonologically null NPs. The phenomenon is entirely explained as the result of the lack of functional projections. On his language development hypothesis, early child grammar can allow null NPs and overt NPs in any argument position given that, at this stage, there are no functional projections and hence no functional licensing conditions available to determine the distribution of null constituents. Their content may be subject to pragmatic identification, given that they are free of binding constraints.

Radford (1996) adopts an almost identical version of the structure-building approach as the one put forth in Radford (1990). Early syntactic structures are defined as minimal lexical projections and children's initial clauses are hypothesised to be small clauses ('simple projections of a head non-finite lexical V constituent' p.45). This time, he argues that it is plausible to treat null subjects as null constants (nc), similar to the null subjects in adult diary style sentences like (43) below:

(43)   *Don't know what I can do. / Can't tell my parents I've failed the exam.*

A null subject sentence such as *want tiger* would have the representation in (44):

(44)
```
            VP
           /  \
          n    V'
              /  \
             V    N
           want  tiger
```
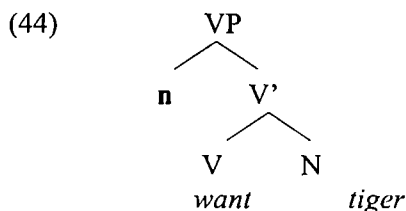
The identification of the null constant, which occupies a root specifier position and has no c-commanding identifier (there is no higher projection which could host a binding antecedent), is possible via discourse identification. As we are going to see, Radford (1996) follows the line of Rizzi (1994), where a similar analysis of null subjects in child language is proposed.

2.1.7. Null subjects within the Truncation Account

Rizzi (1994) accounts for the possibility of omitting lexical subjects in early child language within his own developmental model, according to which the child does not realise from the beginning that root clauses are CPs .The main assumption he starts from is that early null subjects and null subjects in *pro*-drop languages evince different properties. In this respect, his theory departs from Hyams (1989, 1992) but resembles the one put forth in Weissenborn (1992) and Radford (1996). Rizzi argues that early null subjects and subject omissions in adult (non *pro*-drop) grammar are governed by the same constraints. In particular, subject omission in child language is assumed to be similar to the so-called 'diary drop' in English (45a) or French (45b):

(45)   a. *A very sensible day yesterday. Saw no one. Took the bus to Southwark Bridge. Walked along Thames Street.*

b. *M'accompagne au Mercure, puis à la gare...*
    '(He) takes me to Mercure, then to the station...'
    Me demande si... je lui eus montrés les notes...
    '(I) ask myself if... I would have shown him the notes...' (cited in Rizzi 1994: 155-156)

The two types of null subjects share two properties: they cannot be dropped after a preposed element nor in embedded clauses. Though at first sight a topic-drop analysis might seem adequate, according to which the matrix Spec CP hosts a discourse bound null operator which binds a variable in subject position, along the lines suggested for omitted subjects in colloquial German (Ross 1982 or Weissenborn 1992), the fact that child language does not evince subject-object symmetry (in child English objects cannot be dropped[13], whereas they can in colloquial German) such an analysis is rejected.

Rizzi's proposal relies on the analysis of null epithets in Lasnik and Stowell (1991). They derive a typology of empty categories which comprises, besides the traditional categories, null R-expressions (or null definite descriptions) which are the null counterparts of epithets (i.e. definite descriptions which function quasi-pronominally, with linguistic antecedents) illustrated in (46):

<div style="border:1px solid; float:left">The truncation hypothesis: early null subjects are null constants, allowed in child grammar because CP may be missing.</div>

(46)   *John went to see Bill$_i$ but **the guy**$_i$ was too busy to talk to him.*

This analysis is extended to early null subjects which are defined as null epithets or null constants, [-anaphoric, -pronominal, -variable] elements, which can be discourse identified. They are allowed in early English precisely because, at this stage, the child's clause is truncated, lacking CP:
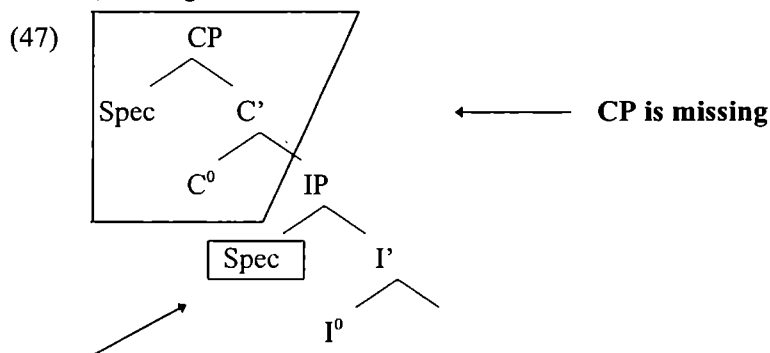
the null subject has no clause internal identifier

As can be seen in (47), the complementizer layer is assumed to be absent at this stage. The higher position (the root position) in the tree is Spec IP and the null subject can occupy this position. A survey of the data reveals that early null subjects occur only in the Specifier position of the root, i.e. only in the highest Specifier position available. No null subjects have been attested in early embedded clauses or in wh-questions, i.e. in structures which involve the presence of a CP. On the truncation account, given the absence of any higher functional projection, the null element cannot be syntactically identified because there is no clause internal identifier. This poses the obvious problem of the identification and licensing of this empty element, in accordance with the Empty Category Principle (ECP). Rizzi reformulates the principle as in (48):

(48) ECP: A non-pronominal empty category must be chain-connected if it can.

But, if the empty category occurs in the highest Specifier in the structure, as is the case of null subjects, no potential antecedent can be detected; consequently the

---

[13]But see Bloom (1990) for a different point of view. The children in his corpus omitted the object 9% of the time.

element cannot be chain-connected. It will be identified via discourse. The theoretical implication is that discourse identification of an empty category is restricted to the root. Once another element occupies a higher Specifier position, it can count as a possible antecedent and the null subject will have to observe the ECP.

How does the English-speaking child realise that null subjects are not an option in the target language? Recall that null constants in subject position are allowed in early language because CP is optional at this stage. It follows that acquisition of the axiom 'root clause = CP' will lead to the dismissal of null subjects. The Spec of IP will no longer be the root position (and an unbound null constant is only allowed in the specifier of the root). Moreover, English does not have a discourse-identified null operator, which means that the Spec of CP cannot contain an antecedent of the null subject. The null constant is banned.

One advantage of Rizzi's account is that it can treat in a unified way null subjects in both finite and non-finite environments as well as postverbal subjects. According to the truncation hypothesis, the child can truncate the structure at VP, AgroP or AgrsP. If AgrsP is the place of truncation, the structure provides the appropriate syntactic context for a null subject: in the Specifier of a finite root clause.

Friedemann (2000) argues that early postverbal subjects could be analysed, along the lines of the truncation hypothesis, as occurring in the Specifier of VP, i.e. in their base VP-internal position. If the child chooses to truncate the structure at VP, the Spec of VP is the highest position available. In order to account for the postverbal position of subjects in early French, two assumptions are necessary. First, that the Specifier of VP is right-branching in French (Friedemann 1993/1994). Second, in order to explain how the DP postverbal subject gets Case within a VP configuration, he extends the Truncation hypothesis from CP to DP. The claim is that the DP level, on a par with the CP level, can be truncated in early syntax. Since DP is responsible for Case transmission to the NP, when the DP level is not projected, The Case Filter will have to be vacuously satisfied.

2.2. Performance accounts

2.2.1. Subjects require a heavy processing load

Bloom's (1990) main claim is that English speaking children know that the target language requires an overt subject from the very beginning; they produce subjectless sentences not because of a syntactic deficit, but because of performance factors which force the young learners to produce shorter utterances. Rate of omission of constituents is directly dependent on the length of the intended utterance: the longer the latter, the more probable the former.

This obviously implies a view on early child language according to which there is an imperfect mapping between what children want to say (and actually know how to say) and what they actually manage to utter.

As support in favour of a performance account of null subjects, he invokes the results presented in Bloom (1970), according to which children tend to omit other sentence constituents when expressing the subject and also to omit the subject more frequently in sentences which are negated, i.e. where the processing load is heavier. More importantly, Mazuka et al. (1986) argue that there is a stage when children neither include the subject nor omit it: they reduce it to a schwa. This phenomenon, Bloom claims, can only be accounted for if one assumes that children do know that subjects are required but have difficulties producing them.

The subjectless sentences produced by three children, Adam, Eve and Sarah of the Brown (1983) corpus (CHILDES MacWhinney and Snow 1985) are analysed, with a

Subjects are dropped because sentences which contain subjects require a heavy processing load.

view to testing the hypothesis that children's null subject sentences tend to have longer VPs than sentences with overt subjects. The results confirm the hypothesis. Indeed, there is a significant difference in VP length between sentences with/without overt subject. Moreover, the data also prove that when children use pronouns in subject position the VP tends to be longer. The length of the VP decreases when the overt subject is longer, for example when it is a non-pronoun subject.

Previous studies argue that English children tend to omit the subject but only rarely, if ever, omit objects. Bloom's analysis of the utterances in the above mentioned corpora reveals that the three children omitted objects 9% of the time whereas subjects were omitted in 55% of their declarative sentences. This difference is explained as the result of processing factors: there are more processing resources available at the end of the sentence than at the beginning[14].

The hypothesis is confirmed by the fact that children tend to use shorter subjects than objects, on the one hand, and that they tend to use a greater number of pronoun subjects in subject position than in object position, on the other hand. At an early stage in acquisition, performance seems to be affected by the processing principle 'save the heaviest for the last', which is operative in adult language as well. They tend to drop subjects because they require more processing load. Short-term memory may also play a part in this phenomenon: 'Such a bias may arise naturally from the interaction between grammatical structure and short-term memory within language production' (Bloom 1990: 502).

An alternative explanation which Bloom discusses would be the pragmatic hypothesis of Greenfield and Smith (1976), according to which children omit subjects only when the context is relevant enough for their meaning. Thus subjects are more easily inferred from the context if the VP is longer and hence children tend to drop subjects in utterances which contain longer VPs. Also, they tend to omit subjects because they are more likely to provide old information, unlike objects which are usually associated with new information. But the pragmatic account, Bloom claims, unlike a performance explanation, makes no predictions about the relationship between length of subject- length of VP and hence cannot explain why the length of the VP decreases as a function of the size of the subject.

> Subjects tend to be omitted because they are more likely to provide old information.

2.2.2 A dual-value parameter solution

Valian (1990, 1991) argues that the child is supplied both values of the *pro*-drop parameter at the onset of acquisition (contra Hyams 1986, 1992). The correct value would be set via a mechanism of hypothesis-testing which is not handled by the grammar but by the child's performance system.

The hypothesis relies on a comparative study of American and Italian child language. Longitudinal data from 21 American children and 5 Italian children, at roughly the same age and level of linguistic knowledge, are compared in an attempt at testing how well the data could be accommodated by previous competence deficit analyses.

The comparison of the rate of overt subjects used by the American and the Italian children reveals that the American children used subjects (nominals and pronouns) much more frequently[15] than the Italian children (who used subjects only 30% of the time, less than half as often as the English-speaking children), but less frequently than adults. If it were true, she argues, that English-speaking children started with an

> Early null subjects are related to performance factors which ban longer utterances during this early stage. The child's grammar needs both values of the *pro*-drop parameter in order to be able to parse the input.

---

[14] For a different point of view see Hyams (1994), where it is argued that 'This assumption [that the beginning of a sentence is harder to process than the end of the sentence] is neither theoretically nor empirically motivated. There is no theory of performance from which such a result follows, and the scant empirical data that exists relevant to children's productive abilities fails to support the claim.' (p. 290).

[15] The combined results from Valian (1991), Valian and Hoeffner (1992), Gerken (1991) and Nunez del Prado et al. (1993) point to a rate of subject production ranging between 50% and 80% in utterances with verbs (Valian 1994).

178

Italian-like grammar (as argued in Hyams 1989) with respect to the *pro*-drop parameter, we would not expect this difference in overt subject usage between the two groups[16]. The assumption is that children's early grammar is only lexically incomplete; there is no evidence that English-speaking children have set a different value to the null subject parameter for their target language[17]. The fact they use overt subjects more frequently than the Italian children is taken as strong evidence that the children have set the parameter value correctly.

Many previous studies related the use of null subjects to lack of knowledge of Inflection. However, the analysis of the data obtained in the reported experiment is taken to contradict competence deficit accounts of early null subjects. The evidence is related to two phenomena which have been invoked as related to missing subjects: the lack of modals (in child English) and the absence/optionality of Tense. The results show that the American children produced more modals than the Italian children (in spite of the fact that Italian modals are not Inflection elements). Interestingly, the analysis of the data revealed that modal usage did not increase when null subject usage began to decrease and overt subject usage became more substantial. The rate of subjects remained constant regardless of the number of modals.

The data also reveal that the English-speaking children had knowledge of Tense at that stage, which suggests that lack of knowledge of Tense cannot explain the optionality of null subjects. It is also worth pointing out that the data show a correlation between frequency of subjects and frequency of verbs. The more frequently English-speaking children use verbs the more frequently they use overt subjects with those verbs.

Valian takes these empirical data as strong evidence against competence-deficit accounts. The conclusion she reaches is that English speaking children know that subjects are required, which means that it is not their competence which is deficient. Performance factors ban longer utterances during the early stages. Gradually, as the performance mechanism is developing, longer utterances are allowed. Otherwise, the child's early syntax consists of the entire phrase marker, with the nodes unfilled and with the order Specifier-head-complement unspecified. The child's task is to lexicalise the nodes, to learn the proper word order and what empty categories the target language allows. But how does the child do that? How does the child manage to finally set the value of the null subject parameter? The claim is that the child does all these via a mechanism of probable-cause decision.

The input which an English-speaking child receives is ambiguous with respect to null subjects since it may also contain subjectless sentences: imperative sentences or sentences like the ones in (49):

(49)   *Sings like a dream.*
        Can't sing worth a nickel.
        Want lunch now? (Valian 1991:33)

The child would be able to cope with such an ambiguous input only if both values of the null subject parameter are supplied. This allows the evaluation of the ambiguous input. If the child had only one value available his/her parser could not deal

---

[16] See also Hyams (1994) who points out that Valian offers no theoretical reason why a performance constraint should yield fewer null subjects in the speech of American children than in that of Italian children. 'Thus, all Valian's analysis shows is that there is some difference between Italian- and English-speaking children with respect to the use of null subjects. It does not speak to the question of where the difference lies'. (p. 293)

[17] One might, however, wonder how relevant this comparison is. Subject omission in *pro*-drop languages is not as optional as it might look at first sight. Information structure and discourse strategies are involved. The rate of subject omission directly depends on the context where they are dropped. Suppose the Italian children in Valian's study had the correct value of their parameter, [+ *pro*-drop]; one cannot reach the conclusion that they generally use more null subjects than American children, for example, unless one notices that the American children used more overt subjects in exactly the same contexts where the Italian children dropped them. Otherwise the comparison runs the risk of not being relevant. For other problems which Valian's proposal encounters see O'Grady (1997: 84).

with those sentences which, according to the initial setting of the parameter, are ungrammatical. The input would result in a failed parse. Equipped with both values, the child will be able to analyse sentences with/without an overt subject and to understand where different interpretations come from.

What an English-speaking child would first have to do is observe the distribution of subjects in the input. The scenario (Valian 1990) comprises the following steps:

(i)   the child has to identify the utterance-initial position as a possible position for deletion[18];

(ii)   the child distinguishes between sentence-initial and utterance-initial position;

(iii) the child classifies the utterance-initial position as a structure-independent position, subject to discourse and prosodic effects, rather than to syntactic effects.

This would only be possible, according to Valian, if the child were supplied both values of the parameter from the very beginning[19]. Children's initial state must be, with respect to parameters, unset:

[...] the child does not begin acquisition with one or another value preset; there is no default setting. Rather, the child entertains both options on an equal footing until sufficient evidence accrues to favor one over the other. (Valian 1994:273)

The child's task is reduced to evaluating and weighing the consequences of each parse.

2.3. *A prosodic account*

According to Gerken (1991) young children's subject omission as well as the asymmetry between subject and object omission should be correlated to omission of other elements. English-speaking children tend to omit weakly stressed elements: weakly stressed functional morphemes or weak syllables in multi-syllabic words. Moreover, the tendency is to omit the word-initial weak syllable and not a word final one. For example, in 'giraffe', children usually omit the first syllable, reducing the word to 'raffe'. It is unlikely that they will reduce 'monkey', for example, to 'mon' omitting the word-final syllable. The difference between the two words is related to stress pattern: a iambic foot (weak-strong) in 'giraffe' but a trochaic foot (strong-weak) in 'monkey'. The conclusion is that children omit the weak syllables from iambic feet.

> Omission of overt subjects is linked to children's tendency to omit weakly stressed elements.

Gerken then extends this phonological phenomenon, claiming that the same constraint will affect children's omissions at sentence level.

The predictions of such a hypothesis are:

(i)   children will tend to omit sentential subjects while retaining the object;

(ii)   children will omit pronominal subjects because they are weak;

(iii) they will omit more frequently articles from iambic foot (the DOG KISSED her) than from trochaic foot (PETE KISSED the DOG).

An experiment was designed in order to test (i) whether children omit pronouns or lexical subjects more frequently; (ii) if children omit NP subjects more frequently than NP object and (iii) if they treat articles in iambic and in trochaic feet differently with respect to omission.

---

[18] In English, the subject can only be omitted in utterance-initial position.
[19] For a different point of view see Hyams (1994).

180

The subjects in the experiment (18 monolingual English-speaking children ranging in age from 23 to 30 months, with an average MLU[20] of 2.54, were required to do an imitation task. The experimenter provided a sentence and the child was asked to repeat it. Each child was asked to imitate a total of 18 sentences, which contained both lexical (proper noun or common noun) and pronominal subjects. Also, they contained lexical or pronominal objects.

The results revealed that:

(i)   children omitted the NP subject much more frequently than the NP object
(ii) subject pronouns were omitted more frequently than lexical subjects
(iii) the subject was less frequently omitted from sentences which contained an object pronoun than from sentences with a lexical pronoun
(iv) more articles were omitted from subject NPs than from object NPs.

The predictions of the hypothesis were thus borne out.

On this approach, children's omissions are viewed as arising from the production system. The child's dependence on production templates decreases in time leading to a decrease in omissions.

English speaking children assign different case inflections to subjects according to the thematic role they are associated with.

3. Non-Nominative subjects

3. 1. A semantic/pragmatic analysis

Budwig (1989) proposes an interesting semantic/pragmatic analysis of the various forms which children use at an early stage to refer to Self: own name, *I, my* and *me*. The core of her argument is that young children do not use these forms randomly; rather, the use of Self reference forms seems to be systematically and constantly related to semantic and pragmatic factors. *My, me* and *I* are used in utterances which are categorised differently by English speaking children, who are claimed to give special linguistic treatment to the notions of agentivity and control: Case is assigned to constituents as a function of their thematic role[21].

The study is based on videotapes made of six monolingual English speaking children, aged 1; 8 and 2; 8 at the onset of the study. Their MLU ranges between 1.72 and 3.91.

The analysis of the corpus led to grouping the children in two groups:

A. The ego-anchored children (3) who primarily referred to themselves

B. The non-ego-anchored children (3) who regularly referred both to themselves and to the others as main participants.

Table 4 below illustrates the use of Self reference forms with the children in each group:

Table 4

Distribution (%) of Self reference forms

Group	I	My	Me	'Other'	Name	Number of instances
Ego-anchored	33	37	13	4	14	(288)
Non-ego-anchored	60	8	2	23	7	(456)

(Budwig 1989: 270)

Interestingly, the non-ego-anchored group was linguistically more advanced than the ego-anchored children.

---

[20] MLU: mean length of utterance.

[21] Budwig's results provide support in favour of the hypothesis in Slobin (1985) according to which Russian -speaking children employ Case inflection around notions related to 'prototypical agentivity'.

181

The ego-anchored children used various forms to refer to Self:

(50) *I cried.*
(51) *My open that.*
(52) *We made that.*
(53) *Grice ride bicycle.* (Budwig 1989: 269-270)

Each utterance containing a Self reference form was analysed according to five semantic agentivity parameters described in Table 5:

Code description of semantic agentivity parameters

	Agentivity ranking		
Parameter	High	Mid	Low
Participants	2 or more	Reflexive	I
Kinesis	Highly kinetic verbs	Action verbs requiring minimal effort	Stative verbs
Aspect	Telic situation	Telic/atelic reading possible	Atelic situation
Volitionality	Purposeful action	–	Non-purposeful action/ happenings
Affirmation	Affirmative	–	Negative

(Budwig 1989: 272)

For example, a sentence like *My cracked the eggs* is interpreted as ranking: high on the participant parameter (because it involves two participants), high in kinesis and aspect (because it describes a telic action), high in volition (because it denotes an action carried out with a purpose) and high in the affirmation parameter (because it is affirmative).

The results (presented in Table 3) clearly show that *I* and *my* receive different rankings: *I* is mainly used when the sentence is low in agentivity whereas *my* is used mainly in sentences which are high in agentivity. The conclusion is that *my* is used to refer to Self in those sentences in which the child acts as a prototypical agent bringing about a change of state.

Distribution (%) of I and my at High and Low end of the agentivity continuum: ego-anchored children.

	High agentivity			Low agentivity		
Parameter	I	My	Nr of instances	I	My	Nr of instances
Participants	57	43	(109)	82	18	(21)
Kinesis	41	59	(29)	95	5	(80)
Aspect	28	72	(25)	70	30	(105)
Volitionality	51	49	(51)	68	32	(82)
Affirmation	60	40	(129)	100	–	(7)

(Budwig 1989: 273)

One problem raised by the data was that children produced pairs of sentences like the ones in (54). At first sight, it seemed that in this case there was no semantic difference between the *I* and the *my* subjects.

(54)   a. *I wear it. / My wear it.*
        b. *I want that. / My want that.*

On the basis of the data, however, Budwig reaches the conclusion that the difference was a pragmatic one: *my* was mainly used in control acts, in which the child wanted to bring about a change in the environment, while *I* was preferred in assertives, as can be seen in Table 7:

182

Table 7

Distribution (%) of *I* and *my* in terms of pragmatic function: ego-anchored children

Pragmatic function	I	My	Nr of instances
Control acts	19	81	(52)
Assertives	63	37	(87)

(Budwig 1989: 275)

The data also revealed that *me* was used when the child referred to Self as a subject affected by the action. The children in this group used their own name when no control was involved and often in conjunction with action verbs. The view of Self was, in these cases, referential.

The non-ego-anchored children relied on *I* to refer to Self and did not use *my* when taking the view that they were prototypical agents. Nor did they use *me* to mark an affected agent.

In a nutshell, the core of Budwig's hypothesis is that at an age when children cannot refer to others systematically, they use different Self reference forms to mark agentivity and control. Their notion of prototypical agentivity comprises a cluster of parameters which cut across semantic and pragmatic factors.

Budwig's analysis is indeed interesting and opens the way for challenging research. But it only tackles first person pronouns. It would be interesting to see if the semantic/pragmatic distinction which she proposes works for pronouns other than in the first person.

> Early wrongly cased subjects are related to the inability of the LAD to analyse pronoun Case forms into stems and affixes and, consequently, to the lack of knowledge of the pronominal paradigm.

3.2. A morphological explanation

Rispoli (1994) puts forth a different hypothesis with respect to the use of non-Nominative subjects in child grammar. Subject Case errors are rooted in the inability of the LAD to analyse pronoun case forms into stems and affixes. The main assumption is that the LAD 'builds paradigms to express a finite stock of grammatical notions [...]. In the course of building a paradigm, the child will search for phonological consistency' (p. 159).

The English pronoun paradigm, which is highly irregular, does not offer such a consistency, making the child's task difficult. He/she has to learn the pronoun case forms by rote memorisation. Before learning the paradigm, the child may access the 'wrong' form of the pronoun. However, in this case, only those forms which share the phonetic core[22] can be accessed. This fact is captured in the following rule:

(55)   Only pronoun case forms sharing the phonetic core will be overextended.
       Therefore, suppletive nominative forms will not be overextended. (p. 161)

For example, forms like *I* will be blocked, because the phonetic core for the first person singular is *m-*. *She* will also be blocked, since the phonetic core for the third person feminine is *h(er)*.

The predictions of the rule in (56) are the following:

(i)   there will be more Nominative Case overextensions for 3rd person plural pronouns and 3rd person masculine pronouns than for 1st person singular and 3rd person feminine pronouns (i.e. there will be more instances of *he* used instead of *him/his* than *I* used instead of *my/me*, for example)

(ii)   there will more Accusative/Genitive Case extensions of 1st person singular and 3rd person feminine than of 3rd person masculine and 3rd person plural

---

[22] A phonetic core is defined as a minimal phonetic consistency which the child can establish on the basis of the forms available in the paradigm. For example, given that *y* is consistently used for the second person, it will represent the phonetic core for second person.

(i.e. there will be more instances of *me/my* used instead of *I* than of *him/his* used instead of *he*, for example).

The subjects used in the study were twelve monolingual American-English speaking children. The corpus contained 19,561 correct uses of pronouns and 1,347 pronoun Case overextensions. The analysis of these overextensions showed that the predictions in (i) and (ii) above were correct. No child produced any Nominative Case overextension of *I* and only two children each produced one Nominative overextension of *she*. The average rate of Nominative overextension for *he* (illustrated in 56 below) was 9% and for *they* (illustrated in 57) of 4%:

(56)   *I got **he** out.*
          *He got back in **he** house.*
(57)   *I'll put **they** in.*
          *They stay with **they** mothers.* (Rispoli 1994: 166)

Also, the average rate of Genitive/Accusative Case overextension for *she* (as in 58) was 47%, much more frequent than for *he* (illustrated in 53) – 5% – or for *they* (as in 60) – 6%. The only case where the prediction was not completely right was the 1st person singular Genitive/Accusative overextension; it was only in 10% of the situations that the children used *me/my* instead of *I* (as in 61 below). Rispoli explains the phenomenon as being due to the fact that children use first person pronouns earlier and more frequently than other pronouns.

(58)   ***Her** cries a lot.*
(59)   ***Him**'s a boy.*
(60)   *No, **them** ain't right.*
(61)   *How can **me** do it?*
          ***My** can do this.* (Rispoli 1994: 168)

3.3. The issue of Case

3.3.1. The issue

> Syntactic approaches: early non-Nominative subjects are related to a deficient /inoperative Case system.

Syntactic approaches to non-Nominative subjects in early English have tried to analyse the phenomenon in connection with the properties of the early Case system, which was claimed to be "deficient" in some way or another.

Radford (1990, 1996) argues that subjects are assigned Accusative case by virtue of standing in a Spec-head relation with an untensed verb, since at this stage functional projections (Tense included) are missing. Without an operative I-system which could assign Case and without a D-system, the Case system is inoperative and one can expect to come across non-Nominative Case subjects during the early lexical stage. When Inflection and the D-system become operative, Case errors should begin to disappear.

However, empirical data show that non-Nominative (or oblique) subjects are present in child speech even after the Case system has become operative. Children know the Case system of English early and they also know that presence of agreement and/or Tense requires that Nominative Case be assigned to the subject.

In what follows, three proposals which try to account for this empirical fact will be discussed.

3.3.2. A default Case account

Vainikka (1994/1995) adopts a developmental model similar to the one proposed in Radford (1990,1996), where the child's phrase marker is a bare VP at an early stage.

184

Unlike in Radford's (1990) model, Vainikka argues that Case theory is present and operative from the onset of acquisition. The phrase marker grows gradually, i.e. functional projections are gradually acquired.

The proposal is that in child English subjects occur in their base position: Spec of VP (they do not raise since there is no functional projection to host them) position whose default case is the Genitive:

(62)

```
        VP
       /\
 Subject   V'
          /_\
```
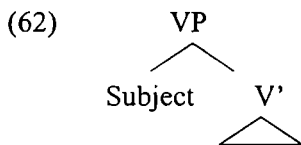
> Genitive subjects are allowed because at this stage the subject remains in its base VP-internal posi-tion, where it is assigned Ge-nitive Case (the default case).

The assumption she starts from is that the English Genitive is a structural case, on a par with the Nominative and the Accusative. This theoretical assumption allows her to compare the occurrence of Genitive subjects in early English to Genitive constructions in Finnish, where the Genitive is assigned structurally by any lexical head to the specifier of its projection. By analogy, the Genitive could be assigned by (non-finite) V (not only by N) in child language: 'I propose that the English Genitive is assigned structurally by these heads [N and V] to an NP in the Specifier position of the Case assigner' (p. 264). The child will use the Accusative form when he/she realises that the Genitive Case is not structurally assigned to all Specifier positions in English. When the IP becomes part of the child's phrase marker, the subject raises to Spec IP where it is assigned Nominative Case:

(63)

```
              IP
             /\
        Spec    I'
      subjectᵢ  /\
              I⁰   VP
                  /\
               Spec  V'
                tᵢ    |
```
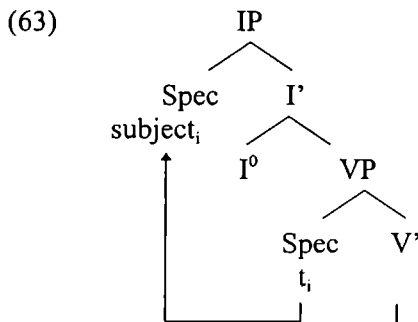
But oblique subjects are still present in the corpus (longitudinal data from five English-speaking children, CHILDES database) after the children begin to use modals or even some past tense forms, i.e. when the phrase marker is no longer a bare VP, mainly in wh-questions, which may pose a problem for this account. But Vainikka solves this problem by arguing that at this stage, which she calls the pre-CP stage, only IP is available (Nominative subjects emerge at this stage), CP is not available in the surface syntax yet. In wh-questions, Spec IP is exceptionally occupied by a wh-element (or other CP-related material); movement to this position is blocked and the subject nominal is forced to remain in its Spec VP position where it can only receive Genitive Case.

(64)

```
              IP
             /\
        Spec    I'
    wh-element  /\
              I⁰   VP
                  /\
               Spec   V'
              subject  /\
                     V⁰  ....
movement is blocked
```
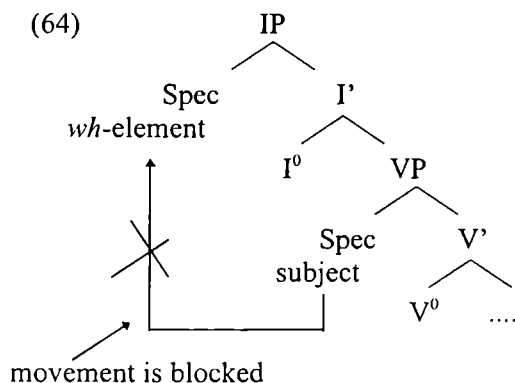
When the child reaches the CP stage, Spec IP becomes available and no more Case errors will occur.

This analysis seems problematic from several points of view. Firstly, it fails to explain why the Genitive should be the default Case in English. Secondly, it does not explain how the child de-learns that Genitive Case is not structurally assigned in the target grammar. What exactly leads to a reanalysis of the input? Another problem which this scenario encounters is linked to the analysis of the IP stage. Empirical data show that Nominative subjects emerge before non-Nominative objects (Bellugi 1971, Powers 1996). Vainikka's account fails to explain this fact.

3.3.3. Oblique subjects and ungoverned positions

Powers (1996) provides an explanation which takes into account the fact that Nominative subjects emerge before the wrongly cased ones:

(65)   *I turning back.*
         I not your daughter.
         I just checking. (Powers 1996)

On her account oblique subjects initially appear in a VP-adjoined position, as in (66) below:

(66)
```
              VP
             /  \
       Subject    VP
                  /  \
                      V'
                     /  \
                    V    object
```
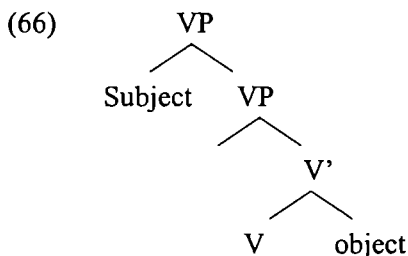
The position of the subject in (66) is an ungoverned position which can be occupied by proper names and pronouns[23]. Since there is no Case associated with this position, there are no Case constraints, and the subject can surface as a Genitive or Accusative pronoun or as (caseless) names.

Given that the empirical data in the corpus which she analyses (CHILDES database) show that children use Nominative subjects before oblique ones (60), Powers proposes that, at this stage, the child's derivation is "shallow": the Spec IP and the Spec VP positions are linked via co-indexation, not movement (as in adult English). The sentences in (65) could be represented as:
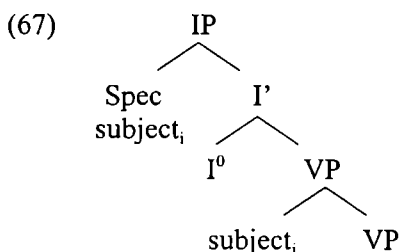
> Oblique subjects occur in a VP-adjoined position where no Case can be assigned.

(67)
```
              IP
             /  \
        Spec      I'
      subject_i  /  \
               I⁰    VP
                    /  \
               subject_i   VP
```

The child assumes that the subject is base-generated in Spec IP and linked to Spec of VP via co-indexing. When oblique subjects begin to surface in the Spec of VP

---

[23] Powers adopts the analysis of nouns in Longobardi (1994) according to which proper nouns and pronouns, which are DPs, are not restricted to governed positions, unlike bare nouns which can only appear in governed position.

186

position, the status of the VP-subject changes from a caseless element, co-indexed with the subject in Spec IP, into an overtly cased nominal; but, for reasons already mentioned, there are no Case constraints associated with this position. The child will no longer use oblique subjects when the VP-adjunction position is linked to the Spec of IP by movement.

3.3.4. Agreement and oblique subjects

Non-nominative subjects have also been explained as following from a particular property of the optional infinitive stage: that of allowing both finite and non-finite verbal forms to occur in finite environments. In Schütze & Wexler (1996) and in Schütze (1997) it is argued that English-speaking children know that Accusative forms represent the default Case in English. This hypothesis is supported by data from CHILDES (MacWhinney & Snow 1985) which show that when agreement is present, Accusative subjects are much less frequent. Finite contexts seem to exclude default Case assignment. Children tend to use default Case subjects in non-finite contexts, illustrated in (68), and Nominative subjects in finite environment, illustrated in (69):

(68)   *My going in.*
        My ate outside.
        Her sick.
(69)   *I will get it.*
        He has six.
        No, she's not up there. (Schütze & Wexler 1996)

However, as already pointed out, non-Nominative subjects can occasionally appear with past tense verbs (70) and Nominative subjects, in their turn, can appear in infinitival constructions (71):

(71)   a. *Her said no.*
        b. *My had a tape recorder.*
(72)   a. *She drink apple juice.*
           She up there.

The empirical findings also prove that children make no Case errors in object position and only few errors in possessor position. This suggests that they do have knowledge of Case at this stage.

If this is the case, how can one account for the fact that they make Case errors in subject position? Moreover, how can we explain the fact that one and the same child may use both Genitive and Accusative subjects during the same stage?

This proposal relies on the theoretical assumption that Tense and Agreement (Agrs) should represent two different projections (as in Chomsky 1993). Morphological Case marking and structural licensing are also separated. Agr, not Tense[24], is the one which assigns Nominative Case. In early child language, Tense and Agr are underspecified, i.e. either Tense or Agreement can be independently missing during the optional infinitive stage. Thus, the following situations can obtain:

a. [+Tense (present), – Agr]   (*him cry/ her tired*)
b. [+ Tense (past), – Agr]   (*him cried*)
c. [+Tense (present), + Agr]   (*he cries/ I am crying*)
d. [+Tense (past), + Agr]   (*he cried*)

---

[24]This assumption is supported, among other data, by Portuguese inflected infinitives which lack tense marking but show agreement and which take Nominative subjects. However, Romanian infinitive clauses and gerundial clauses lack agreement marking and can, nevertheless, assign Nominative Case.

187

e. [− Tense, +Agr]   (*he cry/ I crying*)
f. [− Tense, − Agr]   (*his cry/ my crying*)

When Agr is present, i.e. in c, d and e, Nominative Case is assigned. This situation can account for the existence of both Nominative and Non-Nominative subjects during the optional infinitive stage. When Agr is missing, as in a and b, given the fact that there is no Case assigner, the default Case will surface.

When both Tense and Agreement are missing, as in f, Genitive Case will be assigned. This latter proposal is sort of ad-hoc and obviously far from motivated:

> *If we ask ourselves which case an NP subject gets when there are no Tense or Agr INFL features present, the adult grammar yields one clear case of this, namely gerunds, which cannot be marked for tense or agreement: they can have GEN subjects. We suggest that this feature matrix is responsible for GEN subjects of OIs'* (Schütze & Wexler 1996: 679).

Though this analysis has the advantage of maximizing continuity between early and adult grammars, it encounters empirical problems. Gerunds can also have Accusative subjects (in spite of the fact that Genitive and Accusative gerunds may have different properties) which, according to the scenario proposed here should appear in a [+ Tense, − Agreement] context. This would lead to the stipulation that the child interprets the Gerund in two ways: (i) [+ Tense, − Agr] and (ii) [− Tense, +Agr]. This assumption would certainly gain weight on the background of an analysis of the English gerunds which could prove that Accusative Gerunds have while Genitive gerunds lack Tense.

One more empirical problem is posed by adult mad magazine sentences in which the verb is non-finite, but where Genitive subjects are disallowed (Radford 1998):

(73) Speaker A: *I heard that you got drunk at Nina's party last night.*
Speaker B: *Me/*my/*I get drunk at Nina's party?! Impossible- I was at home in bed with a good bottle of malt whisky.* (Radford 1998:118)

SUMMARY

The goal of this chapter was twofold. First, it tried to briefly present some of the analyses of early deviant subjects: null and wrongly cased ones. Second, it tried to show in what way theoretical assumptions and acquisitional data intermingle and influence each other in acquisition studies.

There are several conclusions which emerge from this chapter.

The first is that there is *cross-linguistic evidence that children may optionally omit the subject* during early stages of acquisition, even when the target language does not allow subjectless sentences, a property which seems to intermingle with the optional use of the infinitive in contexts requiring finite verbal forms.

Early missing subjects have been claimed to be due to:

- an early competence deficit
- performance/ processing limitations
- prosodic factors
- semantic/pragmatic factors

According to competence deficit accounts:

- children use null subjects because they have mis-set the *pro*-drop parameter in their target language, opting for an Italian- or a Chinese-like linguistic start with respect to subjects
- they have not set the C-parameter yet, consequently they do not know that their target language disallows null subjects

- Inflection is underspecified at this stage, i.e. non-finite, and hence PRO subjects are allowed
- the child's early phrase marker is either merely lexical or truncated, which can explain why Case assignment is absent. Thus, null subjects are allowed.

All the studies have been shown to solve some of the problems while leaving some of the questions related to null subjects unsolved. Valian (1994), examining the various approaches to the phenomenon, reaches the following conclusion:

> *[...] theories must specifically include both a competence component and a performance component, and a model of how the two interact. Each component by itself is too weak in predictive power to handle the facts. A corollary of this is that there is no metatheoretic reason to prefer competence-deficit explanations over performance-deficit explanations"* (p. 273).

Hamann and Plunkett (1998) reach a similar conclusion when considering the various accounts of subject omission from the perspective of child Danish. One should also add that more recent accounts, such as Rizzi (1994) or Hyams (1996), also resort to an integration of grammatical and discourse-based approaches in their analyses of early null subjects.

It has also been shown that not only do children omit the subject but *they can also use wrongly cased forms as subjects.* Accusative and Genitive subjects have been attested in child English. Though we have reasons to believe that Accusative and Genitive subjects represent different phenomena, many studies treat the two together, in an attempt at providing a unifying analysis. Most of the studies relate these deviant subjects to:

- lack of knowledge of Case
- lack of knowledge of movement (in particular subject raising)
- missing or underspecified Inflection (in particular the lack or optionality of Tense and/or Agreement).

In other studies, wrongly cased subjects have been claimed to represent:

- left-dislocated topics (for Accusative subjects)
- contrastive focus (for Genitive subjects)
- the result of the lack of knowledge of the pronominal paradigm
- a case of phonological mis-analysis of some sequences in the input (for *my* subjects)
- the subject of early Restrictive Relative Clauses (for *my* subjects)
- early linguistic instances of different Case assignment to Nouns with different thematic roles.

The diversity of the analyses and the empirical data on which they rely point to the fact that it might be difficult, if not impossible, to treat non-Nominative subjects in a unified way. Accusative and Genitive subjects seem to stem from different causes.

Further reading

Advanced: Most of the papers presented in this chapter presuppose some previous knowledge of generative grammar (the Principles and Parameters model). The student will benefit a lot from going to the very source of those analyses which (s)he considers challenging, interesting or implausible.

Textbooks: O'Grady (1997) contains a critical survey of the research literature on both omitted subjects in early language (Chapter 5 – *Subject Drop*) and on wrongly cased marked subjects (Chapter 4 – *On Word Order and Case*). Goodluck (1991) has a small section on subjectless sentences (in Chapter 4 – *The Acquisition of Syntax*).

5

THE ACQUISITION OF THE SYNTAX/SEMANTICS INTERFACE

THE ACQUISITION OF VOCABULARY

THE ACQUISITION OF VOCABULARY

> *Milo had never thought much about words before, but these looked so good that he longed to have some. "Look, Tock", he cried, "aren't they wonderful?" "They're fine, if you have something to say", replied Tock in a tired voice. [...] "Maybe if I buy some I can learn how to use them", said Milo eagerly as he began to pick through the words in the stall. Finally he chose three which looked particularly good to him – "quagmire", "flabbergast", and "upholstery". He had no idea what they meant, but they looked very grand and good.* (Norton Juster – *The Phantom Tollbooth*)

KEY POINTS:
In this chapter you will learn about:
- various hypotheses on how children cope with word meaning
- constraints which 'guide' the acquisition of words
- the relevance of the assumptions with respect to syntax/semantics mapping for the study of lexical development

1. Introduction

1.1 Vocabulary Growth

Children acquire lexical items as rapidly as they build grammatical structure. By age 6;00, the vocabulary of a monolingual child contains between 8,000-14,000 words. They learn words at such a staggering speed (approximately 5-9 words per day between 18 months to 6 years of age) that they have been compared to 'lexical vacuum cleaners, inhaling a new word every two waking hours, day in day out' (Pinker 1994a). An English-speaking high school graduate has a vocabulary of about 60,000 words, which means that we have the ability to learn approximately 3,750 new words per year (Bloom 2000).

> In spite of the difficulty of the task, children acquire words extremely fast.

We have seen that there is a certain developmental pattern with respect to the acquisition of morphosyntax. Can one detect a certain pattern with respect to vocabulary development as well? It seems that children begin by merely showing that they can understand the meaning of words. At this stage, they do not use any word yet. Though the question of what exactly may count as understanding a word casts certain doubt over this hypothesis, parents report that 8 month-olds have a receptive vocabulary ranging in from 15 to over 80 words (Fenson et al. 1994). The gap between comprehension and production seems to continue during the next stages and research results suggest that the gap is more significant in the case of verbs than in the case of nouns (Fenson et al. 1994). Further evidence that comprehension precedes production comes from anecdotal stories about children who began to speak relatively late. Bloom (2000) reports a story about Albert Einstein, according to which his first words would have been uttered when he was about three, one evening at dinner. He put his spoon down and said: 'The soup is too hot!' The parents were obviously surprised and asked him why he had not talked before. Einstein would have answered: 'Well, up to now, everything has been fine'.

At approximately 10 months, children begin to use words. These early 'words' do not only sound different from the ones in adult vocabulary, but they can also be used in a different way: words naming properties may be used to refer to objects which have that property (for example, *hot* may be used to refer to a radiator) or the same word may be used for both the action and an object (for example, *to fly* may be used to refer to both the action and to birds, Dromi 1987). Lexical constraints are claimed to be inoperative at this stage. The rate of word learning is slow, children only learn a few words and they make many errors.

During the next stage, which begins at approximately 12 months, children begin to use words appropriately, with the adult-like meaning, and they acquire them at a much faster speed.

Once children have learned approximately 50 words (Nelson 1973) and once learning constraints become operative, the increase of vocabulary is extremely rapid, which led some researchers to associate this stage with a vocabulary spurt/ word burst/ word spurt. It is also at this stage that the child realises that language is symbolic, which may account for the rapid increase of their vocabulary. However, other researchers have pointed out that the increase in vocabulary is constant at this stage (around 16-19 months) (Bloom 2000).

A possible pattern of vocabulary growth along time, which supports this latter view, is the one in *Table 1* below:

Table 1:
12 months to 16 months: 0.3 words per day
16 months to 23 months: 0.8 words per day
23 months to 30 months: 1.6 words per day
30 months to 6 years: 3.6 words per day
6 years to 8 years: 6.6 words per day
8 years to 10 years: 12.1 words per day (Bloom 2000:44)

Obviously, word learning can be subject to great individual variation, so the figures in the Table above should be taken as an approximation. Variation may be due to the type of input which the child receives. The extent to which caretakers speak to the child as well as the nature of the input which they provide may influence the speed of vocabulary growth. Children of educated parents tend to know more words at early stages. Also, variation in the ability to learn words may be related to the child's intellectual and social abilities as well as to genetic information. Ganger, Pinker and Wallis (1997) argue that vocabulary growth is more similar in the case of monozygotic twins than in the case of dyzygotic twins. It has also been observed that girls tend to know more words than boys do or that first-born children acquire word meanings faster than later-borns. However, the data seem to differ from one language to another. While French girls score significantly higher than French boys (Kern and Gonnand 2001), recent studies of the early acquisition of vocabulary of Mandarin Chinese monolinguals provide evidence that there are no significant gender differences (Fletcher, Tardif, Zhi-Xiang, Wei-Lan 2001).

Still, in spite of variation, word learning seems to begin at around 12 months and the rate increases in a significant way after the age of approximately 30 months (see Table 1). What exactly leads to this important developmental step? The literature provides several possible answers. According to some researchers, this step should be related to phonological development. At about 12 months, the child has acquired the relevant phonological knowledge, which enables him/her to detect word boundaries. According to others, children younger than 12 months cannot memorise arbitrary pairs of form and meaning. It is only at around the age of 1 year that their memory allows them to store these arbitrary pairs. Conceptual ability has also been invoked. Children cannot learn words before they are able to understand and to encode the concepts which words refer to. Bloom (2000) relates the beginning of word learning to the development of the theory of mind.

196

According to his hypothesis, children can begin to learn word meanings only after having developed 'enough of an understanding of referential intent to figure out what people are talking about when they use words' (Bloom 2000:46).

1.2 The problem of induction

The task the child faces when trying to hypothesise the meaning of a string of sounds is not an easy one. Firstly, matching the string of sounds with a particular meaning does not have any innate support. Meanings are expressed in various shapes in various languages. Secondly, the linguistic input which they receive only rarely provides explicit information with respect to word meaning, which has to be inferred. Though error correction in the domain of vocabulary may occur on more occasions than in the domain of syntax, it may still be totally absent in some cases.

> The linguistic input is deficient in terms of word meaning information.

When hearing an unfamiliar word, the child faces the task of relating it to some content, to a particular meaning. He/she has to choose one hypothesis out of a large set of logically possible hypotheses which match the data. When an adult says "dog" while pointing to a big furry dog which is barking and wagging its tail, how does the child know that the term "dog" refers to the whole animal, and not to its ears or fur or that it does not mean "big" or "furry" or "barking dog"? Also, "dog" could refer to a subordinate kind (Terra Nova, for example) or a superordinate kind ('animal'). All these hypotheses are logically possible. This is what Quine referred to as *the problem of induction*: for any set of data there is an infinite set of logically possible hypotheses consistent with the data. And this is a task which a child faces several times a day, with each and every novel term in the input. In some cases, the number of logically possible hypotheses is smaller (as in the case of concrete nouns, for examples) and observation may be helpful to some extent; but the number of possible hypotheses grows bigger with verbs and abstract terms, where observation is no longer that helpful.

1.3 On observation

How does the young child search within this set and how does he/she choose one single hypothesis, rejecting all the others, at an age when he/she has trouble solving very simple kinds of hypotheses? How does a child solve the problem of induction? The real-world contingencies do not seem to be of much help; on the one hand, they provide too much information (hence the multitude of possible hypotheses) but, on the other hand, they do not provide sufficient information (hence the absence, sometimes, of constraints on the possible hypotheses). This challenges the traditional view which goes back to John Locke and according to which children learn word meanings by noticing the real-world environment in which an unfamiliar word is uttered:

> Observation of real-world contingencies is not helpful enough.

> *If we will observe how children learn languages, we will find that, to make them understand what the names of simple ideas or substances stand for, people ordinarily show them the thing thereof they would have them have the idea; and then repeat to them the name that stands for it, as 'white', 'sweet', 'milk', 'sugar', 'cat', 'dog'.* (John Locke 1690/1964 cited in Gleitman 1990:1).

At first sight, this hypothesis seems to be on the right track. Early vocabularies usually contain words whose meaning can be easily 'guessed' via observation of the environment: *mama, cookie, dog*, and the like. However, words are not always used when their referent can be perceived. Some (abstract) referents can never be 'seen', actually. With verbs, observation seems to be even less helpful, since the time when the verb is uttered may not coincide with the time when the event denoted by the verb takes place.

197

Also, on such a view, difference in experience should yield differences in the meanings which are acquired. However, studies of the acquisition of vision-related terms (*see, look*) by blind and sighted children (Landau & Gleitman 1985) show that the representations of vision-related terms are similar with the two groups, in spite of the difference in experience. It has also been observed that, in spite of their different perceptual experience, blind children learn words almost as fast as sighted children.

Also, as will be discussed further in this chapter, even extremely simple terms, which belong to every day vocabulary, may encode shades of meaning which are not perceivable to observation alone.

But, if observation is not enough, if the traditional view on lexical acquisition via observation oversimplifies the whole process, failing to account for the acquisition of those terms for which real-world contingencies are not sufficient, how can one account for the fast acquisition of word meanings?

In spite of the difficulty of the task, children can correctly induce meaning and they are able to learn words as rapidly as they acquire grammar. By analogy with morphosyntactic development, one might ask whether lexical development may not be guided by some (possibly) innate principles, ranked one way or another, whose main role is to constrain the number of logically possible hypotheses and thus to help the child to travel through the vast searching space. Maybe children's conceptual systems are guided by some pre-existing expectations, which render their learning task easier. Children's word learning mechanisms have been said to be constrained by various innate assumptions, constraints or biases, some of which are domain-specific, while others may be domain-general. This is in line with the view that lexical knowledge also includes 'knowledge of complex abstract structures that cannot be arrived at through parameter setting, and which must be learned from the data' (Williams 1994:8) and consequently its rich structure cannot result only from an innate linguistic structure but also from a structured learning strategy. One can thus speculate that acquisition of word meaning cannot rely on UG alone. It has to rely on extra-linguistic factors as well:

> It is not, however, intended that UG should account for all aspects of L1 acquisition. Properties that are specific to a language will have to be learned. These include much of the lexicon: words and their meanings will have to be learned [...]. (White 1989: 30)

It seems that vocabulary development is related to the nature and quantity of the linguistic input which the child receives, on memory and cognitive abilities, socialising skills, attention span, phonological, morphological and syntactic knowledge.

2. Word learning constraints

2.1 The hypothesis

Children are able to learn words so rapidly because 'they are limited in the kinds of hypotheses they consider' (Markman 1990:155) by some specific constraints, which are present from the onset of acquisition, can be seen as default conditions and can be later abandoned.

Let us see in what way these constraints are assumed to narrow the child's searching space.

2.2 The whole-object assumption

The whole-object assumption (Markman 1990) refers to the child's expectation that a new label refers to a whole object rather than to one of its parts or one of its

Vocabulary development is sensitive to the nature of the linguistic input, memory and cognitive abilities, socialising skills, phonological, and morpho-syntactic knowledge.

Children can acquire words so rapidly because they are limited in the hypotheses they make by various (innate) constraints.

198

properties. When a child hears someone utter the word "car", for example, while looking or pointing to the object "car" in the street, he/she will take the string of sounds "car" to denote the whole object, not a wheel or the colour of that object. The kind of individuals which an infant seems to be able to understand at an early stage are physical whole objects. Most of the countable nouns which are present in early vocabularies denote whole objects. For example, Nelson, Hampton and Shaw (1993) show that 67% of the nouns used by 20 month-olds denote (whole) objects.

It is important to mention that the whole-object assumption is operative in non-linguistic domains as well. When asked to count different objects, young children tend to count whole objects in spite of what they are actually asked to do. Shipley and Shepperson (1990) report an experiment in which pre-school children, when shown five forks, one of which broken into two pieces, and asked to count "the forks", the majority answered "six". This proves that domain-general biases may guide children in their understanding of discrete objects as separate individuals, i.e. as whole objects.

> The child expects a new label to refer to a whole object.

However, there are words which do not refer to whole objects, but to properties (adjectives) or spatial relations (prepositions), or words which refer to groups/collections of objects (*family, flock, herd, bundle*) as well as words which denote parts of objects (*surface*). Abstract nouns (*idea, dream)* do not refer to a material entity at all. Mass terms (*milk, coffee, chocolate*) do not refer to whole objects either. In all these cases, the whole-object assumption does not seem to be of much help. Are children able to override the constraint and construe other entities as individuals as well? Experimental evidence shows that they are able to construe entities such as sounds or bounded substances as individuals. There is also evidence that collective nouns such as *family* are present in early vocabularies. This suggests that, in spite of a strong domain-general whole object bias, children are also guided in the acquisition process by other facts, possibly by syntactic cues. The implication would be that in the acquisition of vocabulary domain-general principles and language specific ones intermingle.

2.3 The partonomic assumption

Infants are assumed to determine the extension of basic level categories by attending not only to whole objects but also to parts of objects. According to the so-called partonomic assumption, parts of objects are given a special status in category membership decision (Poulin-Dubois 1995). Experimental evidence shows that infants are sensitive to the absence of an object part, being able to detect missing part(s) for categories for which they already have a label. Infants aged 12, 15 and 18 months were shown sets of three pictures: one picture represented a 'complete' referent, i.e. a cat, a dog, etc. The other two pictures represented the same referent but with one part removed (i.e. a cat without a tail, a dog without legs, etc.). An adaptation of the preferential looking paradigm was used to test the infants' sensitivity to the absence of a perceptually salient part in word referents. 18 month – olds looked longer at the incomplete referent than at the complete one. No preference could be detected with younger infants, which may suggest that the abstraction of parts develops through language development (Poulin-Dubois 1995).

> Parts of objects are relevant in category membership decision.

However, experiments have also revealed that a salient part is not defining at any age. Object parts do not have the status of defining features for young children. When shown object referents (category exemplars) with one part missing children consider them acceptable. Thus, one can say that object parts are involved in the early meaning of words but they do not represent defining features.

2.4 The taxonomic assumption

The taxonomic assumption (Markman 1990) states that children expect a new word to refer to objects of the same kind, ruling out thematic meanings. When a child hears a novel term, he/she will look for taxonomic relations rather than thematic ones, in spite of the fact that, at this early stage, children are extremely interested in the latter type. If the child is taught an unfamiliar word, *bird* for example, when asked to find another *bird*, he/she will tend to choose another bird or bird-like creature, and not a cage or an egg. Single nouns do not encode thematic relations, such as 'a spider and its web'. Markman suggests that the taxonomic constraint may be a consequence of words being generic, unlike phrases. A word like *robber*, she argues, denotes a permanent quality, whereas the phrase *is robbing a bank* does not.

Bloom (1994) suggests that it would be more accurate to say that nouns and verbs – not words – have generic reference, given that there are words which can be phrases (pronouns, proper names). Nouns are generic because they can be used to denote an indefinite number of different objects or portions of substance of the same kind. They refer to kinds. Noun phrases (such as *the big dog*) can be interpreted as denoting one single instantiation of the kind "dog", i.e. an individual or a stage (Carlson 1977). By analogy, a verb like *read* denotes a kind of action, whereas *is reading* refers to an instantiation of the kind of action "read".

Guided by the taxonomic assumption, when children hear a novel word, they will not consider thematic relations as possible candidates for the meaning associated with that particular new label. They will tend to categorise it as referring to other objects of the same kind.

But there are words like pronouns or proper names, which are among the first to appear in early vocabularies as referring to unique individuals (Sorrentino 1999) and which do not generalise to other entities, i.e. which do not refer to taxonomies (Bloom 1994). How do children learn these words? The taxonomic constraint cannot help them in this case. One possible solution proposed in the literature is that young children are guided by an animacy bias in their construal of proper name reference. This bias may, however, be a reflection of the frequency with which proper names in the input are used for people and animals. Experimental evidence has shown that the animacy bias is not an absolute constraint and that, with proper names too, children use a set of cues (semantic, pragmatic and proper name syntax information) to infer that a word refers to a proper name (Sorrentino 1999).

2.5 The mutual exclusivity assumption

The mutual exclusivity assumption (Markman 1990) or **the principle of contrast** (Clark 1983)[1] refers to the child's expectation that a new term should refer to an object for which they do not have a label yet. The novel term will not be interpreted as a complete synonym. For example, if you show a child a flower and call it *yellow*, the child will not interpret the novel term as denoting the "flower" if he/she already has a label for that object, but will probably interpret it as denoting a salient property of the object.

Pinker (1994a) reports of an experiment in which children were taught a nonsense word – *biff* – for a pair of pewter tongs. In this case, the child, who does not know any other label for the object "tongs" will take *biff* to refer to the whole object, as the whole-object constraint guides him/her to do. But if you show a child a pewter cup and call it *biff*, the child, who already knows a label for "cup", will interpret *biff* to refer to a salient property of the object, most probably substance. When required to find more *biffs*, the child will look for more pewter objects and not for more cups.

---

[1]The mutual exclusivity assumption is related to Slobin's (1973) Principle of one-to-one mapping and to Pinker's (1984) Uniqueness Principle.

200

2.6 Conventionality

Children know, from very early on, that different forms have different meanings, and that each label stands for one concept. And they also know that this relation is arbitrary[2]. Conventionality is assumed to be one of the pragmatic principles which constrain the options children have to consider when hearing novel terms (Clark 1991). They know that language is conventional, that words are shared symbols and that, for a certain meaning, speakers in a certain community expect a particular form to be used. From the onset of acquisition they elicit conventional words by constantly asking *What is this/that?*.

> The child knows that words are used in a **conventional** way.

Conventionality and contrast work together with the same aim as the one assumed for the mutual exclusivity assumption:

> *This consequence of conventionality and contrast together can be expressed as the principle of pre-emption by synonymy: "If a potential innovation would be precisely synonymous with a well-established term, the innovative term is normally pre-empted by the well-established one, and is therefore considered unacceptable"* (Clark 1991:35).

One question raises at this point: if children always observe the mutual exclusivity assumption or the principle of pre-emption by synonymy, how can they learn labels for an object in a second language?

Experimental studies on both monolingual and bilingual children (Au & Glusman 1990, DeWitt 1995) show that pre-school children are able to suspend this assumption when needed. This allows them to accept different labels for one and the same object when the labels belong to two different languages.

With the mutual exclusivity assumption it is more obvious than with other constraints that it has to be suspended at least at a later stage. If this principle were never suspended, one could not account for how children manage to learn names for particular individuals or synonyms, for example. It seems that either children know when they have to observe and when they have to suspend this assumption or that it is operative only during early stages of linguistic development. As they get older, they become aware that the mutual exclusivity assumption can be restricted in some domains and given up in others.

2.7 Simplicity of form, transparency of meaning and frequency

Young learners also show a bias towards simple forms, transparent meanings and frequently used options especially when creating new words (Clark 1991). Thus, **simplicity, transparency of meaning** and **frequency** represent further constraints operative in the domain of lexical learning and early compound formation[3]. When the child must choose between forms he/she will choose the simplest ones, which he/she already knows, i.e. which are transparent to him/her. And when he/she has to choose between forms which are equally simple or equally transparent he/she seems to have a bias towards the most productive of the options available, i.e. those word-formation procedures which are the most frequently ones used by adults and which are more frequent in the linguistic input that the child receives.

> The child tends to choose the **simplest, the most transparent** and **the most frequently** used words.

2.8 The shape-bias

Perceptual information about the object/substance status of the object denoted by a noun has also been proved to be important for the initial mappings between objects and

> Children resort to **shape** similarity in order to map novel terms onto basic level categories.

---

[2] Before turning 2, ASL-speaking children and English-speaking children make the same error when using *you* and *me*. This demonstrates that the arbitrariness of the relation between a symbol and its meaning is deeply entrenched in the child's mind (Pinker 1994a).

[3] See Chapter 3 for details.

countable nouns, and between substances and mass nouns, respectively (Subrahmanyam and Landau 1995). A bias that seems to be guiding the acquisition of word meaning (possibly even initially overriding the syntactic context) is the so-called **shape bias**. Children seem to tend to map new nouns onto basic–level categories by resorting to shape similarity:

> *The early shape bias in word learning invites children to form categories of perceptually similar things. Because members of the same taxonomic category tend to look alike in the real world, these shape-based categories will often be good approximations of theory-based ontological categories* (Imai and Gentner 1995:175)

For example, when taught new countable nouns that denote objects, children will generalise these nouns on the basis of shape (Landau et al. 1988). The shape bias seems to be stronger with younger children and to get weaker with older children and adults who attend more to the syntactic context.

The shape bias has been said to precede the taxonomic assumption: children extend noun meaning on the basis of shape at an early age and, only later, after further learning occurs, do they shift to extension of meaning on taxonomic assumptions (Imai and Gentner 1995).

2.9 The type-of-substance bias

It has also been claimed that children are guided in the acquisition of noun meanings by the type of substance denoted by the noun. Soja et al. (1991) point out that children follow two procedures in the acquisition of noun meanings according to whether the noun denotes **a solid or a non-solid substance**:

> **The type of substance** denoted by the novel noun is relevant for acquisition.

Procedure 1:
Step 1: Test to see if the speaker could be talking about a solid object; if yes,
Step 2: Conclude that the word refers to individual whole objects of the same type as the referent.

Procedure 2:
Step 1: Test to see if the speaker could be talking about a non-solid substance; if yes,
Step 2: Conclude that the word refers to portions of substance of the same type as the referent.

2.10 Word learning constraints are not (always) language specific

As can be seen, the principles invoked in relation to the acquisition of word meaning are not always language specific. Children are assumed to rely on some extra-linguistic facts (pragmatics, knowledge of the world, underlying conceptual and perceptual categories) in their attempt at improving their vocabularies.

> (Some) word learning constraints are not language specific.

One should however point out that a different point of view has been put forth in the literature, according to which such constraints would be too "strong", at least for the early stages of word learning, during which many lexical items are unstable or /and do not have the adult meaning (Nelson 1988, Dromi 1993). On such a view, the young child cannot take words to refer to kinds of objects, individual objects or portions of stuff from the onset of acquisition. In the beginning, word meanings are assumed to be salient perceptual features of what the child believes the referent of the word is. Only after the so-called vocabulary spurt (Nelson 1988) or after the child has learned the syntax of

202

quantification (Quine 1960) could the young child distinguish between kinds of objects, individuals or portions of stuff.

But there are experimental results which suggest that this point of view encounters a few problems. Carey (1993) provides evidence that the ontological status of the referent is relevant for early vocabulary learning (24 months) and that children can induce the ontological distinction between objects and substances before having learned the syntax of quantifiers, plurals or determiners. In Xu et al. (1995) it is argued that 12-month-olds can already make a distinction between kinds and properties before they begin to acquire countable nouns.

Other researchers emphasise the fact that these learning constraints are mere by-products of children's non-linguistic conceptual biases and hence should not be posited as principles specific to word learning. Bloom (1994:306) argues that the constraints which actually guide lexical learning 'emerge from other properties of children's knowledge: in particular, from children's grasp of syntax-semantics mappings', which play a crucial role in lexical development. Any other type of constraint, though relevant for acquisition, is not language specific:

> By rejecting the idea of special constraints, I am not denying that young children know a lot about words – about their phonology, morphology, syntax, and meaning – and that this knowledge can facilitate the learning of language [...] and that some of it may be innate. The proposal I am arguing against is that there exist additional constraints of the sort proposed by Markman and others, constraints whose sole role is to facilitate the process of word learning. (Bloom 2000:11)

Suppose it is true beyond doubt that these constraints, in spite of not being language specific, play an important part in the acquisition of word meaning. The view that lexical development may involve domain-general mechanisms besides language specific ones has already been advanced. But most of the constraints discussed so far refer to the acquisition of nouns. The question is: do children make similar assumptions when learning verb meanings or pronouns and proper names? Early vocabularies also contain words which refer to locations, events, temporal entities. What constraints are available in this case? Can we say that these principles constrain the acquisition of word meaning in general or only the acquisition of nouns?

3. Vocabulary acquisition and theory of mind

Bloom (2000) proposes that the most important element in the process of word learning is the child's understanding of the (referential) intentions of others, i.e. on their theory of mind:

> [...] some capacity to understand the minds of others may be present in babies before they begin to speak. There are many names for this capacity, including mind-reading, social cognition, and pragmatic understanding, but [...] I use the term theory of mind (Bloom 2000: 61).

In this, he follows some of the earliest attempts at explaining word learning, such as the one in The Confessions of Saint Augustine (398):

> When [my elders] named any thing, and as they spoke turned towards it, I saw and remembered that they called what they would point out by the name they uttered. And that they meant this thing and no other was plain from the motion of their body, the natural language, as it were, of all nations, expressed by the countenance, glances of the eye, gestures of the limbs, and tones of the voice, indicating the affections of the mind, as it pursues, possesses, rejects, or

shuns. And thus by constantly hearing words, as they occurred in various sentences, I collected gradually for what they stood; and having broken in my mouth to these signs, I thereby gave utterance to my will. (cited in Bloom 2000:61)

According to Bloom, the child's ability to read the mind of the 'interlocutor' underlies his/her learning not only of the meaning of words but also of how words relate to each other and of how they can be used in communication. Word learning is defined as 'a species of intentional inference' (p. 61). The young child needs to see the speaker and what he/she is looking at in order to be able to infer the meaning of words.

<div style="border:1px solid">Word learning is a type of intentional inference.</div>

Evidence in favour of this hypothesis comes from experimental data. 18 month old infants were placed in a context in which they played with one object, while a different object was placed in front of the experimenter, in a bucket (Baldwin 1991, 1993 reported in Bloom 2000). The experimenter looked at the object in the bucket and uttered a new word, *moni*, while the child was playing with the other object. When asked to point to the *moni*, the children chose the object in the bucket and not the one they were playing with. When young children were placed in a room, alone, with a new object, they did not relate the string of sounds *Dawnoo! There's a dawnoo!*, uttered by an impersonal voice, to the new object. Such data suggest that children rely on the referential intention of the interlocutor (which plays the part of a cue) in order to learn word meaning, and not on observation of the object alone.

Further evidence in favour of this view comes from studies of two radically different types of impairment: autism and Williams syndrome. The cause of autism is related, according to one hypothesis, to a delayed, impaired or missing theory of mind. Autistic individuals cannot socialise or communicate with the others. The majority have limited language skills. Pronominal reversal, the use of 'I' for 'you' and vice-versa, seems to be rather frequent. When they hypothesise the meaning of words, they mainly rely on associative learning mechanisms. For example, Bloom reports the case of an autistic boy who used 'Peter eater' when talking about saucepans. This was taken to be due to the fact that, when he was about 2, his mother dropped a saucepan while reciting him 'Peter, Peter, Pumpkin Eater'. Another cited case is the one of an autistic child who used the word 'sausage' to refer to toy trucks, presumably because his mother had told him 'Come and eat your sausage' while he was looking at his truck.

Williams syndrome individuals, on the other hand, are highly social. In spite of their mental retardation, their language ability is relatively spared and, in the domain of vocabulary, it may even surpass that of normal individuals of the same age. This contrast between the two types of impaired individuals shows how important social capacities and ability to guess the communicative intentions of others can be.

4. The acquisition of nouns vs. the acquisition of verbs

4.1 Are nouns easier to learn?

There is evidence, both theoretical and experimental, that verbs are more difficult to learn than nouns or, at least, than non-abstract nouns. This could explain why nouns seem to be predominant in children's early vocabularies, as can be seen in Table 2 (taken from Goldfield 1998:281), which summarises the results of various studies related to the early emergence of (common) nouns and verbs:

204

Table 2

Diary Studies	Common nouns	Verbs/Action words
Proportion of nouns and verbs in the early lexicon		
Nelson (1973)	.51	.13
Benedict (1979)	.50	.19
Goldfield (1986)	.48	.16
MacArthur Communicative Development Inventory	.63	.08

It has been suggested that noun meanings are easier to hypothesise because they can be often inferred by pairing a string of sounds with an object or an individual by sheer observation of the extra-linguistic situation, whereas actions seem more difficult to identify. Terms for actions are always relational in meaning, they link one or more participants to the event (Gentner 1982, Clark 1991). Maybe that is the reason why they can almost never occur in ostensive definitions. We often say "This is a book" or "This is water", but we hardly ever say "This is reading" or "This is eating". Even when we say 'Look, he's eating!' the hypothesis space is much larger than when we say 'Look, this is a flower'.

> Nouns are predominant in early vocabularies because noun meanings are easier to infer than verb meanings.

Actions have vaguer boundaries and quite often the verb is heard before or after the action takes place. For example, the child can hear an utterance like "I will give you something to eat" before the action actually takes place. Ambalu, Chiat and Pring (1997) studied the effects of verb input on the acquisition of verb meaning on 30 children aged 2; 3 to 3; 6. Interestingly, the findings of their experiment show that verbs which describe movement can be better learned when heard before the event has taken place, whereas verbs which focus on the result are better learned if the child hears the unfamiliar word after the action has taken place.

Also, some very simple verbs, used in every day conversation, and which denote perceivable events, may encode perspectives and beliefs which cannot be inferred by mere observation; some semantic components (causation, manner of action, etc.) are conflated into the meaning of the verb. Consider, for example, pairs of verbs such as *buy/sell, win/beat, give/receive* (Gleitman 1990). How can the child detect the change of perspective while watching a buying-selling scene, for example? There are also verbs which denote states of affairs which cannot be observed at all, such as *think, believe, want, wonder, guess, understand.* And these verbs are used by parents quite a lot when talking to their children.

The conclusion we can reach so far is that the meaning of at least some classes of verbs is even more difficult to hypothesise by mere observation than the meaning of nouns. And there is experimental evidence that indeed verb meaning is more difficult to infer than noun meaning. Gillette and Gleitman (1995) devised an experiment in which adults' ability to infer verb meaning by observation was tested. The subjects were shown short videotapes of mothers playing with their infants, with the audio turned off. Whenever the mother uttered a noun, a beep was heard and the subjects were required to guess what noun had been uttered. About 50% of the guesses were accurate at the first beep, but the results improved for later beeps. In a second experiment, the subjects watched videotapes, as in the first experiment, but this time a beep was heard every time the mother had uttered a verb. The subjects managed to guess the right verb only 7% of the time.

By analogy, Gleitman and Gillette conclude that it must be more difficult for children to infer verb meaning than noun meaning. This hypothesis is also supported by the fact that early vocabularies (the first 50 words) often contain no verbs and the number of verbs continues to be smaller than that of nouns until around age 3. This fact is more intriguing as these early vocabularies do not contain only nouns which denote basic-level classes of objects (which could be learned by observation) but also nouns which refer to locations, events or temporal entities, i.e. which can hardly be

learned by mere observation. This suggests that verbs are not more difficult to learn only because their meaning cannot always be inferred by resorting to the extra-linguistic environment but for some other reasons as well which may be linked to the complexity of their structure. If this is the case, the obvious question is: how do children cope with verb meaning in the end? Are they constrained in their hypotheses by some general principles? Are these principles the same as the ones which guide the learning of noun meaning?

4.2 Word learning constraints and the acquisition of verbs

The same constraints apply in the acquisition of both nouns and verbs.

Clark (1991) argues that the constraints which guide the child in the hypothesis space of noun meaning will also apply to the acquisition of verb meaning. The whole-action assumption will tell the child that a novel term denoting an action refers to the act that links the different participants in that event as a whole. The generic-level assumption relates to the expectation that words (nouns or verbs) denote categories which are distinct from each other, but whose members share a maximum number of properties. The equal-detail assumption also applies, according to Clark, in the learning of both noun and verb meanings. The child somehow knows that each word denotes equally detailed instances of categories.

However, this does not seem to be enough. Even if one adopted the view that these constraints are sufficient to guide the child through the maze of hypotheses, they still cannot explain why children are slower to learn verbs than nouns. Nor can they explain how children acquire pronouns or proper names.

Nouns and verbs are acquired differently.

Fisher et al. (1994) advance a different point of view. According to them, nouns and verbs are actually acquired in different ways: when learning a novel noun, the child must map a word to the world, whereas when learning a new verb, he/she must map a sentence to the world. This sentence-to-world mapping could explain why early vocabularies contain few verbs (if at all); noun meanings can be learned in the absence of structural knowledge, but verbs cannot.

4.3 Input and lexical development

The predominance of nouns in early vocabularies may be the result of the linguistic input.

The input has also been invoked as a possible cause of the predominance of nouns or verbs in early vocabularies. The predominance of nouns in early vocabularies has been said to be the result of the linguistic input which children receive at this stage, and which provides more evidence for the meanings of nouns than for the meanings of verbs (Snedeker and Gleitman 1999). On such an account, it is not relevant to stress the difficulty of inferring the meaning of verbs and as such to try and link the lack of verbs in early vocabularies to the cognitive limitations of young learners. Certain properties of the input are responsible for the predominance of nouns in early vocabularies. This view predicts that the way in which children cope with nouns vs. verbs, being dependent on properties of the input, may differ from one language to another.

The predomi-nance of nouns in early vocabularies may be due to the morpho-logical variation available in the input.

This prediction is borne out by data from child Mandarin Chinese and Korean. Mandarin-speaking children produce more verbs than nouns in their early vocabularies. Tardif (1995) accounts for this phenomenon by resorting to a comparison of the percentage of nouns and that of verbs in the subjects' speech and in the input which they received. Similarities between the percentage of nouns and verbs in the input provided by adults and in the early speech of Mandarin-speaking children have been found.

Choi and Gopnik (1995) report an early verb-bias in child Korean that they also attribute to certain properties of the input. But, even with Korean children, there is a noun bias in the first 50 words.

206

One more possible explanation for the early predominance of verbs or nouns may be one which takes into account the morphological variation (i.e. the number of forms used for one and the same word) available in the input. Yamashita (1999) argues that Japanese children acquire nouns earlier because nouns have the least variation in the linguistic input, whereas verbs are acquired late due to the fact that they have the most morphological variation.

Such findings lead to the conclusion that the noun bias or the verb bias in early speech may be language dependent and not universal as previously claimed (Gentner 1982, Nelson 1973). This conclusion is supported by a study of the early lexical acquisition of four Mandarin Chinese-English blilinguals (Nicoladis 2001), aged; 7 – 2; 0. In spite of the fact that all the children knew more nouns than verbs in both English and Chinese, the children with larger Chinese vocabularies used more verbs than nouns in Chinese and more nouns than verbs in English.

4.4 Conclusions so far

So far, we have seen that the following explanations for the predominance of nouns or of verbs in early vocabularies have been put forth:

(i)   nouns emerge earlier because they are more 'accessible' to children, their meaning is easier to identify;
(ii) certain properties of the input (such as frequency of nouns)   are responsible for an early noun-bias or an early verb-bias;
(iii) language specific properties, such as morphological variation can explain why nouns are acquired faster than verbs.

There is evidence in favour of all these hypotheses, which suggests that multiple factors may be involved in lexical acquisition (Tardif, Shatz and Naigles 1997, Yamashita 1999) and also that input plays a more important part in the process of lexical development than it does in the process of syntactic development.

5. Syntax-guided or semantics-guided learning of word meaning?

5.1. The question

In the late 60s and early 70s, a debate began concerning the way in which children learn the meaning of words and their syntactic properties. At the very core of the debate, in which the acquisition of verb meaning had a central part, was the question: "What comes first: syntax or semantics?" i.e. "Do young children analyse their words in semantic or syntactic categories, do they rely on the syntactic categorisation or on the semantic properties of words?" This question received two different answers:

(i)   Syntax helps lexical learning. Young children are imposing syntactic categories on words at a very early stage and syntactic environment is crucial for lexical development. On this view, which has been known in the literature as the **syntactic bootstrapping** hypothesis, children rely on syntactic categorisation to learn the meaning of words.
(ii) Semantics helps lexical learning. On this view, known as the **semantic bootstrapping** hypothesis, children infer the meanings of words from the observation of events, without grammatical information. Acquisition of syntax requires prior knowledge of word meanings.

207

The views in (i) and (ii) can be reconciled. On this **reconciliation** view, a hypothesised meaning based on observation is seen as the input to linguistic mapping principles.

Let us see how each of these approaches deals with the complexity of the acquisition of word meaning.

5.2. *The syntactic bootstrapping hypothesis*

5.2.1. The role of the linguistic context

Learners are sensitive to the formal properties of language; they expect to find a link between these properties and semantic interpretation. In order to infer the meaning of a word, the child is assumed to rely on the syntactic context in which the word is used, i.e. its syntactic frame. The child can predict the meaning(s) of the verb by analysing the argument structure with which it has been used in a sentence.

As early as 1957, Brown demonstrated that the acquisition of vocabulary could get help from the linguistic context in which the particular word is uttered. When 3- to 5-year olds are shown sets of pictures depicting one an object and the other one a substance, they will tend to point to the picture depicting the object when required to show *a sib,* but to the one depicting the substance when required to show *sib.* There are morphological cues which help the child to label the word with an object or an activity. When hearing a nonsense word like *the gorp*, children tend to point to an object, but when they hear *gorping* they tend to point to the implied action. Such experimental evidence led linguists to look for different cues in the linguistic context which could help the child to map the label with the appropriate intended meaning (Landau & Gleitman 1985, Naigles 1990, Gleitman & Gillette 1995 among others). The hypothesis which they advance is that children rely on syntactic information to learn new words:

> *... the range of subcategorization frames has considerable potential for partitioning the verb set semantically, and [...] language learners have the capacity and inclination to recruit this information source to redress the insufficiencies of observation. This examination of structure as the basis for deducing the meaning is the procedure we have called syntactic bootstrapping* (Gleitman 1990:27).

For example, when hearing the sentence *He gorped the apple*, the child can infer that *gorp* denotes an action which implies an agent and a physical object relying on the syntactic frame in which the verb has been used: a transitive one. When hearing *I gorped the apple from the basket* the child will hypothesise that *gorp* also involves a direction. If *gorp* is followed by a clausal complement, as in *I gorped that he did not like the apple*, the child will infer that the verb may denote some kind of mental activity.

The proposal is not as radical as it might look at first sight; it does not imply that syntactic information alone helps the child to map the word with its intended meaning. It simply argues that syntactic information plays an important part in the acquisition of vocabulary, without denying the part of observation:

> *The input is seen as consisting of both the extralinguistic event, observed by the child, and the linguistic event, which provides a verb used in a certain grammatical environment* (Gleitman 1990).

Consider, for example, the pairs of sentences below:

(1)   a. *John melted the ice.*
         b. *The ice melted.*

> **Syntactic bootstrapping:** children use syntactic information to learn word meaning.

208

(2)   a. *She cooled the soup.*
        b. *The soup cooled.*

In both (1) and (2) the same verb describes an accomplishment in **a** (i.e. a telic predication which crucially involves causation) and an achievement in **b** (i.e. a predication which is telic, just like the one in **a**, but which involves only a change of state; no causation is at stake in this case). The situation which sentence **a** describes can be equally described by the **b** sentence. There is no possibility to infer the correct meaning of the verb in **a** and **b** on the basis of the analysis of the event. How does the child cope with such situations, then? The crucial assumption is that it is the linguistic input, i.e. the subcategorization frame in which the verb appears which guides the child. In the **a** sentences, the verb occurs in a transitive construction whereas in the **b** ones, in an intransitive frame. These syntactic properties are than mapped onto the meaning of the verb.

Children are able to notice the systematic relations which exist between verb meaning and sentence structure. Noticing these regularities helps the child to reduce the hypothesis space, to narrow down the set of logically possible hypotheses with regard to the meaning of an unfamiliar word. For example, when a child hears a nonsense verb like *gorp* in a sentence like *John gorps*, it is more likely that he/she will interpret the novel verb to mean "smile" rather than "hit". When hearing *John gorps Bill*, the reverse will happen. The frame in which the verb occurs provides information about the number of arguments, the type of arguments, the choice of agent or affected entity when more than one is possible, i.e. the type of information impossible to infer from mere observation of the extra-linguistic situation in which the verb is used.

The part of the frame in the learning of word meaning seems to be so important that it can even make the young learner change the meaning of a familiar verb to make it conform to the new frame in which it was encountered. Naigles, Gleitman and Gleitman (1992) tested the role of frames in the lexical development of 2-, 3- and 4 year olds. In the experiment, familiar transitive verbs, such as *bring*, were used intransitively (as in 3) and intransitive familiar verbs, such as *come*, transitively (4):

(3) **The zebra brings.*
(4) **The elephant comes the giraffe.*

The subjects were required to act these sentences. The results of the experiment show that the children tried to act them in accord with the frame, thus changing their previously acquired meaning.

5.2.2. Regularities between syntax and semantics

Linguists have noticed that there often exists a certain relationship between the meaning of words and their syntactic properties; words which systematically differ in terms of meaning also differ in terms of the syntactic environment in which they occur. For example, nouns which denote objects tend to be countable (*dog, cat, book*) but nouns which denote substances tend to be mass nouns (*water, milk, juice*). This systematicity could be explained by the fact that objects have boundaries, and hence can be counted, whereas substances describe homogeneous wholes, which do not have boundaries or whose boundaries are vague and, consequently, cannot be counted. This systematic difference in meaning is mapped by a systematic countable/mass syntactic difference.

One can extend this view to the domain of predicates. It has been noticed that predicates denoting states tend to behave like mass terms, they cannot be counted; they denote homogeneous states of affairs, on a par with mass terms (Mourelatos 1986). Change of state predicates, on the other hand, tend to behave like countable nouns, they can describe different instantiations of the same kind of event. This semantic difference is reflected by the incompatibility and, respectively, compatibility with the progressive.

Studies of various classes of verbs revealed that verbs which take prepositional objects whose prepositions indicate direction, such as *across, along, away from, to, towards*, usually denote eventive predicates rather than statives. Verbs which take sentential complements tend to denote mental states rather than physical ones[4]. Verbs which can be used in the imperative tend to denote an action which can be controlled by the subject of the sentence, a.s.o.

One should not, however, reach the conclusion that there is always a systematic syntax/semantics mapping cross-linguistically and that similar semantic facts do always result in similar syntactic configurations. One obvious example is that of the modal verbs. In spite of the fact that they denote the same notions, they do not behave similarly cross-linguistically. In English, for example, the class of the so-called modal verbs behave more like functional categories, representing a distinct morpho-syntactic class, whereas in Romance languages like Italian, Spanish or Romanian, they behave like lexical verbs. Also, in English, the verbs *donate* and *give*, in spite of the similarity of the event which they denote, differ in terms of syntactic frame.

5.2.3. How children exploit these regularities

> Children are able to exploit syntax-semantics regularities.

There is experimental evidence that children can detect and use these syntax-semantics regularities in the acquisition of vocabulary, both in the domain of nouns and in the domain of verbs.

Bowerman (1983) noticed that her children would occasionally use, in spontaneous speech, innovative causative constructions of the type:

(5) *I'm gonna fall this on her.*

In (5), the verb *fall* has been used as *cause to fall*. Such constructions show that children are aware of the transitive-causative relation, which they can make use of in a creative way.

Naigles (1990) used the preferential-looking paradigm[5] to investigate whether children (aged between 1; 11 – 2; 3) can use syntactic structure in hypothesising verb meanings in their interpretation of unfamiliar verbs. The child was seated on the mother's lap and observed pairs of events, simultaneously presented on two video monitors. The children were then shown a multiple scene, with two actions going on simultaneously, performed by the same actors. One action was causative and the other one non-causative. For example, the children were shown a multiple scene in which a duck was forcing a rabbit to stay in a bending position (the causative action) and, at the same time, the duck and the rabbit were making arm gestures (the non-causative action). Some children heard a novel nonsense verb in a transitive frame – *Look! The duck is gorping the bunny.* The other children heard the new (nonsense) verb in an intransitive frame – Look, *the duck and the bunny are gorping.* Then, one single action scenes appeared again: on one monitor, the causative action could be seen and on the other one the non-causative event. The child was asked: *Where's gorping? Find gorping now!* The children who had heard the novel verb in the intransitive frame focused significantly longer on the monitor presenting the non-causative event. The children who had heard the verb in a transitive construction looked longer at the monitor which presented the causative event. The findings clearly support the view that the structure of the sentence represents an important source of information for verb learners.

---

[4]See Levin (1993) for more examples.

[5] The preferential looking paradigm is a comprehension test during which the child is required to look at one of two simultaneously presented video events while hearing a sentence which describes one of the events. His/her preference of looking longer at one event is taken as indicative of how he/she has interpreted the sentence.

210

Fisher et al. (1994) tested how children can detect the distinction between pairs of perspective-changing verbs (of the type *give/receive, chase/flee, lead/follow*) on the basis of observation and syntactic deduction.

The hypothesis they started from was that children watching a scene showing, for example, a rabbit giving a ball to an elephant and hearing a new verb describing the scene, will interpret its meaning according to the frame in which the verb was first heard. The experimental method they used was the paraphrase method. The children (24 3-year-olds and 30 4-year-olds) were shown six brief videotaped scenes, described by the experimenter with a sentence that contained a nonsense verb. The subject was then asked to paraphrase that verb. Each scene contained puppet actions, which could be described by two English verbs that differed both semantically and syntactically. For example, in one of the scenes, an elephant hands a ball to a rabbit. The children were divided into groups and each group heard one of the three descriptions:

(6) a. *Look, biffing!*
   b. *The rabbit is biffing the ball to the elephant.*
   c. *The elephant is biffing the ball from the rabbit.*

It is interesting to point out that 29% of the trials for 3-year-olds and 23% for 4-year-olds represented failures. In spite of the fact that children could observe the event and were provided a description of the on-going event, they still failed to infer the meaning. In some cases, when children were introduced the verb in the (a) frame, they mentioned both possible paraphrases. Also children showed a clear agent bias in the interpretation linked to (a). They did not randomly choose a *give*-like or a *receive*-like paraphrase, as one might have expected, but they tended to choose the *give*-like verb, i.e. the agentive one. With (b) and (c) the results clearly showed that the syntactic frame had an effect on the acquisition of the new verb. The children chose, in a principled way, a *give*-like or a *receive*-like paraphrase, according to the syntactic frame in which they were taught the verb.

All these findings provide convincing evidence that structural clues are helpful; children are able to detect syntactic cues and to exploit them in order to hypothesise the intended meaning of the novel word.

5.2.4 Multiple frames

We have seen that there is experimental evidence that children can detect and use syntactic information in order to infer word meaning. The learner is assumed to "zoom in" on the most salient interpretation(s) of the extra-linguistic situation by exploiting the structural information provided by the linguistic input. This is what has been called "the zoom lens hypothesis" (Gleitman and Gillette 1995, Fisher et al. 1994 a.o.). But, in some cases, the interpretation of the verb meaning may be impossible on the basis of one single pairing sentence (syntactic structure) – extra-linguistic information. There are cases when such a pairing can be misleading. The example which is usually provided to support this idea is that of the sentences (a) and (b) below, which frequently occur in adult-child dialogues:

(7) a. *Did you **eat** a cookie?*
   b. *Do you **want** a cookie?*

One single syntactic frame is not always enough to hypothesise the right meaning. Children may guess *eat* instead of *want* in the case of (b), for example.

A similar situation may arise in the case of the misleading pairing in (8) below:

(8) A. *Ed **gave** the horse to Sally.*
   b. *Ed **explained** the facts to Sally.*

Both *give* and *explain* describe transfer of entities between two parties and they can appear in the same syntactic construction: NP1 VP NP2 *to* NP3. But *explain* denotes mental transfer and accepts sentential complements (as in 9) whereas *give* denotes physical transfer, and is incompatible with sentential complements (10):

(9) Ed *explained that there was an elephant in the kitchen.*
(10) **Ed gave that there was an elephant in the kitchen.*

The young learner will be able to detect the difference (physical vs. mental transfer) only after having heard the two verbs in both syntactic environments.

The hypothesis put forth is that the mapping problem can be solved by multiple frame information; it is only by examination of all (or several of) the syntactic contexts in which verbs occur, i.e. of multiple syntactic frames, that the children will be able to make out the appropriate meaning.

Evidence in favour of the multiple frame hypothesis comes from the analysis of the role of maternal input on the learning of word meaning. It seems that the diversity of syntactic frames in which verbs appear in maternal speech can predict the frequency with which these verbs appear in child speech later (Naigles, Hoff and Ginsberg 1993).

Multiple-frame information enhances the possibility of correctly hypothesising word meaning with adults as well. Experiments show that they can better infer verb meaning when provided with frame-range information. This shows that verb frames can have semantic implications. Scene information is quite uninformative without frame ranging. What the child actually needs are multiple paired scenes and sentences:

> *... the set of syntactic formats for a verb provides crucial cues to the verb meanings just because these formats are abstract surface reflexes of the meanings...the set of subcategorization frames associated with a verb is highly informative about the meaning it conveys. In fact, since the surface forms are the carriers of critical semantic information, the construal of verbs is partly indeterminant without the subcategorization information. Hence, in the end, a successful learning procedure for verb meaning must recruit information from inspection of the many grammatical formats in which each verb participates* (Landau & Gleitman 1985:138–139).

5.2.5 From verbs to nouns

The arguments which have been discussed so far in defence of syntactic bootstrapping belong to the verbal domain. Actually, one of the assumptions we started from was that verb meaning is more difficult to infer than the meaning of nouns because the structure of verbs is more complex. Does this mean that syntactic cues are not relevant with nouns? Are they less relevant? There is experimental evidence that syntax also helps children to infer the precise noun meaning. Syntactic cues are important in the acquisition of nouns as well.

Bloom and Kelemen (1995) show that children can detect the correct collective noun meaning on the basis of syntactic cues. They tested this hypothesis on 16 adults and 16 4- and 5-year olds. Each subject was first shown pictures of novel objects, described as either "These are fendles" or "This is a fendle". The subjects in the plural condition were expected to treat the word "fendle" as an object name and the subjects in the singular condition were expected to treat "fendle" as a collective noun. After the new word was taught, each subject was shown sets of two pictures, one depicting a single object and one a collection of objects, and asked: "Can you show me the fendle?" If "fendle" was assumed to be a collective noun, the subject was expected to point to the picture depicting a collection of objects. If the word was assumed to be an object name, the subject should have pointed to the picture depicting the individual object. The results

212

revealed that the children were sensitive to syntax[6]. The ones in the singular condition favoured the collective interpretation and the ones in the plural condition the object name interpretation.

Bloom (1994) reports another experiment designed to test if children can detect the syntax-semantic mapping in the case of mass/countable nouns. 3- and 4 year olds were taught novel nouns denoting ambiguous stimuli, i.e. stimuli which could be interpreted either as a set of individuals or as an unindividuated portion, such as spaghetti or lentils, or a string of bell sounds from a tape recorder. The children were divided into two groups. One group was introduced the novel term in a countable frame, e.g. *These are feps – there really are a lot of feps here.* The other group heard the new noun in a mass frame, e.g. *This is fep. There really is a lot of fep here.* Then the children in the first group were asked to "give the puppet a fep". Most of them tried to give the puppet an object. The children in the "mass" group were required to "give the puppet fep". They tended to give the puppet a handful of objects.

These findings show that chidren are aware of the syntax-semantics mappings. And it seems that these mappings help them to infer the meaning of nouns as well as the meaning of verbs.

5.2.6 Conclusions so far

The discussion so far has shown that the syntactic bootstrapping hypothesis proposes a trajectory of lexical development within which the child has to rely on the analysis of (multiple) syntactic frames. The role of observation is not denied, it is only argued that, in many cases, observation of situational contexts alone is not enough. The assumption is that observable properties of sentences are more relevant for the acquisition of meaning. Syntax is a relevant source of information, i.e. children can infer word meanings from word syntax. But, besides syntax, a set of other learning mechanisms are taken to complement each other, among which observational learning.

From the point of view of linguistic theory, syntactic bootstrapping assumes that there exist syntax/semantics mappings. The child will infer the correct semantics guided by the syntax which provides helpful information. Semantics is assumed to be read off the syntactic structure.

5.3 The semantic bootstrapping hypothesis

5.3.1 Arguments against the syntactic bootstrapping hypothesis

Critics of the syntactic bootstrapping hypothesis disagree that the syntactic frame of the verb can play such an important part in word meaning learning. According to them, a child can infer the meaning of a new verb not by resorting to the analysis of the syntactic frame in which it occurs but because he/she knows the meaning of the other words in the sentence. For example, when hearing a sentence like *I gorped the cake and now I am full* the child will infer that *gorp* means something like *eat* because he/she knows what *cake* and *full* mean and also relying on a partial analysis of what links the words together (Pinker 1994b). What guides the child, according to this view, is a kind of 'cognitive inference using knowledge of real-world contingencies' (Pinker 1994b: 382). Notice that, even according to this view, the role of syntactic analysis (be it only 'partial') is not denied.

---

[6] Adults answered correctly 100%. Bloom and Kelemen (1995) also report that there exists a tendency to produce "collective N" responses to *This is a fendle* as subjects get older. The older the subject the more sensitive to the effect of syntax (s)he seems to be.

It has also been pointed out that there are cases when a particular syntactic frame in which a verb occurs may not be informative enough. For example, arguments (11a, 12a, 13a) and adjuncts (11b, 12b, 13b) which have the same form can appear on the same side of the verb in English (Grimshaw 1994):

(11) a. *He put the child **in the pram**.*
      b. *The child was eating a biscuit in **the pram**.*
(12) a. *He put a book **in his room**.*
      b. *He wrote a book **in his room**.* (Grimshaw 1994:417)
(13) a. *The performance lasted **for an hour**.*
      b. *The performer wriggled **for an hour**.* (Grimshaw 1994:417)

In both the **a** and the **b** sentences of the pairs above the Prepositional Phrases *in the pram, in his room* and *for an hour* appear on the same side of the verb. But in the **a** contexts, it is an obligatory argument, and hence relevant for the meaning of the verb, whereas in the **b** sentences it is an optional argument, which does not contribute to the meaning of the verb. The child can only know which Prepositional Phrase is an argument and which one an adjunct only if he/she knows the meaning of the verb (Grimshaw 1994:417). A possible answer to this criticism could be that the child relies on the examination of all the frames in which the two verbs occur. Recall that syntactic bootstrapping assumes the need of multiple frame analysis, which is defined as an iterative application of the single-frame procedure.

But the relevance of multiple frames has also been questioned. Pinker (1994b) argues that the process of learning the meaning of a word from a single frame is fundamentally different from the process of learning the content of a verb from a set of syntactic frames. Grimshaw (1994: 419) points out that:

> ...*the question is whether UG determines the subcategorization set associated with a verb, or not. This issue turns out to be highly problematic – the reason is that the total subcategorization set of a verb is a function of the set of subcategorizations in which each **sense** of the verb participates. And the way senses are distributed across morphemes is not uniform across languages. [..]. UG says little or nothing about the complete set of senses the verb has, and therefore little or nothing about the total set of subcategorizations of the morpheme. UG only determines the properties of the individual senses and those that are related grammatically.*

Another problem which the syntactic bootstrapping proposal does not seem to be able to solve appropriately according to the advocates of the semantic bootstrapping hypothesis is the one of many-to-one-semantics-to-syntax mappings (Grimshaw 1994, Pinker 1994b). Consider, for example, the set of verbs in the sentences below (all the examples are from Grimshaw 1994:418):

(14) a. *He weighed the tomatoes.*
      b. *He weighed 300 pounds.*
(15) a. *He became a doctor.*
      b. *He shot a doctor.*
(16) a. *He asked someone the time.*
      b. *He asked someone a question.*

The syntactic frame is rather uninformative with respect to verb meaning in all these sentences. It can only provide information with respect to the number of arguments which the verb relates in each context, but it cannot help the child infer the root meaning of the word.

214

5.3.2 Semantic bootstrapping

A different point of view on how children cope with word meanings is that the young learner can infer the meanings of words from observation of the world, without grammatical evidence. The process of acquisition is assumed to rely on mechanisms which imply non-linguistic cognitive inference. On such a view, syntactic frames can only inform the learner about the meaning of a word in that particular frame, but they cannot possibly lead him/her into correctly inferring the root (or core) meaning of that word. The role of syntactic information is not denied, but it is not seen as crucial. The learning of word meanings implies the existence of contingencies between perceptual and syntactic categories which, mediated by semantic categories, can help the child to acquire the properties of words.

> Semantic bootstrapping hypothesis: children rely on word meaning to learn word syntax.

One important claim of the semantic bootstrapping hypothesis is that there exists a close relationship between semantic and syntactic categories, and that the child uses the former to infer the latter:

> *...[t]he claim of the Semantic Bootstrapping Hypothesis is that the child uses the presence of semantic entities such as "thing", "causal agent", "true in past", and "predicate-argument relation" to infer that the input contains tokens of the corresponding syntactic substantive universals such as "noun", "subject", "auxiliary", "dominates", and so on. [...] this knowledge is used by several sets of procedures to build rules for the target language.* (Pinker 1987: 407)

The hypothesised semantics-syntax isomorphy "bootstraps" the child into syntax. Semantics and syntax are related by linking rules (Jackendoff 1987,1990, Pinker 1989), which are universal and innate, and hence do not have to be learned. The child is able to link semantic entities such as Agent, Patient or Theme to grammatical roles such as Subject or Direct Object. Obviously, the implication is that children can analyse which word in the input corresponds to the label Agent, Patient a.s.o. and that the child makes use of linking rules to infer that the Agent should be realised as a DP and appear in subject position.

Let us take an example. On hearing a sentence of the type *John is eating an apple*, which contains a transitive action verb, the child will infer that it denotes an action which involves an Agent and a Patient and, in accord with the available linking rules, the action will correspond to V/VP, the Agent to the Subject DP and the patient to the direct object DP. Used in a semantically transparent situation, the sentence will be analysed as:

(17) John   is eating   an apple
       ↓   ↓   ↓
      Agent   action   Patient
       ↓   ↓   ↓
       DP   V   DP
     Subject   Direct Object
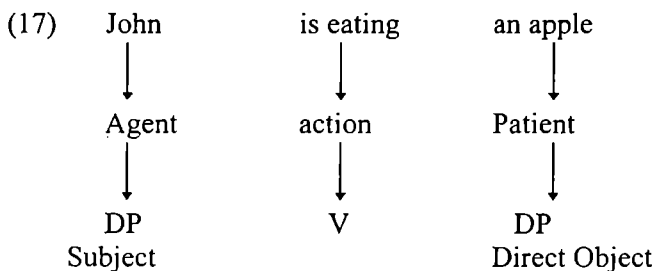
Notice that such a view assumes that a mechanism of identification of grammatical functions has to be in place. Also, the child has to be able to identify the situation as a certain event type, i.e. a certain conceptual structure, and then map the word onto the mental representation of that structure. Conceptual structure is given by the child's perceptual and cognitive mechanisms and it is linked to the verb when the child hears that verb used in a situation which exemplifies the pre-existing structure. The child is claimed to map a string of sounds with a mental representation of a concept via the so-called *Event Category Labelling*. When some meaning does not correspond to the pre-existing event types, the child resorts to the mechanism of hypothesis testing. Incorrect hypotheses of word meaning will be

eliminated as a result of observing how that word is used across situations. For example, for the verb *fill*, the child represents the Agent-Patient relation, the fact that the Patient is a liquid, the goal of the Agent a.s.o. This set of semantic relations associated with the verb are retained by the child and constantly re-evaluated in accord with the new situations in which the verb is heard. In the end, the child will retain only that subset of semantic relations which are relevant for the core meaning of the verb. On the basis of observation of contexts, he/she will know that *fill*, unlike *load*, does not belong to the locative alternation class in spite of their similar semantic properties. The hypothesis testing procedure is constrained by certain semantic biases, discourse and the mutual exclusivity assumption.

Acquisition of meaning appears to be determined not only by innate conceptual knowledge, but it also requires hypothesis testing and induction.

Evidence that word learning is possible without aid from syntax and that children possess abstract semantic categories as well as mappings between these categories and syntactic categories comes from the area of noun meaning. For example, when English monolingual children have to learn words of the type *camp, college, church*, which refer to individuated objects, just like countable nouns but which, at the same time, can be used 'bare' in a sentence, unlike countable nouns, they rely on the semantic properties of these nouns (they all refer to cultural institutions that involve habitual events and they belong to a subclass where all members refer to the same kind of institution, Soja 1994) in order to categorise them (Burns and Soja 1995). However, one should point out that when the children in the experiment also received explicit syntactic information that the novel noun was an NP-type noun they were more likely to categorise it as such. 'This suggests that although they can categorize a novel NP-type noun given only the semantic information, they prefer to have supporting syntactic information as well' (Burns and Soja 1995: 30).

Both Japanese and English speaking children extend novel nouns in accord with the shape and the type of material of which the object denoted by the noun is made prior to and independently of the acquisition of the count-mass syntax (Imai and Gentner 1997).

In determining whether a novel term is a proper noun or a common noun, Japanese children have no syntactic clues to rely on: Japanese syntax does not specify whether a noun is a common one or a proper name. But, in spite of the lack of syntactic cues, they manage to infer the meaning of novel terms by resorting to other constraints (Imai and Haryu 1999).

One should notice that, in spite of the fact that the hypothesis does not explicitly state it, it does assume a transparent mapping between language and extra-linguistic events. It has already been shown that observation of extra-linguistic contexts is not always enough, and that it is quite difficult to accept that there is one-to-one mapping between language and situations which language describes (see, for example, Gleitman 1990 or Fisher 1995 among many others). When observing a scene, how does the child know which part in the string of words is the object, or the subject? It seems that:

> *An innate array of concepts is not going to help the child in deciding which concept fits the scene they just witnessed. Since one breaking scene is never identical to another in the natural world, children have an infinite hypothesis space to draw upon in conceptualising the event. Just hearing a word in context does not guarantee that children will fast map the word correctly.*
> (Clifton et al. 1995: 62)

The linking rules assumed by the hypothesis are not without problems either. Recall that one such rule states that the Agent of a verb projects as the Subject of the sentence. But it is only the subject of transitive verbs that tends to be the Agent. And not even subjects of all the transitive verbs are Agents. The mapping of thematic roles onto grammatical roles may depend on the structure of the whole sentence. The linking rules assumed by the semantic bootstrapping hypothesis cannot really account for how a child represents the relation between the meaning of a verb and clause structure (Fisher 1995).

216

In spite of its intuitive appeal, the semantic bootstrapping hypothesis is not without problems. One can hardly find positive evidence in favour of the isomorphic relation between syntactic and semantic categories at an early stage. Also, by postulating such an isomorphic relation one has to accept that there is an initial stage in lexical development when child's language differs from that of the adult in an important way.

5.4 A possible reconciliation

5.4.1 The two hypotheses compared

A closer look at the two hypotheses with respect to the acquisition of word meaning will actually reveal that there are assumptions which they share and that they are not as radically different as it might appear at first sight. Let us see first what the two theories have in common. They both assume that:

(i)   children are endowed with the innate ability of making certain hypotheses about the meaning and the grammar of words

(ii)   children rely on domain-specific learning procedures to examine the incoming stream of words in the linguistic input; the child is able to conduct syntactic analyses of the input

(iii) children also have to rely on domain-general procedures (such as pattern detection or hypothesis testing for example) to correctly analyse the linguistic input

(iv)   the input which is relevant for lexical learning is the linguistic input; however, the role of the extra-linguistic context is not denied.

(v)   they both assume that semantic information is useful

(vi)   syntactic clues are useful. In particular, syntactic information restricts the hypothesis search within the domain of semantic interpretation.

(vii) there are syntax-semantics mappings.

They differ with respect to the importance they assume semantics and syntax play in the process. On semantic bootstrapping assumptions, the child first analyses the extra-linguistic situation. This analysis allows him/her to hypothesise the meaning of a certain word in the stream. And it is the meaning of the word which leads the child into the syntax of that particular word. Semantics bootstraps the child into syntax. On syntactic bootstrapping assumptions, the child analyses the incoming stream of words first, and this analysis allows him/her to infer the meaning of a word. In this case, syntax bootstraps the child into semantics.

Experimental evidence has shown both the relevance of syntactic cues in the process of lexical acquisition and that the acquisition of certain lexical items is possible in the absence of overt syntactic cues. What no experiment has denied is that children are able to exploit syntax-semantics mappings. This suggests that these mappings may be the ones which constrain children's word meanings even prior to the acquisition of syntax. This does not lead us directly to the conclusion that early grammars are semantic. What it suggests, however, is that there may be a stage during which children rely on syntax-semantics mappings. We have seen that during the two-word stage, children often use only or mainly lexical items but the way in which these items are projected suggests that they have knowledge of the thematic properties of these items and that they know how to 'project' them. One can detect certain regularities in the range of semantic relationships expressed at this age. Knowledge of thematic roles may be extremely important:

> *Thematic roles play a central role in language comprehension. We suggest that thematic roles provide a mechanism whereby the parser can make early semantic commitments, yet quickly recover from the inevitable*

217

misassignments that occur as a consequence of these early commitments. Further, we suggest that thematic roles provide a mechanism for interaction among the syntactic processor, the discourse model, and real world knowledge, and that thematic roles help create coherence in local structure. (Carlson and Tanenhaus 1988:263-264)

On the other hand, syntactic cues are extremely reliable. An extra-linguistic situation can be conceived in various ways, but a syntactic cue is clear: if a noun is preceded by a quantifier, it has to be a countable noun, if a verb is used in the progressive, it has to denote an action a.s.o. It has also been shown that observable properties of sentences, such as the number and order of familiar nouns, can be interpreted as analogically representing aspects of their meanings (Fisher 1995) It may be the case that 'the child's sensitivity to linguistic information actually supports a semantic theory; it does not refute it' (Bloom 1994:312). In which case, the hypothesis that syntax-semantics mappings guide word learning gains support.

5.4.2 A reconciliation model

Grimshaw (1994) proposes what she calls **a reconciliation model,** within which the semantics-to-syntax mapping principles play the part of a predictive mechanism and the syntactic frames that of a checking mechanism. The acquisition steps assumed by her reconciliation model are the following ones:

A recon-
ciliation
model: the
semantics-to-
syntax
mappings
provide the
predictive
mechanism;
the syntactic
frames provide
the checking
mechanism.

(i) *The learner interprets a scene or situation, hears a sentence and detects the verb.*
(ii) *The learner finds a relationship R among participants in the situation (entities, propositions etc.) that is sensible given the interpretation of the observed situation.*
(iii) *The learner checks that R involves participants consistent with the content of the (candidate argument) expressions in the sentence, and rejects an R that does not meet this requirement.*
(iv) *The learner constructs a lexical conceptual structure which is consistent with R, and assigns candidate argument expressions in the sentence to argument positions in the lexical conceptual structure.*
(v) *This lexical conceptual structure is fed through the semantics-to-syntax mapping principles of UG in their language particular instantiation.*
(vi) *The s-structure predicted by step 5 is compared to the observed s-structure.*
(vii) *If they do not match then no learning takes place.*
(viii) *If they do match then the morpheme is entered into the lexicon with the hypothesized lexical conceptual structure.* (Grimshaw 1994: 423).

On such a reconciliation model it is semantics that predicts syntax. Syntax has the role of eliminating the wrong semantic candidates. Semantics leads the child into the semantic content of words. Syntax can only constrain analyses of the semantic structure of a word. For example, it can provide the clue that a certain verb is a change-of-state verb, but it cannot provide information with respect to what kind of change of state it denotes. Syntactic information is also assumed to provide enough structural information to allow the child to infer the meaning of a verb for example, without ever having witnessed a situation that exemplifies the one described by the verb. The implication is that the linguistic input is crucial for the learning of word meanings. Language provides 'information about word meaning which is orders of magnitude more informative than observation of the world can be' and 'by virtue of the grammatical principles that govern it [...] constrains the possible representations of words in ways that learners can exploit in word learning' (Grimshaw 1994:428).

218

5.4.3 A coalition model

We have seen that the acquisition of word meaning implies the existence of a multitude of cues available in the input, which suggests the possibility of an eclectic approach to language development. Hirsh-Pasek and Michnick Golinkoff (1996) propose such an eclectic model which they call **a coalition model of language comprehension.** They start from comprehension which, according to them, plays a central role in the child's construction of mental models. Also, children are able of more linguistic analysis than they reveal in production. The core assumption is that young children use a coalition of cues available in the input in order to cope with language: prosody, semantics, lexical information morphology, social context, environment, semantics and syntax. Throughout development, children are able to analyse input in multiple ways and they weigh the cues differently so that, at various stages, they rely mainly on one of them.

During the first stage (0–9 months) language is processed mainly acoustically. Acoustic packaging is taken as a precursor to linguistic mapping. Children rely on acoustic units in their attempt at segmenting and fusing non-linguistic events. They link acoustics and events. At this stage the child shows a bias for focusing on prosodic information.

During the next stage (9–24 months) children begin to analyse the acoustic units and to map them onto their representations of objects and events. They begin to understand the relationship between sound and meaning, the meaning of certain words, they gradually assign words to their class. They actually begin to map acoustic units onto linguistic units. At this stage, they show a bias for the semantic system.

The third stage (24-36 months) is the time of complex syntactic analysis. Children become aware of interclausal relationships, they can understand passive sentences and binding relations. They can now rely on syntactic information.

What the coalition model actually proposes is that the cues are available in the input all the time. It is only that the child has a bias for focusing on one particular type of cue during the different phases of linguistic development: prosody during the first stage, semantics during the second and syntax during the third:
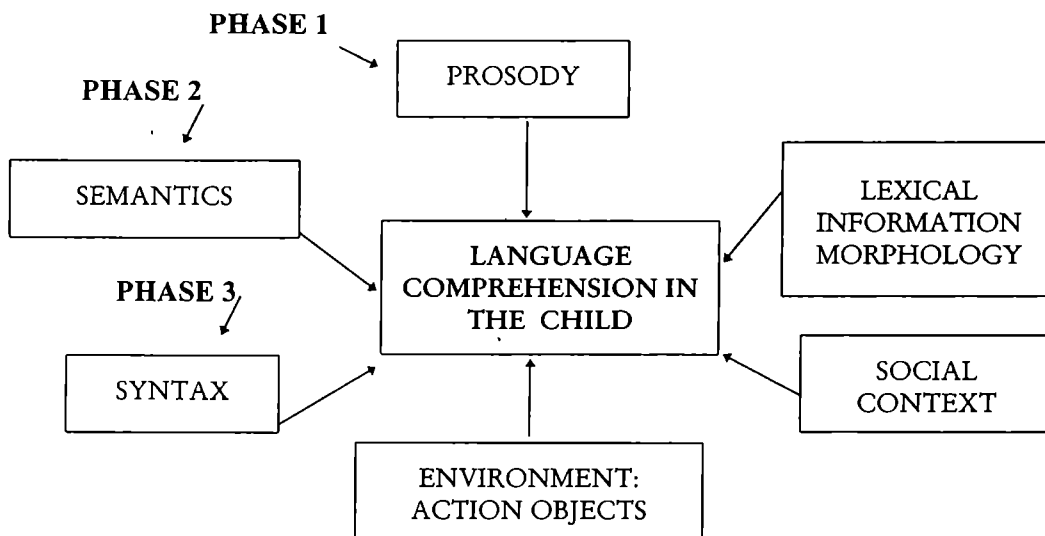
6. Overextension of word meaning

6.1 The question

Once the child has associated the label with a certain meaning, a new task is awaiting: he/she has to extend the label to other similar objects, actions or properties.

How does the child know that the term 'cat', for example, a label for the furry white pet, is an appropriate label for any other cat but not for a dog or a tiger? Although lexical items in early vocabularies are often used with their conventional use, there are also frequent cases of words which are used in a non-adult way, i.e. their meaning is not the conventional one. More often than not, these differences are the result of overextension. Children ascribe a more general meaning to a particular word than adults. The word 'cat' may be extended to other four-legged animals, or the word 'moon' to any other round object. How can one account for the differences between the child and the adult word meaning? What causes overextension of word meaning?

Different answers have been proposed relying, each, on a different theoretical background. In what follows, two possible answers will be briefly presented: the answer provided from the perspective of the semantic feature approach to word meaning and the one relying on the prototype theory.

> Children frequently overextend familiar labels to inappropriate referents.

6.2 A semantic feature account

The componential or feature analysis of word meaning has at its core the idea that there exists a set of semantic primitives which the human mind can use in order to analyse word meaning. For example, the meaning of the word 'cat' can be partially represented by the following features:

(18)   cat

$$\left\{ \begin{array}{l} + \text{ANIMAL} \\ + \text{FELINE} \\ - \text{JUVENILE} \end{array} \right\}$$

Clark (1973) relies on such a componential analysis of word meaning in order to provide a possible developmental story according to which early word meaning may be underspecified. On her account, children (aged 1–2; 6 years) would overextend a term when they have abstracted only a subset of the features that make up its definition, i.e. when they have partial knowledge of the meaning of the word being used. Overextension would be, according to Clark's proposal, due to a matter of competence.

> Children overextend terms because they have abstracted only a subset of the features that define the term.

6.3 A prototype theory account

Rosch (1973,1975) proposes a different approach to word meaning. On this view:

(i)   membership in a natural category is determined by a set of features, strongly associated, which can be more or less criterial, i.e. more or less members of the category can display them;

(ii)   the member of the category which displays the largest number of criterial features is the prototype of the category;

(iii) gradation of membership is allowed along a continuum: some members are more central, they display more criterial features, other members are marginal, displaying a small number of relevant features.

> Children over-extend terms because they pay more attention to different attributes than adults do.

Within such an approach to word meaning, overextension implies an underlying representation of the prototype and the ability to abstract the core features of this prototypical exemplar. It may be that the child pays more attention to different attributes from adults.

220

6.4 A performance account

The two answers briefly sketched above assume that overextension errors are competence errors. If this were the case, one would expect such errors to occur both in comprehension and in performance. However, it has been shown that children may extend in production but they do not do so in comprehension (Fremgen and Fay 1980). An experiment which tested 16 English-speaking children's (aged 1;2-2;2) overextension errors in production and comprehension showed that the same group of children overextended a total of 27 words in production but, on comprehension trials for the words overextended in production, each child indicated the appropriate exemplar.

The results of the experiment suggest that overextensions arise from constraints on linguistic performance. Overextension errors may be caused by difficulty in retrieving the correct word (when the child already knows the word for the inappropriate exemplar) or by 'a lack of vocabulary with the concomitant performance strategy of substituting a word which the child feels is similar enough in meaning to what he wants to express' (Fremgen and Fay 1980:210-211).

SUMMARY

Children acquire words at a tremendous speed in spite of the difficulty of the task. How do they manage to do that, given that relying on mere observation of the extra-linguistic context is not enough? Various hypotheses have been presented:

- they may be limited in their hypotheses by some (innate) constraints
- they may be helped by some constraints which are not language specific
- they may be helped by the linguistic input which they receive
- cognitive abilities, memory, attention span and socialising skills may also help the child in the domain of vocabulary acquisition
- they are able to exploit syntax-semantics mappings or semantics-to-syntax mappings
- they make use of all the cues (prosody, semantics, syntax, extra-linguistic context) available, using them differently at different developmental stages.

Children's early use of certain words may differ from the conventional one. The most frequent type of error is that of overextension. The possible causes of this type of error are:

- a limited vocabulary
- retrieval difficulty
- underspecification of semantic features
- different, non-adult-like importance attached to certain attributes

Acquisition of vocabulary has been shown to be related to both domain-specific and domain-general learning mechanisms.

It has been proposed that the nature of the input plays a more important part in the process of lexical development than it does in the case of syntactic development.

Further reading

General: Bloom (2000) offers a general discussion on the acquisition of word meaning, viewed as a process which implies cognitive abilities used for other purposes. And you can always go back to Pinker (1989, 1994).

Focussed: If you want to find out more about children's creativity in the domain or novel word creation, Clark (1993) is a good choice. It deals with lexical acquisition in a large variety of languages, with a focus on how children use general principles in the analysis and creation of complex word-forms. If you are interested in details of the semantic /syntactic bootstrapping hypotheses, you should then go to Pinker (1989) as well as to the papers mentioned in section 5 of this chapter. Very early lexical acquisition is discussed in Chapters 4 and 5 in Boysson-Bardies (1996, English translation 1999). For insights into the learning of the lexicon in L2 acquisition and a comparison of L1 and L2 acquisition of word meaning, try Juffs (1996).

Textbooks: In Goodluck (1990) you can find a brief presentation of the semantic bootstrapping and the syntactic bootstrapping hypotheses in Chapter 4 – *The Acquisition of Syntax.*

THE ACQUISITION OF TENSE AND ASPECT

THE ACQUISITION OF TENSE AND ASPECT

*'My, my', the man mumbled. 'I know one thing for certain; it's much harder to tell whether you **are** lost than whether you **were** lost, for, on many occasions, where you're going is exactly where you are. On the other hand, you often find that where you've been is not at all where you should have gone, and, since it's much more difficult to find your way back from someplace you've never left, I suggest you go there immediately and then decide.'*
(Norton Juster – *The Phantom Tollbooth*)

KEY POINTS
In this chapter you will find out about:
- **the relationship between tense and aspect morphology in acquisition**
- **the relationship between tense/aspect morphological markers and temporal-aspectual information in early systems**
- **the role of event types in the acquisition of temporal-aspectual systems**

1. Introduction

In previous chapters it was shown that there is an early stage during which children may optionally use the infinitive (in some languages, such as English, German, French or Dutch) or another non-finite form (such as forms with the *-i* suffix in Greek, see Varlokosta, Vainikka and Rohrbacher 1996) in contexts which require the use of a finite (tensed) form. English speaking children produce non-tensed forms like the ones in (1):

(1)   a. *Him gone.*
        b. *Baby do it.*
        c. *Daddy coming.* (Radford 1990: 148)

Most of the accounts of the so-called optional infinitive or root infinitive stage explain this optionality as deriving from the fact that the temporal system has not been fully acquired yet[1].

The child's early clause structure is assumed to be *truncated* (Rizzi 1994) in the sense that at this stage the full array of functional categories has not been yet projected. Specifically, Rizzi proposes that root infinitive clauses are truncated at the TP level and thus lack a Tense projection and any of the dominating functional projections:

---

[1] For details, see *Syntactic Development*, section **4.2**.

(2)

```
      CP
     /  \
        AgrsP
       /   \
          NegP
         /   \
             TP
            /  \
              AgroP
             /   \
                 VP
```

←——————— **absent**
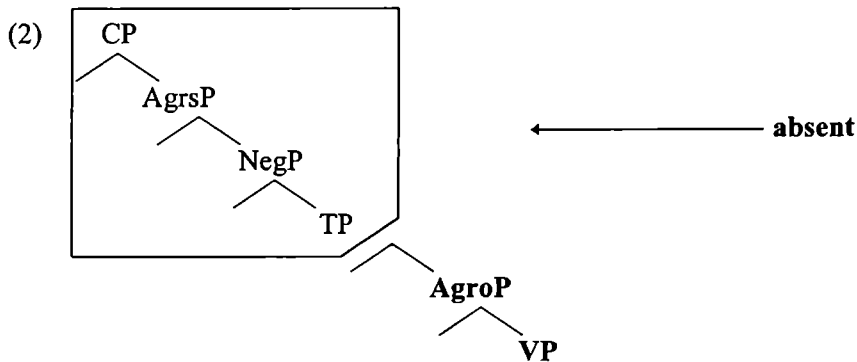
Advocates of the No-Functional Projection Hypothesis (Radford 1990 a.o.) put forth the idea that, at an early stage, the child's grammar lacks any functional projections whatsoever, Tense included. Child clauses are thus assumed to have the status of a VP.

Lack of knowledge of Tense or some sort of deficiency in the tense system has also been invoked by advocates of the Strong Continuity Hypothesis. On such a view, Tense is 'underspecified'. In Wexler (1994), for example, the child CP is assumed to be adult-like during the optional infinitive stage. The child optionally uses non-finite forms in finite contexts simply because Tense has not matured yet.

(3)

```
      CP
     /  \
        AgsP
       /   \
          TP  ——→ has not matured yet
         /  \
         AgroP
        /   \
            VP
```

Early speech lacks overt tense markers.
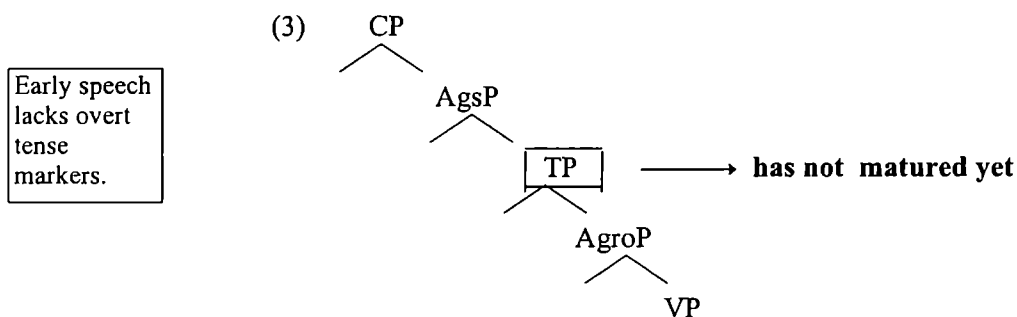
Hoekstra and Hyams (1996) argue that in root infinitives, the Tense chain (which comprises the Complementizer projection and the head of the Tense projection, with Tense being a pronominal variable bound by an operator in C), whose realisation depends on the specification of intermediary functional projections, cannot be established because the intermediary functional position, Number, does not have a specified value. Hence, Tense will be interpreted by reference to context, i.e. to NOW:

(4)

```
            CP
           /  \
  | Number |    \
           \     \——→ does not have a specified value
            TP
```
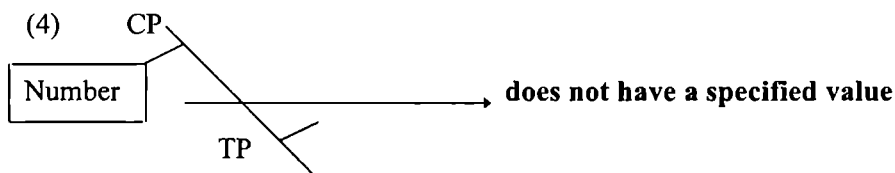
One way or another, the lack of the Tense projection or some deficiency (of knowledge) of Tense is invoked as a possible cause of this phenomenon. **But does the absence of the functional projection Tense, i.e. the lack of overt tense markers, imply that temporal interpretation is also absent or deficient at this stage?**

Boser et al. (1992) and Phillips (1995) propose that the absence of overt marking should be analysed as merely the lack of the phonetic realisation of a specified feature. This might suggest that the lack of overt morphological markers does not automatically imply that temporal meaning is also absent. **If it is the case that young children do have a temporal system, is it identical to the adult's or does it differ from it?**

The examples in (1) show that non-tensed forms, i.e. forms with no overt tense marker, are not restricted to bare infinitives, they can have overt markers of Aspect. This

might suggest that, in languages in which Aspect and Tense are not conflated, Aspect markers emerge earlier than Tense markers. At this stage, the child's projection would then qualify as an Aspect Phrase (AspP):
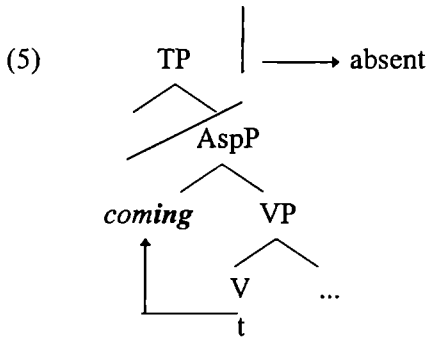
(5) TP | ——→ absent

These data raise at least two questions:

(i) **does aspect morphology emerge earlier than tense morphology?**
(ii) **do early aspect morphemes perform the same function as in adult's grammar?**

It was also said, in previous chapters, that the aspectual marker *–ing* and the past tense morpheme *–ed* are among the first morphemes that enter child English. It has been argued that their early use is associated to semantically well-defined aspectual classes of predicates (see, for example, Bloom et al. 1980, Shirai and Andersen 1995, Olsen and Weinberg 1999).**Could we then reach the conclusion that Aspect (morphological and lexical) and Tense intermingle in early speech? And, if they do, what does the picture of this co-operation look like?**

It has been also assumed in the literature, especially in those studies that follow Piaget's strong determinism position, according to which language acquisition and language use depend on prior acquisition of supportive cognitive structures, that the development of tense expressions in early speech depends on the child's cognitive construction of the time dimension, i.e. children can talk about/understand time only after a certain stage in cognitive development:... *a correct understanding of the child's first past tense forms and their gradual development cannot be obtained unless we place them in relation to their cognitive prerequisites* (Antinucci and Miller 1976:168).

One can then ask the question **whether the meaning encoded in temporal forms is (strictly) based on the child's construction of the cognitive dimension of time.** If this is the case, then we should expect children's early temporal system to be non-adult like in most (if not all) respects.

The present chapter will address the bolded questions stated above. But, before looking at the early temporal-aspectual system, a possible theoretical framework for Tense and Aspect will be briefly presented in the next section.

2. On tense and aspect: a possible analysis

The core theoretical assumption with respect to Tense and Aspect is that they cannot be treated separately. At the level of syntactic representation, they are two links along the same chain: the Tense chain. Following the proposal put forth .in Avram (1999), the Tense chain will be defined as consisting of a Tense operator (T-Op), the head of the Tense projection (TP) in the functional domain, and the head of the Aspect projection (AspP):

(6)　　　　　　T- Operator

TP
　　AspP
　　　　VP
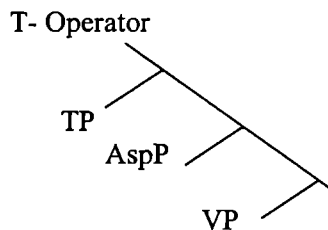
The temporal – aspectual information is provided by the morphological markers associated with the two functional projections TP and AspP.

Semantically, aspect is defined as the domain of the temporal structure of situations (events and states) and their presentation (Smith 1991), i.e. a non-deictic category concerned with the internal temporal constituency of the situation (Comrie 1976). Whereas tense is deictic, placing a situation in time, aspect informs about the contour or the quality of the event or the state as seen by the speaker. Aspectual meaning is a composite of the information provided by the so-called situation-type aspect and the one provided by the so-called viewpoint aspect (Smith 1991). Situation-type aspect is determined by the inherent properties of situations: they can be durative, instantaneous, telic or atelic. This information is actually given by the lexical verb and its arguments, as well as by other complements present in the sentence. Let us briefly analyse the following sentences:

(7)　　*She ate a sandwich in ten minutes.*
(8)　　*She ate ice-cream the whole afternoon.*
(9)　　*She ran in the park.*
(10)　　*She ran to the park.*
(11)　　*She knocked at the door.*

Sentences (7) and (8) differ with respect to their aspectual value, in spite of the fact that they both contain the same lexical verb, *eat*. The direct object in (7), a countable noun, imposes a bounded, telic reading (i.e. the predicate denotes a situation with a natural endpoint). The direct object in (8), a mass term, imposes an atelic value. Sentence (9) describes a dynamic, durative, atelic event. Though in sentence (10) the same verb has been used, *run*, the situation described here is dynamic, durative but telic (because of the meaning of the preposition phrase *to the park*). Sentence (11) describes an instantaneous event given by the meaning of the lexical verb *knock*.

> Tense and aspect are related both notionally and formally and hence cannot be treated separately.

Viewpoint aspect is grammaticised, being signalled by grammatical inflections. For example, in English [*be* + *-ing*] has been analysed as a marker of imperfective viewpoint, signalling that only part of a situation is focused .

One can say that aspect represents an interaction of:

(i)　　the lexical meaning of the verb;
(ii)　　the arguments of the verb (object, subject);
(iii)　　grammatical inflection.

This suggests that aspectual meaning holds for sentences rather than for individual verbs or verb phrases.

In many languages, tenses have a specific viewpoint value. Duration, for example, appears to be a property of both the temporal and the aspectual systems. Also, the conceptual properties of a situation are visible if the situation is placed in time. Aspect and tense are related both notionally and formally[2] and hence they cannot be

---

[2] *The interpretation of tense is a complex affair; particular tense forms can be construed in quite different ways, as determined by a complex interaction of factors, including verbal aspectual class (stative vs. eventive), grammatical aspect (progressive vs punctual), verbal epistemological class (intensional vs. extensional), clause type (complement clause vs. relative clause, finite clause vs infinitive), and scope relations with other tenses* (Stowell 1994:1).

treated separately (Johnson 1981, Bennett 1981, Smith 1991, Stowell 1994, Avram 1996, 1999). This is why we shall adopt the view according to which the analysis of the "flow" of an event should take into account three categories: tense, aspect and existential status (Johnson 1981) which, following the classic analysis of Reichenbach (1947), can be defined as representing three possible combinations for the paired relations among Speech Time (ST), Reference Time (RT) and Event Time (ET).

Tense relates RT to ST:

(i)   *RT prior to ST: past tense value*
(12)   In the last half-hour of 1979, several of her acquaintances attempted to prophesy for the next decade.

(ii)   *ST prior to RT: future tense value*
(13)   They will study syntax next year.

(iii)   *RT simultaneous with ST: present tense value*
(14)   Herds of people are milling around these intersections, waiting for the lights to change.

Aspect relates ET to RT:

(i)   *ET prior to RT: perfective*
(15)   a. They have reached an understanding with respect to bills.
        b. She has never known what he thinks of Liz.

(ii)   *ET including RT: imperfective*
(16)   a. None of us, thought Jane, *is wearing a dress made in France.*
        b. Esther was standing stranded on the black and white marble tiles.

(iii)   *RT prior to ET: imperfective*
(17)   *Tomorrow you will tell me* you have changed your mind.

Existential status relates ET to ST:

(i)   *ET prior to ST: historical status*
(18)   He had had a succession of god hands and won the kitty twice.

(ii)   *ST prior to ET: non-historical status*
(19)   Her nephew is getting married next month.

(iii)   *ST = ET: semi-historical status*
(20)   They are considering going there themselves.

Let us see how these work in the analysis of a particular sentence:

(21) *John had talked to Mary before the party.*
ST= now
RT prior to ST (*-ed*): past tense value
ET prior to RT (*before the party, had*): perfective value
ET prior to ST: the situation has the status of a historical event.

The analysis of the early temporal-aspectual system will have at its core the assumption that tense and aspect cannot be treated separately because they both deal with the temporal structure of situations and their functions are complementary: tense places the event in time, taking an external viewpoint, while aspect presents the internal structure of the event, taking an internal viewpoint. The temporal-aspectual system comprises tense, morphological aspect, situation-type aspect and viewpoint aspect. A second important assumption is that temporal-aspectual meaning holds of whole sentences, and not only of verbs.

The temporal-aspectual system comprises tense, lexical aspect and morpho-logical aspect.

Going back to the Tense chain given in (5), we can conclude that TP is associated with tense markers which indicate the relationship between RT and ST

Temporal-aspectual meaning holds of whole sentences.

whereas AspP is associated with aspectual markers which indicate the relation between ET and RT. The existential status is given along the chain, as a composite of the information provided by the two links, TP and AspP:

(22)   Tense Operator

TP (ST/RT)

AspP (ET/RT)

VP

Existential status:
ST/RT + ET/RT

↓

ET/ST
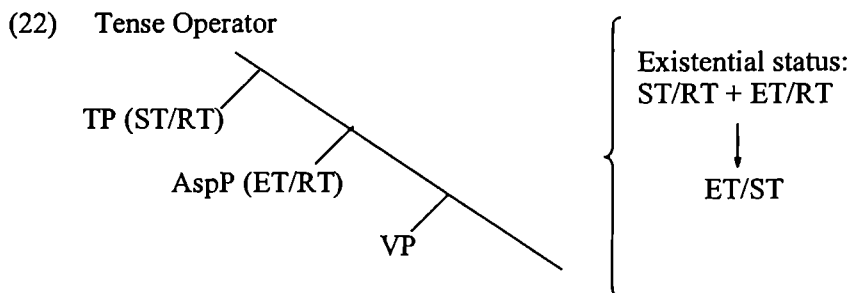
If one adopts such a framework, then the task of the child can be assumed to be that of discovering the lexical aspectual value of VPs, the markers of tense and aspect in the target language and of mapping them onto their semantics. Given the fact that tense and aspect represent links along the same chain, sharing functions with respect to temporal information, one could expect tense and aspect to intermingle from the onset of acquisition.

3. Aspect before Tense?

3.1 The questions

Root infinitives can receive present/past/future interpretation in spite of the lack of overt Tense inflection.

Recent analyses of root infinitives in early child speech have looked at the relationship between tense and aspect in the child's temporal-aspectual system, in particular at the way in which Aspect markers could provide temporal information. One of the puzzling aspects of root infinitive structures is that in spite of the absence of overt Tense markers, they can receive a present, past or future temporal interpretation[3]. This suggests that the absence of morphological markers for Tense does not necessarily point to lack of temporal meaning. But how is this meaning provided?

Data from child Russian support the hypothesis that the temporal interpretation of root infinitives is expressed through the aspectual system (Brun, Avrutin and Babyonyshev 1999). In this case, Aspect markers are used to provide Tense information. Morphological markers of Aspect emerge, then, before Tense markers, but temporal interpretation is available.

Such an assumption is in line with structure building accounts of linguistic development. The Aspect projection is lower in the structure, i.e. closer to the lexical domain, than the Tense projection, and hence we expect Aspect to enter the phrase marker earlier than Tense does:

(23)   TP

AspP

VP

---
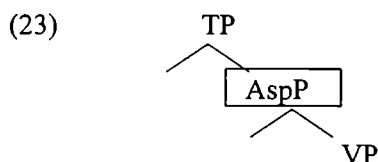
[3] The results and the conclusions of the studies that addressed the issue of the temporal interpretation of root infinitives are, however, non-uniform across languages and, sometimes, in the case of one and the same language. For early Dutch it has been suggested that root infinitives refer mainly to future states of affairs (Hoekstra and Jordens 1994) but also that they can have past, present and future meanings (Behrens 1993). For child German, Ingram and Thompson (1996) argue that the meaning of root infinitives is modal: they would correspond to a sentence which lacks the modal auxiliary.

230

It is also in line with the theoretical framework of tense and aspect adopted in this chapter. Aspect represents, somehow, the border between the lexical and the functional domains of the temporal-aspectual chain, and we can expect early speech to start 'lexical'.

This leads us to another question. Since the term 'aspect' covers both morphological aspect (or viewpoint aspect, Smith 1991) and lexical aspect (Aktionsart or situation-type aspect, Smith 1991), and since some building accounts of linguistic development assume the existence of a lexical stage at the onset of acquisition, could we hypothesise that lexical aspect is acquired before morphological aspect and aspect in general before tense? If this were the case, would it be possible that lexical aspect can be used as a guide to tense interpretation or /and to morphological aspect?

Two questions have been raised:

(i) do children acquire the aspectual system before the tense system of the target language?
(ii) what part does (lexical and grammatical) aspect play in early temporal meaning?

Let us see what answers are available in the literature.

3.2 Early aspect morphemes can provide tense information

In Russian, root infinitives can have present (24), past (25) and future (26) tense interpretation:

(24) *kupat' sya*
      to-bath-imp
      '(He)is bathing.'
(25) *odet'*
      to put on perf
      '(He) has put (the pants) on.'
(26) *pozdravlyat' babucku*
      to-congratulate-imp grandma
      '(I will/want) to congratulate grandma. (Brun et al. 1999: 123–124)

> In child Russian, in the absence of tense inflection, aspectual markers may refer to temporal location.

During the optional infinitive stage, Russian children have acquired knowledge of the aspectual system: they use the morphological markers for perfective and imperfective aspect correctly. The analysis of the corpus provided by transcripts of the spontaneous speech of four Russian monolingual children (aged 1;5–2;5) points to the existence of a strong relationship between the temporal interpretation of root infinitive structures and the type of morphological aspectual marker used in that particular structure. Russian children tend to overwhelmingly use verbs with a perfective marker when they refer to events in the past, and verbs with an imperfective marker when they refer to present situations. In the case of future constructions, there is no correlation between temporal interpretation and morphological markers of Aspect. The data in Table 1 (Brun et al. 1999:128) present the correlation between the aspectual system and temporal interpretation in the analysed transcripts:

Table 1

Correlation between the aspectual system and temporal interpretation

Interpretation	Root infinitives		Finite Verbs	
	Perfective	Imperfective	Perfective	Imperfective
Past	94.6%	5.4%	68.2%	31.8%
Present	1.7%	98.3%	0%	100%
Future	53%	47%	58.2%	41.8%

The table also points to an asymmetry between the use of aspect in infinitival structures and in finite sentences, which suggests that children use the aspectual system in root infinitives to give tense information.

Such data can lead to the conclusion that markers of Aspect emerge earlier than markers of Tense in those languages in which Aspect and Tense have different morphological representation. Aspectual distinction is closely related to the temporal interpretation of the non-tensed forms produced at this early stage.

3.3 Lexical aspect before grammatical aspect?

Children (cross-linguistically) seem to have an early sensitivity to the structure of events as expressed by various classes of predicates. At first sight, this might suggest that they start off with a predetermined set of universal contrasts such as state vs. process, punctual vs. non-punctual (Bickerton 1981, 1984). This idea is put forth in the so-called *language bioprogram hypothesis,* according to which semantic distinctions such as state vs. process or punctual vs. non-punctual are assumed to be biologically programmed, they are innate. The child will accordingly mark verbs denoting states and verbs denoting processes differently from the very onset of acquisition. A weaker variant of this hypothesis is the so-called *basic child grammar hypothesis*, according to which children are endowed with a pre-structured 'semantic space', which contains a set of universal prelinguistic semantic notions, such as the contrast process vs. result (Slobin 1985). At the beginning, children tend to use morphological markers for the past tense or perfective aspective markers to refer only to telic situations, i.e. to situations with a clear result.

Both hypotheses try to account for the acquisition of the temporal-aspectual system by appealing to innate/prelinguistic semantic notions, and they both claim that children restrict the use of certain morphological markers to a subset of predicates for which they are usually used in the adult system, though the latter does not display this restriction. However, there are cross-linguistic differences with respect to how these features are marked linguistically. In Turkish and Greek, for example, one can notice a strong inter-relationship between tense and aspect, on the one hand, and modality on the other (Stephany 1986, Aksu-Koç 1988, 1998). In Russian or Polish, Aktionsart/situation-type aspect is morphologically marked. Such empirical data show that lexical aspect contrasts are differently packaged in different languages. If this is the case, then, can one assume the existence of some universal prelinguistic temporal-aspectual semantic distinctions? Which is the relevance of lexical aspect for the acquisition of grammatical aspect and tense?

Evidence in favour of the early existence of lexical aspect in child language comes from Dutch root infinitives (which admit mainly event-denoting predicates Jordens 1991, Wijnen 1998), English (Olsen and Weinberg 1999) and Chinese (Li and Bowerman 1998).

In child Dutch, event-denoting predicates occur both in finite and non-finite sentences while states are restricted to finite contexts. In the corpus analysed by Wijnen (1998) (four Dutch speaking children, all under 3) over 93% of the temporally interpretable root infinitives contain an eventive verb. The temporal interpretation the most frequently assigned is that of future, but present and past interpretations are also available. This clearly suggests that the temporal reference of Dutch root infinitives depends on the semantic nature of the predicate. The functional projection Tense is absent and, consequently, the temporal interpretation has to rely on context. When non-eventive verbs are used in infinitivals (much more rarely than eventives), their interpretation is mainly future. Non-eventive verbs are better represented in the finite sentences available in the corpus and their temporal interpretation is, more often than not, present. However, past and future time reference is also present. Eventive and non-

---

Sidebar (left margin, upper): Markers of aspect emerge earlier than markers of tense in languages in which tense and aspect have different morphological representation.

Sidebar (left margin, lower): In child Dutch the aspectual class the predicate belongs to determines the temporal interpretation of root infinitives.

232

eventive verbs are equally represented. The experimental data reported in Wijnen (1998) point to a certain distribution pattern: in finite sentences, eventive verbs are more often used with a 'present' interpretation than non-eventive ones. In root infinitives, non-eventive verbs are more often used with a future meaning than eventive verbs. The existence of such patterns leads to the conclusion that it may be the case that the event/non-event contrast is available from the onset of acquisition, and that it may play a part in the temporal interpretation of Dutch children's root infinitivals.

Mandarin Chinese, Japanese and English speaking children are sensitive to associations between classes of predicares and morpho-logical markers of aspect.

Experimental data of child Mandarin Chinese provide further support in favour of the view that lexical aspect is present at an early stage, revealing children's sensitivity to the association between lexical classes of verbs and morphological markers of aspect (Li and Bowerman 1998). Children's comprehension and production of lexical and grammatical aspect was examined in three experiments: (i) a comprehension test that measured children's understanding of morphological aspect markers when combined with verbs belonging to different aspectual classes; (ii) a production test, which investigated children's use of morphological markers of aspect with verbs belonging to different semantic classes, and (iii) an elicited imitation task, that tested children's sensitivity to two specific combinations of 'aspect marker + verb', which do not exist in the adult system[4]. The results obtained in the three experiments provide evidence that Mandarin Chinese-speaking children (aged approx. 3 to 6 years) are sensitive to the association between atelic predicates and imperfective morphological markers (*zai*, *-zhe*, *-ne*) on the one hand, and to the association between telic predicates and the perfective aspect marker (*le*), on the other. Children's early speech shows that the contrast process vs. result is important at an early stage, in accordance with Slobin's basic child grammar hypothesis. However, no results confirmed the predictions of the language bioprogram hypothesis since children did not seem to be sensitive to the contrast punctual vs. non-punctual. Li & Bowerman account for the early sensitivity to the process vs. result contrast in terms of input: children analyse the distribution of the aspect markers in the input which they receive:

> [...] *we believe that it is possible to account for children's early sensitivity to the process result distinction by appealing to leaners' analysis of the distribution of aspect markers in the speech they hear, perhaps as operationalized through connectionist principles* (Li & Bowerman 1998:339).

They invoke studies of early English and early Greek, which provide empirical data that this pattern of association reflects patterns present in the input. Actually, similar claims are made in Shirai & Andersen (1995) for early Japanese and in Aksu-Koç (1998) for child Turkish.

Olsen and Weinberg (1999) examined four CHILDES file sets representing 8 monolingual English speaking children. The longitudinal corpora of child English provide further evidence that children are sensitive to certain associations between lexical and grammatical aspect. Telic verbs correlate with the *-ed* morpheme[5] during all stages of linguistic development, whereas the number of atelic verbs which occur with the same morpheme increases in time. The imperfective marker *-ing* occurs mainly with [+dynamic] and [+ durative] verbs during the early stages. Similar results are reported in Fantuzzi (1996), where the Eve files (Brown 1973, CHILDES) are examined (see **4.2.2**).

Longitudinal observation of Japanese children (Cziko and Koda 1987, Rispoli 1990, Shirai 1998) also point to the fact that children have knowledge of the standard associations between lexical and grammatical aspect (before they acquire

---

[4] (i) progressive marker *zai* with achievements (i.e with telic verbs which do not involve duration or causation, such as the English *find, recognize, spot, notice*) and (ii) the progressive marker *zai* with stative verbs (such as the English *know, believe, love, hate*).

[5] Olsen and Weinberg (1999) treat the *-ed* morpheme as a marker of perfectivity.

tense). Japanese children tend to restrict the use of some morphological markers of tense/aspect to specific aspectual classes of verbs.

In early Brazilian Portuguese the earliest occurrences of the perfective tense forms are with accomplishments and achievements. The imperfect is used later and its first occurrences are with state and activity verbs, i.e. with non-telic ones (De Lemos 1981).

The facts discussed so far suggest that some Aktionsart distinction(s) (eventive/non-eventive or process/result) is/are present from the onset of acquisition, and that it seems that young children are sensitive to the link between lexical aspectual distinctions and morphological aspect, as well as to the link between aspectual contrasts and the temporal interpretation of non-tensed forms.

It is, however, important that this conclusion should not be misunderstood. Firstly, it is not at all clear that the same aspectual distinctions are operative cross-linguistically, i.e. it is not clear that they are universal conceptual primitives. Analyses of corpora of child French do not support Wijnen's (1998) assumption. Secondly, one should not reach the conclusion that lexical aspect is necessarily responsible for tense/aspect interpretation during the early stages of acquisition. Investigations of English-speaking children's comprehension of tense semantics suggest that early comprehension of tense does not depend on lexical aspect information (Wagner 1999).

One more question which Wijnen's assumption raises regards the more general problem of whether the acquisition of tense/aspect may rely on some innate primitive categories.

Experimental data of child Russian seem to lead to the conclusion that the acquisition of aspect is not based on innate primitive categories: ... *aspect acquisition relies on an increasing competence in lexical differentiation of Aktionsarten rather than on a direct linking of conceptual primitives with morphological markers* (Stoll 1998: 352); it is learned. Stoll argues that even if one assumed that some lexical aspectual features such as telicity may play a primitive role in linguistic development, they may be derived from pragmatic competence and hence need not be postulated as innate.

We can tentatively conclude that morphological aspectual markers emerge earlier than tense markers and that children have an early sensitivity to certain event characteristics. The temporal interpretation of early VP or AspP utterances is mainly contextual (it is closely related to the HERE and the NOW) and, in some cases, it may be guided by aspectual markers or by certain salient contrasts such as eventive vs. non-eventive, telic vs. atelic. Temporal interpretation seems to be interwoven, at this stage, with lexical aspect, i.e. with the aspectual class the predicate belongs to, and, in languages which have morphological markers for aspect, with these markers as well. Children are sensitive to certain associations between morphological markers of aspect and lexical aspectual classes.

| The acquisition of aspect may rely on an increasing competence in lexical differentiation of the semantic classes of predicates. |

3.4. Early tense morphemes used to mark aspectual information

3.4.1 The aspect-before-tense hypothesis

| The Aspect-before-Tense Hypothesis: early Tense markers are used to refer to aspectual distinctions and not to temporal location. |

Child language corpora from a variety of typologically different languages (Italian, English, Turkish, Japanese, German, Portuguese, Hebrew) also reveal the existence of a cross-linguistic distribution pattern of Tense morphemes: particular Tense morphemes tend to be used only with certain aspectual classes of predicates in a way which does not parallel the adult pattern. Children's early use of Tense morphology seems to be non-adult like, assuming a certain connection between Tense morphology and the semantics of events. This led to the so-called Aspect-before-Tense Hypothesis which assumes that, before indicating deictic tense notions, Tense markers seem to be used to refer to aspectual distinctions such as stative/non-stative, perfective/imperfective (Bronckart and Sinclair

234

1973, Antinucci and Miller 1976, Aksu-Koç 1988). In the previous section, evidence that lexical aspect can be responsible for temporal interpretation in the absence of tense morphological markers was discussed. In this section, we are going to discuss evidence that early tense markers are associated with certain aspectual distinctions.

3.4.2 Cross-linguistic data

This latter hypothesis is supported by cross-linguistic empirical data of child language, which reveal a strong tendency of restricting the use of (some) past tense markers with telic predicates (i.e. predicates which denote an event that implies an inherent end-point, an event which is bounded, such as *repair, draw a horse, melt, kill*) and the use of present tense markers with atelic predicates (i.e. predicates which denote events that lack an inherent end-point such as *walk, dance, sleep*). During early stages, tense morphemes seem to be used to mark aspectual information.

> Empirical data show that in early speech past tense markers tend to occur with telic verbs and present tense markers with atelic verbs.

Analyses of child English corpora have revealed that, when English-speaking children begin to mark verbs morphologically, they tend to use the -*ed* past tense morpheme[6] only with telic verbs (achievements and accomplishments) (Bloom, Lifter and Tanouye 1977) and the present tense -*s* with durative verbs (Bloom et al. 1977). Also, the progressive marker –*ing* is firstly used to refer to present non-stative events or to achievements used iteratively (Shirai and Andersen 1995).

One can notice a similar pattern in child Italian. According to Antinucci and Miller (1976), one of the first distinctions which Italian children can make is that between stative and non-stative situations. At an early stage, they mark the past participle of transitive verbs for agreement with the object, an agreement pattern which is ungrammatical in adult Italian:

(28) *La signora ha chiusa la porta.* Cf. *La signora ha chiuso la porta.*
The woman has closed-**fem.sg**. the door (fem.sg.)/ the woman has closed the door
'The woman closed the door.'

Such data are taken as strong evidence that the children focus on the result of the action denoted by the verb, using the past participle to describe the end-result. The past tense is taken as having more of an aspectual than of a temporal value: the present state of the object is used in reference to a past telic action:

> ... *the meaning of the child's past tense is at this point rather limited. He is able to encode a past event, but only if it results in a present state. [..] we could say that the past "tense" has more of an aspectual than a temporal value* (Antinucci and Miller 1976:183).

When the child begins to use the *imperfetto* he/she uses it mainly in inventive story telling (use which has also been observed in child Brazilian Portuguese, de Lemos 1981, and in child Greek, Stephany 1986) to denote events in a pretend world. Thus, Italian children seem to use Tense marking to distinguish between real and pretend world. It is only later that they begin to use the *imperfetto* to refer to past atelic situations.

Data from child Turkish (between the age of 21–30 months) provide further evidence in favour of the existence of a cross-linguistic tendency in early child language to use Tense inflections to express aspect (Aksu-Koç 1988). The progressive marker -*Iyor* tends to be used with activities at an early stage, indicating a present 'ongoing'

---

[6] However, see Brown's (1973) analysis of children's early use of tense markers in English: *the American child's use of the past inflection, though it is in principle applicable to past times of whatever remoteness, is in fact used by him at first exclusively for the immediate past* (259). Past tense morphemes are thus taken to mark immediate past tense, not aspect.

event, i.e. aspect. Though in adult Turkish it can combine with both present and past, it is not used in past contexts in child language. The past tense marker -*dI*, which focuses equally on the process and its completion, and which encodes the informational perspective of a direct experiencer (i.e. it encodes the past of direct evidence), is mainly used with telic change of state verbs. Another past tense marker, -*mIş*, which has a perfective meaning, implying that a resultant state has to come into being, and which encodes the informational perspective of an indirect experiencer (i.e. it encodes both perfectivity and inferential past), is acquired later than -*dI*. Its first occurrences show that it is mainly used to refer to existing states.

French-speaking children (aged 2;11–8;7) tend to use the *présent* with inherently durative actions and the *passé composé* (a compound form of past tense) with achievements and accomplishments (Bronckart and Sinclair 1973). The *imparfait* (a past tense form usually associated with incompleteness) is seldom used during the early stages, its development being slower than that of the *passé composé*.

In child Japanese the present progressive forms are restricted to pure process verbs (i.e. verbs which are non-stative both semantically and syntactically) (Cziko and Koda 1987) and the past tense marker -*ta* is predominantly used with achievements (Shirai 1998).

Armon-Lotem (1996, 1998) shows that in Hebrew, a language which lacks syntactic aspect, during the first phase of early verb usage, unaccusative verbs denoting a complete action are used with past tense morphology (29), while the present tense markers occur with verbs denoting activities (30), i.e. atelic situations:

<table>
<tr><td>(29)</td><td>*nafal* 'fell', *nishbar* 'broke', *nigmar* 'finished'</td></tr>
<tr><td>(30)</td><td>*oxel* 'eating', *boxe* 'crying'</td></tr>
</table>

<div align="right">(Armon-Lotem 1998:29)</div>

Can we, on the basis of the empirical facts presented above, reach the conclusion that early child language resorts, cross-linguistically, to tense markers to encode lexical aspectual information?

Advocates of the so-called Aspect-before-Tense Hypothesis (Bronckart and Sinclair 1973, Antinucci and Miller 1976, Aksu-Koç 1988, Shirai and Andersen 1995) assume that there is indeed an early stage during which children use Tense markers to encode aspectual meaning. However, one should note that there are two possible interpretations of the hypothesis. In its strong version, children are not marking tense information at all (Antinuci and Miller 1986, Bronckart and Sinclair 1983). The early temporal system would thus be defective, it would lack the concept of temporal location and differ from the adult norm. In its weak interpretation (called by Shirai and Andersen 1995 The Aspect Hypothesis), it only states that past tense morphemes occur predominantly with telic verbs and that lexical aspect 'guides' the child's application of tense morphology (see also Olsen and Weinberg 1999). Nothing is said about the lack/the presence of a deictic system.

Some linguists explicitly adopt the view that the child learns aspect and tense together (Bloom, Lifter and Hafitz 1980, Harner 1981, Rispoli and Bloom 1985) but that aspect can influence the acquisition of tense marking:

> *This claim does not require that children's use of aspect marking becomes fully developed before they learn tense distinctions, or even separate and sequential development of the two. Both systems develop together, but aspect is an early determining factor* (Bloom and Harner 1989: 211).

But, for any of the above variants, one still has to account for the developmental shift from this aspect-for-tense stage to the adult system. How does the child get rid of this tense-for-aspect grammar?

<div style="border:1px solid black; padding:4px; width:200px;">

The Aspect-before-Tense hypothesis: (i) strong version- children do not mark temporal information at all; (ii) weak version: lexical aspect guides early appli- cation of Tense morphology but the existence of a temporal system is not denied.

</div>

236

3.4.3 Accounts of the developmental shift from tense-for-aspect to the adult temporal system

3.4.3.1 Cognitive development accounts

It has been suggested that the development of the temporal-aspectual system closely follows the child's cognitive development. Before the age of 6, children pay more attention to particular rather than to more general characteristics of situations or objects. They are limited to an egocentric view of the world, they cannot 'decentre' and hence are able to talk mainly about the 'here' and the 'now'. After the age of 6, during the so-called operational stage, children are able to deploy complex activities. Most importantly, relational thinking develops during this stage.

> Differences related to cognitive development can account for the differences between early temporal systems and the adult norm.

Cromer (1968), Bronckart and Sinclair (1973), Antinucci and Miller (1986) adopt this view in their analyses of temporal-aspectual development. Cromer (1968) suggests that English-speaking children use few temporal structures before the age of 6 because of their egocentric view of the world.

Antinucci and Miller (1986) argue that at the beginning of acquisition, which would correspond to Piaget's pre-operational stage[7], the child's capacity to represent past events is limited: he/she can only encode past events which have a clear resultative value, i.e. when they result in a present observable end-state. In order to be able to represent a past event, the child needs a concrete link between the NOW and the action, i.e. an observable result. That is why Italian children use the *passatto prossimo* (a compound form of past tense) first only with telic predicates, over-marking the resultative value with non-adult agreement between the verb and the direct object. The capacity of representing past events expands via different cognitive routes and the child will gradually use the *passatto prossimo* with all types of predicates.

> Children can initially refer only to past events which have a clear resultative value.

Bronckart and Sinclair (1973) propose that, during the pre-operational cognitive stage, young children mark aspectual distinctions because they refer to properties of particular events; during this stage children tend to pay more attention to particular rather than to more general characteristics. They will begin to use different verb forms indicating tense only during the operational cognitive stage, when relational thinking develops.

Such accounts, however, are not without problems. On the one hand, they cannot explain why children do use various temporal forms before the age of 6, i.e. before the operational stage. There is experimental evidence that young children have good knowledge of temporal concepts (Wagner 1999) and can use past tense markers in the absence of end-results (Di Paolo and Smith 1978, Harner 1981). On the other hand, they cannot explain the existence of similar developmental patterns with respect to the acquisition of tense and aspect in adult second language acquisition, i.e. in the case of learners who are past their operational stage.

> Children tend to mark aspectual distinctions because they pay more attention to particular characteristics of events.

3.4.3.2 Environmentally driven accounts

Shirai and Andersen (1995) and Aksu-Koç (1998) take the distribution of past tense morphemes in the linguistic input provided by caretakers as a possible cause of the distributional pattern observed in early speech. They adopt the distributional bias hypothesis which claims that adult speakers tend to use past tense inflections more frequently with telic predicates than with atelic ones. On such a view, the child's mappings resemble the linguistic input which he/she receives. The distributional pattern observed in caretakers' speech is taken to account, at least partially, for the pattern

> The early 'past tense inflection-telic verb/ present tense inflection-atelic verb' pattern actually reflects the linguistic input which the child receives.

---

[7] But see Weist (1981) where it is argued that Piaget does not actually state that the pre-operational stage or the sensorimotor one is a period when the child lacks the ability to talk about past and future events. This period seems rather a time when children acquire the capacity to represent temporal concepts syntactically and hence to express deictic relationships.

observed in early speech. The analysis of the input received by the three English children (Adam, Eve, Naomi, Brown corpus, CHILDES) whose speech was examined by Shirai and Andersen (1995), lend support to this 'input' hypothesis. All the mothers used past tense inflections more frequently with telic verbs (Andersen and Shirai 1995:751):

Table 2

Inherent aspect with past tense inflection in mother's speech

	State	Activity	Accomplishment	Achievement
Adam's mother	17%	8%	11%	67%
Eve's mother	13%	7%	21%	59%
Naomi's mother	12%	18%	12%	23%

Further evidence comes from the input Turkish children receive. Aksu-Koç (1998) examined the frequency of tense and aspect inflections and their distribution with various lexical classes of verbs in a mother and child conversation. The Turkish mother uses the past tense morpheme *-dI* most frequently with achievement verbs (70%) and the present/imperfective morpheme *-Iyor* most frequently with activity verbs (61%). However, in the child language corpus, the preference for the pattern of distribution detected in the adult input is stronger (Aksu-Koç 1998: 265):

Table 3

Distribution of *-dI* and *-Iyor* in the mother's and child's speech

		State	Activity	Accomplishment	Achievement
-dI	Mother	6%	8%	16%	70%
	Child	3%	6%	7%	84%
-Iyor	Mother	21%	61%	9%	9%
	Child	18%	67%	7%	7%

How can one account for this stronger tendency detected in child speech if one assumes that the early distributional pattern reflects the adult norm? Besides reflecting the input, the child's tendency to restrict one inflection to one aspectual class may suggest that 'the child tends to simplify the pattern in the input, to carve herself an operational space to figure out how the system to which she is exposed works' (Aksu-Koç 1998:277)[8]. Gradually, children extend the use of tense morphemes to all the classes of predicates. What 'guides' them in this shift?

Andersen and Shirai (1995) propose an explanation of this developmental shift in terms of the prototype theory (Rosch 1973, 1978). Early tense marking is analysed as having three relevant features: [+ telic], [+ punctual], [+ result], which the child treats as prototypical. In the beginning, he/she will only associate the past tense markers with those predicates which share the same set of features, i.e. he/she tends to represent events in their prototypical aspect. Gradually, the child will extend the category boundary and make non-canonical aspectual choices. He/she will begin to use the tense inflection with other, more marginal members of the category, as is the adult norm.

The prototypes of past tense and perfective aspect are very similar, if not identical, which makes it very difficult to state whether it is the case that early past tense morphemes encode aspectual features or tense features. This analysis, according to which telicity and pastness share a prototypical representation, leads to a confusion with regard to the dimension which the past tense morpheme targets, and hence significantly weakens the validity of the aspect before tense hypothesis in its strong variant.

> A prototype explanation: the child begins with a prototypical representation of events, making non-canonical aspectual choices at a later stage.

---

[8] Notice that this is very much in the spirit of Weissenborn's (1990) Principle of Minimal Structure.

3.4.3.3 Continuity accounts

3.4.3.3.1 A performance explanation

McKee and Emiliani (1993) re-examine the data from Italian children that Antinucci and Miller (1976) used to demonstrate that the early temporal system is different from that of the adult. McKee and Emiliani argue that the children's speech is, actually, consistent with the target grammar. This hypothesis is supported by the results of an elicited production task which show that, in spite of some clitic omissions, children have knowledge of clitics and of object agreement in *passato prossimo* clitic and non-clitic constructions. They also have correct knowledge of subject-participle agreement. The agreement pattern analysed by Antinucci and Miller as non-adult is assumed, on this view, to be consistent with the adult norm, which allows the past participle in *passato prossimo* configurations to agree with the object when a clitic object is placed in preverbal position (31) but disallows it when an full DP object is used in post-verbal position (32) :

> A performace account: children seem to mark only aspectual distinctions because, for performance reasons, they omit auxiliaries and clitics.

(31)   *Ho preso le calze.*
       have-1st pers. sg. taken the socks

(32)   *Le o prese io.*
       clitic-them-fem.pl. have-1st pers.sg. taken-**fem.pl** I

The utterances discussed in Antinucci and Miller are argued not to be deviant from the target, they are only incomplete (they lack an overt clitic); the agreement pattern does show that the clitic is there: 'Briefly, we think it likely that even the youngest children's object agreement only occurred where clitic objects were intended' (McKee and Emiliani 1993). It is for performance reasons (limitations on utterance length, developing lexicons, interactions with stress) that early utterances seem different from the norm.

3.4.3.3.2 A subset principle account

In line with the Continuity Hypothesis, Olsen and Weinberg (1999) argue that the asymmetry between the use of the English *-ed* morpheme in child and adult speech does not reveal the existence of different organisational principles in the two grammars. The temporal systems of early speech and of the adult are assumed to be constrained by the same principles. The differences observed between the two are accounted for in terms of the syntactic Subset Principle, in accordance with which children, when forced to choose from a set of possible hypotheses, will start with the most restrictive option, which may differ from the option available in the target language but does not violate UG. Then, on the basis of the positive data provided by the linguistic input, they will relax the initial restrictive option and will switch to the one which is appropriate with respect to the target, i.e. to the option which matches the input.

> A Subset Principle account: children begin with the most restrictive option with respect to the mapping between tense/aspect inflection and aspectual features.

They adopt the analysis of aspect put forth in Olsen (1997) (which follows mainly the theory of aspect in Smith 1991), according to which the aspectual classification of verbs is taken to operate on the level of semantic features, as shown in the table below (Olsen and Weinberg 1999: 531):

Table 4

Lexical aspect

Aspectual class	Telic	Dynamic	Durative	Examples
State			+	Know, have
Activity		+	+	March, paint
Accomplishment	+	+	+	Destroy
Achievement	+	+		Notice, win
Semelfactive		+		Jump, tap

The features marked with '+' are the only ones which may be used as determinants of the core behaviour of the members of each class. Grammatical aspect interferes with these features and can thus be restricted or unrestricted in predictable ways. Since the child's early options are guided by the Subset principle, he/she will have to choose the most restrictive option with respect to the mapping between grammatical tense/aspect inflection and aspectual features. A very restrictive option is the one of Chinese, where imperfective affixes are restricted to events, and the one in Korean, where the perfective is restricted to verbs which have the feature [+telic]. Both Chinese and Korean are UG possible options. The child will initially assume that these restrictions can apply to the target language as well: 'So children assume as an initial hypothesis in all languages that the imperfective is restricted to [+dynamic] and [+durative] verbs and the perfective to [+telic] predicates.' (Olsen and Weinberg 1999: 533). If this hypothesis is not appropriate for the target language, the child will see, gradually, that the positive data disconfirm this initial option and will relax it, allowing, for example, the English past perfective morphemes to occur with all the lexical classes of verbs. On such a view, the input helps the child to switch to the adult state.

Their hypothesis is supported by the data in four CHILDES file sets of child English, which provide evidence that children initially choose the most restrictive option, i.e. the most restrictive relationship between grammatical morphemes and lexical aspect. The use of -ed, for example, is initially restricted to [+telic] verbs but gradually, on exposure to adult data, the constraint is relaxed and the children adopt a less restrictive alternative: the number of atelic verbs which appear with -ed increases as they mature.

4 Early tense systems do not lack tense

4.1 The deficient tense hypothesis

> Children use tense inflection to refer to temporal location.

The empirical data presented in the previous section only show that children show a preference for certain patterns of distribution of early tense morphemes, they do not actually provide evidence that at an early stage the child uses only this pattern nor that he/she lacks the ability to code deictic relationships. We have seen that as early as the optional infinitive stage, the root infinitive structure can receive present, future and past tense interpretation, in spite of the absence of explicit tense markers. Children seem to have a basic temporal orientation before the onset of tense marking which suggests that they develop time concepts independently of their encoding of tense by inflection.

Also, as Shirai and Andersen (1998), among many others, point out, because telicity and pastness, on the one hand, and atelicity and presentness, on the other, share a prototypical representation, it is difficult to state what exactly a child targets when using a certain tense morpheme. Also, since temporal interpretation also implies aspectual information, it is difficult to tear tense and aspect apart. In some languages, tense and aspect can be marked by one single marker and they can also interfere with modality (see, for example, the case of Greek, Aksu-Koç 1988).

> The deficient tense hypothesis: the early temporal system is simpler: it lacks RT, but it is deictic.

There is evidence both from early corpora of child speech and from experiments that young children use and/or comprehend past tense morphology in the absence of an end result in various languages, such as English (Di Paolo and Smith 1978, Wagner 1999), Serbo-Croat (Radulović, cited in Weist et al. 1984), Polish (Weist et al.1984) and Russian (Gvozdev, cited in Weist et al. 1984). Such data led researchers (Weist et al.1984, Smith and Weist 1987, Fantuzzi 1996, Weist et al. 1997) to conclude that children can assign tense meaning to tense morphology, a point of view radically different from the one supported by advocates of the aspect-before tense hypothesis. The differences between the child's temporal-aspectual system and the adult's are accounted for as deriving from a fragile temporal system: 'young children have not yet securely

240

mapped tense concepts onto tense morphology' (Wagner 1999:716), which is deficient or limited because it lacks flexible RT and hence embedding possibilities (Smith 1980). Briefly, on such a view, the child's temporal system is deviant with respect to the adult norm but it is, however, a deictic system: 'The child system is simpler but not different in organization from the adult: both have the essential property of relating a time to an orientation time by simultaneity or sequence' (Smith 1980:265). It is not the case that tense inflection codes aspectual information. Contrasts in tense and contrasts in aspect emerge simultaneously (Weist et al. 1984).

Let us call this the deficient-tense hypothesis and let us see how the deficiency of the early system has been analysed.

Smith (1980), Weist et al. (1984), Smith and Weist (1987), Fantuzzi (1996), Matsuo and Hollebrandse (1999) propose that the child's early temporal system is simpler in terms of organisation than the adult's. According to a by now traditional analysis of tense, which goes back to Reichenbach (1947), it is assumed, as already discussed in this chapter, that tense implies three distinct relationships: Speech time (ST) – Reference time (RT), ST- Event time (ET) and ET-RT.

The child's early temporal system is limited to the relationship between ET and ST. At this stage, RT is always established at ST, it is "fixed". The child can refer to times other than the present, but only from the point of view of ST, i.e. of NOW. The system involves the basic relational values of simultaneity and sequence, but only with respect to this "fixed" point of orientation. The lack of a flexible RT can explain why embeddings are not possible during this stage (Matsuo and Hollebrandse 1999, Hollebrandse 1998). Aspectual contrast is also present. Time adverbials are rarely used though their presence in the input seems to be relevant for a correct comprehension of temporal values (Wagner 1999). The ability to refer to events from more than one perspective develops gradually, in stages:

> *What develops gradually is the ability to refer to events from more than one aspectual perspective. It is also necessary for the two parts of the temporal reference system (time order and aspect) to integrate with each other* (Smith 1980: 266).

4.2 Two early temporal systems

4.2.1 The case of German

In what follows two developmental 'stories' of two different temporal systems will be sketched. One story looks at data from child English, the other one to data from child German. They both assume that early temporal systems are deictic.

Behrens (1993) examines the acquisition of the past tense by seven monolingual Geman children (aged 1;0 -4;0) and takes the longitudinal data to reveal the existence of three phases of development with respect to the past tense:

Phase I: all the children (with one single exception) used non-finite forms and a few finite forms. However, in spite of the lack of overt tense marking, children already had a basic temporal orientation: they could refer to past and future events.

Phase II: during this stage all the children could use the present tense paradigm and non-finite past participles. The bare past participle (33) and the copula preterite (34) are the first overt markers of past tense (at about age 2):

(33)   *fasche tunken*
        bottle drunken

(34)   *ba waden* (=ba waren)
        we were for a walk

(Behrens 1993:67)

Phase III: all the children acquired complex predicates, notably the Perfekt (a compound form of past tense which requires the use of an auxiliary). The finite auxiliary emerged about 2-3 months after the first markers of past tense:

(35)   *Puppa ist putegange.*
        doll is broken

(Behrens 1993: 68)

The preterite emerges simultaneously with the past participle and Perfekt constructions. However, at this stage, the predominant markers for the past tense remain the past participle and the Perfekt construction. The preterite and the pluperfect (which emerges later) have a marginal role, though the preterite is the standard form used with modals and copulas.

Though one can detect a certain tendency of using the past tense with telic verbs, this preference is not exclusive. German children do not rely on resultativity as a semantic basis for the acquisition of the past tense. Tense morphemes are used not only to refer to aspectual distinctions but also to genuine temporal reference.

4.2.2 The case of English

Fantuzzi (1996) analyses the Eve files (Brown 1973, CHILDES) with respect to the acquisition of tense. Different stages are observed:

Stage I: most verbs are not inflected for tense, but their temporal meaning is clear from the context. The past tense and progressive inflections emerge at this stage and are used to contrast perfected past events with imperfective present events. The past tense morpheme *-ed* is mainly used with non-durative verbs (*fell, forgot, broke*) while the progressive marker *–ing* occurs mainly with durative ones *(swimming, banging, lying down)*.

Fantuzzi (1996) tries to account for the optional use of tense markers in terms of the deficient tense hypothesis. His core proposal is that at this early stage the temporal system is underspecified: RT is missing. Tense morphemes, when used, refer only to the relationship ET-ST, i.e. they differ from the adult system, where they indicate the relationship RT-ST. Progressive vs. non-progressive aspect is also distinguished:

(36)

```
                   TP
                  /  \
        E=S          Aspect
        E<S           /  \
        E>S      + progr   VP
                 – progr
```
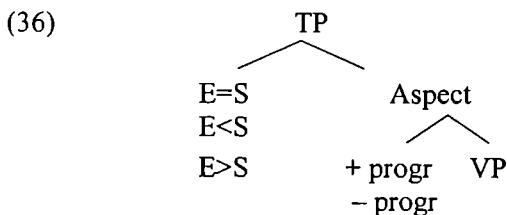
As long as RT is absent, the use of tense morphemes is optional: 'The obligatory use of tense morphemes in English follows from the establishment of a third reference point and the construction of complex tense structures with syntactic dependencies' (p. 201).

Stage II: at this stage, there is clear evidence that the system is deictic:

(37)   *I write right there* (for a completed event)
(38)   *I go write* (for intention)

(39)   *I writing* (for action in progress)
(Fantuzzi 1996: 208)

Stage III: a third reference point is established: RT. However, the use of auxiliaries and tense inflection is still optional. This suggests that the temporal system is not yet fully adult-like, it does not involve syntactic dependencies between CP and TP in complex clauses. This will only be attained in the next stage.

The two developmental analyses lead to the same conclusion: early temporal systems are deictic before the emergence of overt tense markers. The first overt tense inflections do not refer (only) to aspectual distinctions but to temporal relationships. This conclusion is also supported by experimental data: 16- and 20-month-old English speaking children do include information about temporal order in their representation of experienced event sequences (Bauer and Mandler 1989).

Telicity or resultativity do not seem to be important for the acquisition of tense marking. Such a view is also supported by experimental data regarding children's comprehension of present, past and future tense in telic and atelic contexts (Wagner 1999). The results of the experiment, which tested monolingual English-speaking children (younger than 4) show that the lexical aspect of the predicate does not influence children's comprehension of tense morphology, providing evidence that there are not strong conjectures relating semantic features such as resultativity or telicity to tense morphology.

The child' s system differs from the adult's in terms of simplicity. Early temporal systems lack RT and hence the syntactic dependencies between CP and TP.

Both cases lend support to the deficient tense hypothesis without denying, however, that there is an early connection between lexical aspect and grammatical morphemes of tense and aspect.

SUMMARY

In this chapter the following core issues regarding the acquisition of tense and aspect have been addressed:

- the existence/the absence of an early temporal system
- the emergence of aspect before tense
- innateness and lexical aspect
- the early temporal-aspectual system: is it adult-like in most/all respects?

The following tentative generalisations have been provided:

- morphological markers of aspect seem to emerge earlier than morphological markers of tense, at least in languages in which tense and aspect have different markers. In the absence of tense markers, the markers of aspect can refer to temporal location.

- Lexical aspect can also be associated with temporal interpretation at an early stage and one can also notice an early awareness of the relationship between lexical and grammatical aspect.

- Early tense markers may provide aspectual information .

- The empirical data as well as the available analyses are contradictory with respect to the innateness of aspectual contrasts as well as with respect to the relevance of lexical aspect for the acquisition of the temporal-aspectual system. However, most of the data suggest that children are sensitive to certain associations between lexical classes of verbs or between certain aspectual contrasts and morphological markers of aspect/tense.

243

- There exists an early deictic temporal-aspectual system which differs from the adult one; it is limited to the relationship between ET and ST. At early stages, RT is always established at ST.

Further reading

Focussed: If you are interested in the acquisition of the Sequence of Tenses, Hollebrandse (1998) presents a challenging hypothesis. If you want to focus on the acquisition of tense-aspect functional elements, Stromswold (1990) is a comprehensive dissertation on learnability and the acquisition of auxiliaries. For data from particular languages, you can go to the references in this chapter.

Textbooks: If you are interested in a very brief presentation of the acquisition of tense and aspect, Goodluck (1991) is a good choice (pp. 128–130).

REFERENCES

ABNEY, S., 1987. *The English Noun Phrase in its Sentential Aspect.* Doctoral dissertation, MIT.

AITCHISON, J., 1988 'All paths lead to the mental lexicon'. In S. Flynn, W. O'Neil (eds.) *Linguistic Theory in Second Language Acquisition* (pp.346–361), Dordrecht/Boston/London: Kluwer.

AKSU-KOÇ, A., 1988. *The Acquisition of Aspect and Modality: The Case of Past Reference in Turkish,* Cambridge: Cambridge University Press.

AKSU-KOÇ, A., 1998. 'The role of input vs. universal predispositions in the emergence of tense-aspect morphology: evidence from Turkish', *First Language 18: 255–80.*

ALDRIGE, M.,1989. *The acquisition of INFL,* Bloomington: Indiana State University Linguistics Club.

ALEGRE, M., P. GORDON, 1996a. 'Recursion in Children's Word Formation: An Examination of "Exceptions" to Level Ordering'. Ms. University of Pittsburg.

ALEGRE, M., P. GORDON, 1996b. 'Red rats eater exposes recursion in children's word formation', *Cognition* 60:65–82.

ANDERSON, S. R., 1982. 'Where is morphology?', *Linguistic Inquiry* 13:571–612.

AMBALU, D., S. CHIAT, T. PRING, 1997. 'When is it best to use a verb? The effects of the timing and focus of verb models on children's learning of verbs', *Journal of Child Language* 24: 25–34.

ANTINUCCI, F., R. MILLER, 1976. 'How children talk about what happened', *Journal of Child Language* 3:167–189.

ARMON-LOTEM, S., 1996. 'What early Hebrew verb teaches us about root infinitives'. In *Proceedings of 1995 Gala Conference,* Groningen.

ARMON-LOTEM, S., 1998. 'Agreement mismatches and the economy of derivation'. In B. Hollebrandse (ed.), *University of Massachusetts Occasional Papers in Linguistics,* Volume 22: *New Perspectives on Language Acquisition,* 27–35.

ATKINSON, M., 1985. 'How Linguistic is the One Word Stage?' In Barrett, M.D. (ed.) *Children's Single-Word Speech,* New York: Wiley.

ATKINSON, M., 1992. *Children's Syntax. An Introduction to Principles and Parameters Theory,* Oxford, UK/Cambridge, USA: Blackwell.

ATKINSON, M., 1996. 'Now, hang on a minute: some reflections on emerging orthodoxies'. In H. Clahsen (ed.) *Generative Perspectives on Language Acquisition* (pp. 451–486), Amsterdam: John Benjamins.

AU, T.K., M. DAPRETTO, Y. SONG, 1994. 'Input vs. constraints: early word acquisition in Korean and English', *Journal of Memory and Language* 33: 567–582.

AU, T.K., M. GLUSMAN, 1990. 'The principle of mutual exclusivity in word learning: to honor or not to honor?, *Child Development* 61:1474–1490.

AVRAM, L., 1993. 'On lexical and functional categories', *Revue Roumaine de Linguistique* 6: 517–525.

AVRAM, L., 1996. *The Functional Categories of English,* unpublished course of lectures, University of Bucharest.

AVRAM, L., 1999. *Auxiliaries and the Structure of Language,* Editura Universității București.

AVRUTIN, S., 1997. *Discourse-based analyses of root infinitives',* Ms.

BACIU, I., 1998. *Word Formation in English,* Editura Universității București.

BAKER, C. L., 1979. 'Syntactic theory and the Projection Problem', *Linguistic Inquiry* 10: 533–581.

BAKER, C. L., J. J. McCARTHY, 1981. *The Logical Problem of Language Acquisition,* Cambridge, Mass.: MIT Press.

BATES, E., L. BENIGNI, I. BRETHERTON, L. CAMAIONI and V. VOLTERRA, 1979. *The Emergence of Syntactic Cognition and Communication in Infancy,* New York: Academic Press.

BATES, E., B. MacWHINNEY, 1987. 'Competition, variation and language learning'. In MacWhinney, B. (ed.) *Mechanisms of Language Acquisition* (pp. 157–193), Hillsdale, NJ: Lawrence Erlbaum Associates.

BAUER, P. J., J. M. MANDLER, 1989. One thing follows another: effects of temporal structure on one- to two-year-olds' recall of events', *Developmental Psychology* 25: 1–8.

BEHRENS, H., 1993. 'The Relationship between conceptual and linguistic development: the early encoding of past reference by German children'. In *CLS 29,* vol. II , 63–75.

BEHRENS, H., 1994. *Temporal Reference in German Child Language.* Doctoral dissertation, University of Amsterdam.

BELLETTI, A., 1990. *Generalized Verb Movement,* Torino: Rosenberg & Sellier.

BELLUGI, U., 1971. 'Simplification in children's language'. In Huxley, R. and Ingram, E. (eds.) *Language Acquisition: Models and Methodology,* New York: Academic Press.

BELLUGI, U., S. MARKS, A. BIHRLE, H. SABO, 1993. 'Dissociation between language and cognitive functions in Williams syndrome'. In D. Bishop, K. Mogford (eds.) *Language Development in Exceptional Circumstances* (pp. 177–189), Hove (UK)/ Hillsdale (USA): Lawrence Erlbaum Associates.

BENNETT, M., 1981. 'On tense and aspect: one analysis'. In *Syntax and Semantics* 14, 13–29.

BERKO, J., 1958. 'The child's learning of English morphology', *Word* 14: 150–177.

BERMAN, R., 1988. 'Word class distinctions in developing grammars'. In Levy et al. (eds.) *Categories and Processes in Language Acquisition*, London: Erlbaum.

BERWICK, R.,1985. *The Acquisition of Syntactic Knowledge*, Cambridge, Mass.: MIT Press.

BERWICK, R., P. NIYOGI, 1996. 'Learning from Triggers', *Linguistic Inquiry* 27(4): 605–622.

BICKERTON, D., 1981. *Roots of Language*, Ann Arbor, Karoma.

BICKERTON, D., 1984. 'The language bioprogram hypothesis', *Behavioral and Brain Sciences* 7: 173–221.

BLOOM, L., 1970. *Language Development: Form and Function in Emerging Grammars*, Cambridge, Mass.: MIT Press.

BLOOM, L., K. LIFTER, E. TANOUYE, 1977. 'Semantic organisation of verbs in child language and the acquisition of grammatical morphemes'. Ms.

BLOOM, L., K. LIFTER, J. HAFITZ, 1980. 'Semantics of verbs and the development of verb inflection in child language', *Language* 56: 386–412.

BLOOM, L., L. HARNER, 1989. 'On the developmental contour of child language: a reply to Smith and Weist', *Journal of Child Language* 16: 207–216.

BLOOM, P., 1990. 'Subjectless sentences in child grammar', *Linguistic Inquiry* 21: 491–504.

BLOOM, P., 1994. 'Possible names: The role of syntax-semantics mappings in the acquisition of nominals', *Lingua* 92:297–329.

BLOOM, P., 2000. *How Children Learn the Meanings of Words*, Cambridge, Mass./London, England: MIT Press.

BLOOM, P., D. KELEMEN, 1995. 'Syntactic cues in the acquisition of collective nouns', *Cognition* 56: 1–30.

BLOOMFIELD, L., 1933. *Language*, New York: Holt, Rinehard and Winston.

BOBALJIK, J. D.,1997. *Morphosyntax: the Syntax of Verbal Inflection*, Doctoral Dissertation, MIT.

BONET, E., 1991. *Morphology after Syntax: Pronominal Clitics in Romance*, Doctoral Dissertation, MIT.

BORER, H., B. ROHRBACHER, 1998. 'Minding the absent: arguments for the full competence hypothesis.' Ms.

BORER, H. and WEXLER, K., 1987. 'The maturation of syntax'. In T. Roeper and E. Williams (eds.) *Parameter Setting*, Dordrecht: Reidel.

BOSER, K., LUST, L., SANTELMANN, L., WHITMAN, J., 1992. 'The Syntax of V2 in early German Grammar: The Strong Continuity Hypothesis', *Proceedings of the North Eastern Linguistic Society 22*. Amherst, Mass.: Graduate Linguistic Student Organization.

BOYSSON-BARDIES, B.de, 1999. *How Language Comes to Children. From Birth to Two Years*, Cambridge, Mass./ London, England: MIT Press (French version 1996).

BOWERMAN, E., 1976. 'Semantic factors in the acquisition of rules for word use and sentence constructions'. In D. M. Morehead & A. E.Morehead (eds.) *Normal and Deficient Child Language*, Baltimore:University Park Press.

BOWERMAN, M,. 1982. 'Evaluating competing linguistic models with language acquisition data: implications of developmental errors with causative verbs', *Quaderni di Semantica* 3: 5–66.

BRAINE, M.D.S., 1971. 'On two types of models of the internalization of grammars'. In D.I.Slobin (ed.) *The Ontogenesis of Grammar: A Theoretical Symposium*, New York: Academic Press.

BROMBERG, H.S., K. WEXLER, 1995. 'Null subjects in wh-questions', *MIT Working Papers in Linguistics* 26: 221–248.

BRONCKARD , J.P., H. SINCLAIR, 1973 'Time, tense, and aspect', *Cognition* 2:107–130.

BROWN, R., 1973. *A First Language: The Early Stages*, Cambridge: Cambridge University Press.

BROWN, R., C. HANLON, 1970. 'Derivational Complexity and Order of Acquisition of Syntax'. In J. Hayes (ed.) *Cognition and the Development of Language*, New York: Wiley.

BRUN, D., S. AVRUTIN, M. BABYONYSHEV, 1999. 'Aspect and its temporal interpretation during the optional infinitive stage in Russian.' In A Greenhill, H. Littlefield, C. Tano (eds.) *Proceedings of the 23rd Boston University Conference on Language Development*, 120–131.

BUDWIG, N., 1989. 'The linguistic marking of agentivity and control in child language', *Journal of Child Language* 16:263–284.

BURNS, T., N. N. SOJA, 1995. 'The case of NP-type nouns: support for semantic theories of acquisition'. In E.V.Clark (ed.) *Proceedings of the Twenty-Sixth Annual Child Language Research Forum* (pp. 22–31), Center for the Study of Language and Information.

BYBEE, J., 1985. *Morphology: A Study of the Relation between Meaning and Form*, Amsterdam: Benjamins.

BYBEE, J., 1991. 'Natural morphology: the organization of paradigms and language acquisition'. In T. Huebner, C. Ferguson (eds.) *Crosscurrents in Second Language Acquisition and Linguistic Theories* (pp. 67–92), Amsterdam: John Benjamins.

CAREY, S. 1993. 'Ontology and meaning – two contrasting views'. In E. Dromi (ed.) *Language and Cognition: A Developmental Perspective* (pp. 88–103), Norwood, NJ: Ablex Publishing Corporation.

CARLSON, G., 1977. *Reference to Kinds in English*. Doctoral Dissertation, University of Massachusetts.

CARLSON, G., M. Tanenhaus 1988. 'Thematic Roles and Language Comprehension' . In W. Wilkins (ed.) *Thematic Relations*, New York: Academic Press.

CARROLL, S., 1999. 'Input and SLA: adults' sensitivity to different sorts of cues to French gender', *Language Learning* 49 (1): 37–92.

CHIEN,Y.-C., K. WEXLER, 1990. 'Children's knowledge of locality conditions on binding as evidence for the modularity of syntax and pragmatics', *Language Acquisition* 1: 225–295.

CHOI, S., A. GOPNIK, 1995. 'Early acquisition of verbs in Korean: a cross-linguistic study', *Journal of Child Language* 22: 497–529.

CHOMSKY , N., 1959. A Review of B.F. Skinnner's *Verbal Behavior, Language* 35: 26–58.

CHOSMKY, N., 1965. *Aspects of the Theory of Syntax*, Cambridge Mass.: MIT Press.

CHOMSKY, N., 1970. 'Remarks on nominalization'. In R. Jacobs, P.Rosenbaum(eds.) *Readings in English Transformational Grammar* (pp. 184–221), Waltham Mass.: Ginn.

CHOMKSY, N., 1971. 'Deep structure, surface structure and semantic interpretation.' In D. D.Steinberg., L.A. Jacobovits (eds.) *Semantics*, Cambridge: Cambridge University Press.

CHOMKSY, N,. 1972. *Language and Mind*, New York: Harcourt Brace Jovanovich.

CHOMKSY, N., 1980. *Rules and Representations.* New York: Columbia University Press.

CHOMSKY, N., 1981. *Lectures on government and binding*, Dordrecht: Foris.

CHOMSKY, N., 1986. *Knowledge of Language: Its Nature, Origin and Use*, New York: Praeger.

CHOMSKY, N., 1987. *Language and other cognitive systems.* Paper presented at Sophia University, Tokyo.

CHOMSKY, N., 1988. *Language and Problems of Knowledge. The Managua Lectures*, Cambridge, Mass.: MIT Press.

CHOMSKY, N., 1989. 'Some notes on economy of derivation and representation'. *MIT Working Papers in Linguistics 10, Functional Heads and Clause Structure*, 43–74.

CHOMSKY, N., 1992. 'A minimalist program for linguistic theory', MIT Occasional Papers in Linguistics 1.

CHOMSKY, N., 1993. 'A minimalist program for linguistic theory'. In K. Hale, S.J.Keyser (eds.) *The View from Building 20* (pp. 1–52), Cambridge, Mass.: MIT Press.

CHOMSKY, N., 1995. *The Minimalist Program*, Cambridge, Mass.: MIT Press.

CHOMSKY, N., 1997. 'New Horizons in the Study of Language', MIT class lecture.

CHOMSKY, N., 1998. 'Minimalist inquiries', Ms. MIT.

CHOMSKY, N., 2000. *New Horizons in the Study of Language and Mind*, Cambridge, UK: Cambridge University Press.

CHOMSKY, N. and LASNIK, H., 1993. Chapter 1 in Chomsky (1995).

CHOMSKY, N., G. MILLER, 1963. 'Introduction to the formal analysis of natural languages'. In R. Duncan Luce, R.R.Bush, E. Galanter (eds.) *Handbook of Mathematical Psychology*, vol. II, 269–322, New York: Wiley.

CLAHSEN, H., 1989 . 'The grammatical characterization of dysphasia', *Linguistics* 27: 897–920.

CLAHSEN, H., 1990. 'Constraints on parameter-setting. A grammatical analysis of some acquisition stages in German child language', *Language Acquisition* 2: 361–391.

CLAHSEN, H., 1992. 'Learnability theory and the problem of development in language acquisition'. In J. Weissenborn, H. Goodluck, T. Roeper (eds.) *Theoretical Issues in Language Acquisition* (pp. 53– 76), Hillsdale, NJ: Lawrence Erlbaum Associates.

CLAHSEN, H. and MUYSKEN, P., 1986. 'The availability of Universal Grammar to adult and child learners. A study of the acquisition of German word order', *Second Language Research* 2 :93–119.

CLAHSEN, H., M. PENKE, 1992. 'The acquisition of agreement morphology and its syntactic consequences. New evidence on German child language from the Simone corpus'. In J. Meisel (ed.) *The Acquisition of Verb Placement, Functional Categories and V2 Phenomena in Language Acquisition*, Dordrecht: Kluwer.

CLAHSEN, H., M. ROTHWEILER, 1992. 'Inflectional rules in children's grammars: evidence from German participles'. In G. Booij, J.van Marle (eds.) *Yearbook of Morphology*, 1–34.

CLAHSEN , H., ROTHWEILER, M., WOEST, A., MARCUS, G., 1992. 'Regular and irregular inflection in the acquisition of German noun plurals', *Cognition* 45: 225–255.

CLAHSEN, H., S. EISENBEISS, M. PENKE, 1996. 'Lexical learning in early syntactic development. In H. Clahsen (ed.) *Generative Perspectives on Language Acquisition* (pp. 129–160), Amsterdam: John Benjamins.

CLARK, E. V., 1973. 'What's in a word? On the child's acquisition of semantics in his first language'. In T. E. Moore (ed.) *Cognitive Development and the Acquisition of Language* (pp. 65–110), New York: Academic Press.

CLARK, E. V., 1982. 'The young word-maker: A case study of innovation in the child's lexicon'. In E.Wanner, L.R.Gleitman (eds.) *Language Acquisition: The State of the Art* (pp. 390–425), Cambridge: Cambridge University Press.

CLARK, E., 1983. 'Meanings and concepts'. In J. H. Flavell, E. M. Markman (eds.) *Handbook of Child Psychology:* Vol. 3. *Cognitive Development* (pp. 787–840), New York: Wiley.

CLARK, E. V., 1987. 'The principle of contrast: a constraint on language acquisition'. In B. MacWHINNEY (ed.), *Mechanisms of Language Acquisition.* Hillsdale, N. J.: Erlbaum.

CLARK, E.V., 1991. 'Acquisitional principles in lexical development'. In S. A. Gelman, J. P. Byrnes (eds.) *Perspectives on Language and Thought. Interrelations in Development* (pp.31–71), Cambridge: Cambridge University Press.

CLARK, E.V., 1993. *The Lexicon in Acquisition*, Cambridge: Cambridge University Press.

CLIFTON, P., D. F. LOEB, S. REDMOND, L. Z. RICHARDSON, 1995. 'When do children acquire verbs?' In E.V. Clark (ed.) *The Proceedings of the 26th Annual Child Language Research Forum* (pp. 60–93), CSLI Publications.

COLLINS, C., 1997. *Local Economy,* Cambridge, Mass.: MIT Press.

COMRIE, B., 1976. *Aspect: An Introduction to the Study of Verbal Aspect and Related Problems*, Cambridge: Cambridge University Press.

COOK, V., 1988. *Chomsky's Universal Gammar: An Introduction*, Oxford: Blackwell.

CORNILESCU, A., 1995. *Concepts of Modern Grammar.* Bucureşti: Editura Universităţii Bucureşti.

CRAIN, S., 1991. 'Language acquisition in the absence of experience', *Behavioral and Brain Sciences* 14: 597–650.

CRAIN, S., C. McKEE, 1986. 'Acquisition of structural restrictions on anaphora'. In S. Berman, J-W. Choe, J. McDonough (eds.) *Proceedings of the North Eastern Linguistic Society* 16: 94–110, Amherst, Mass.: GLSA.

CRAIN, S., D. LILLO-MARTIN, 1999. *An Introduction to Linguistic Theory and Language Acquisition*, Malden, Mass./Oxford, UK : Blackwell.

CRAIN, S., M. NAKAYAMA, 1987. 'Structure dependence in grammar formation', *Language* 63: 522–543.

CRAIN, S., R. THORNTON, 1991. "Recharting the course of language acquisition: studies in elicited production". In N. A. Krasnegor, D. M. Rumbaugh, R. L. Schiefelbusch, M. Studdert-Kennedy (eds.) *Behavioral Foundations of Language Development* (pp. 321–337), Hillsdale, NJ: Lawrence Erlbaum Associates.

CRAIN, S., R. THORNTON, 1998. *Investigations in Universal Grammar: A Guide to Experiments on the Acquisition of Syntax and Semantics*, Cambridge, Mass.: MIT Press.

CRISMA, P., 1992. 'On the acquisition of wh-questions in French'. Ms. Geneva University.

CROMER, R., 1968. 'The development of temporal reference during the acquisition of language', Doctoral dissertation, University of Texas.

CRYSTAL, D., 1985. *A Dictionary of Linguistics and Phonetics*, Oxford/New York: Blackwell.

CURTISS, S., 1977. *Genie: A Psycholinguistic Study of a Modern-Day "Wild Child"*, New York: Academic Press.

CURTISS, S., 1988. 'Abnormal language acquisition and the modularity of language'. In F. J. Newmeyer (ed.) *Linguistics: The Cambridge Survey*. Vol. 2: *Linguistic Theory: Extensions and Implications*, Cambridge, UK: Cambridge University Press.

CZIKO, G. A., K. KODA, 1987. 'A Japanese child's use of stative and punctual verbs', *Journal of Child Language* 14:99–111.

DEPREZ,V., A. PIERCE, 1993.'Negation and Functional Projections in Early Grammar', *Linguistic Inquiry* 24: 25–67.

DEWITT, J. E., 1995. 'How a word-learning principle might interact with metalinguistic knowledge and input'. In E. V. Clark (ed.) *Proceedings of the 26th Annual Child Language Research Forum* (pp. 159–166), Center for the Study of Language and Information.

DRESCHER, E., 1998. 'Charting the learning path: cues to parameter setting', *Linguistic Inquiry* 29.

DRESCHER, E., J. KAYE, 1990. 'A computational learning model for metrical phonology', *Cognition* 34: 137–195.

DROMI, E., 1987. *Early Language Development*, Cambridge: Cambridge University Press.

DROMI, E. (ed), 1993. *Language and Cognition. A Developmental Perspective*, Norwood, NJ: Ablex Publishing Corporation.

DUȚESCU-COLIBAN, T., 1983. *The Grammatical Categories of English*, București: Tipografia Universității din București.

EMONDS, J., 1976. *A Transformational Approach to Syntax,* New York: Academic Press.

FANTUZZI, C., 1993. 'Core grammar and the acqusition of verbal aspect'. In K. Beals, G. Cooke, D. Kathman, S. Kita, K-E. McCullough, D. Testen (eds.) *CLS 29*, Vol. II, 125–138.

FANTUZZI, C, 1996. 'The acquisition of tense and temporal reference'. In A.Stringfellow, D. Cahana-Amitay, E. Hughes, A. Zukowski (eds.) *Proceedings of the 20th Annual Boston University Conference on Language Development,* vol. I, 201–212.

FELIX, S., 1984. 'Maturational aspects of Universal Grammar'. In A. Davies, C. Cripper, A. Howatt (eds.) *Interlanguage,* (pp. 133–161). Edinburgh: Edinburgh University Press.

FELIX, S., 1987. *Cognition and Language Growth*, Dordrecht: Foris.

FELIX, S., 1988. 'Universal Grammar in language acquisition', *Canadian Journal of Linguistics* 33: 367–393.

FELIX, S., 1992. 'Language acquisition as a maturational process'. In J. Weissenborn, H. Goodluck, T. Roeper (eds.) *Theoretical Issues in Language Acquisition* (pp. 25– 51), Hillsdale, NJ.: Lawrence Erlbaum Associates.

FENSON, L., P. S. DALE, J. S. REZNICK, E. BATES, D. THAL, S. J. PETHICK, 1994. 'Variability in early communicative development'. *Monographs of the Society for Research in Child Development* 59.

FERDINAND, A., 1996. *The Acquisition of the Subject in French*. Doctoral dissertation, HIL/Leiden University.

FISHER, C. L., 1995. 'Who's the subject? Structural guides for verb learning'. In E.V.Clark (ed.) *The Proceedings of the 26th Annual Child Language Research Forum* (pp. 42–59), Center for the Study of Language and Information.

FISHER, C. L., D. G. HALL, S. RAKOWITZ, L. GLEITMAN, 1994. 'Why it is better to receive than to give: syntactic and conceptual constraints on vocabulary growth', *Lingua* 92: 333–375.

FLETCHER, P., T. TARDIF, Z. ZHI-XIANG, L. WEI-LAN, 2001. 'Early lexical learning in Mandarin: evidence from parent report'. Poster presented at ELA 2001, Lyon.

FODOR, J. A., 1983. *The Modularity of Mind*, Cambridge, Mass.: MIT Press.

FODOR, J. D., 1989. 'Principle-based learning', *CUNY Forum* 14: 59–67, Graduate Center, CUNY.

FODOR, J. D., 1998. 'Unambiguous Triggers', *Linguistic Inquiry* 29(1): 1–36.

FREMGEN, A., D. FAY, 1980. 'Overextensions in production and comprehension: a methodological clarification', *Journal of Child Language* 7: 205–211.

FRIEDEMANN, M. A., 1993/1994. 'The underlying position of external arguments in French: A Study in adult and child grammar', *Language Acquisition* 3(3): 209–255.

FRIEDEMANN, M. A., 2000. 'Early French post-verbal subjects'. In M. A.Friedemann, L. Rizzi (eds.) *The Acquisition of Syntax: Studies in Comparative Developmental Linguistics* (pp. 63–83), Longman.

FROMKIN, V., 1997. 'Some thoughts about the brain/mind/language interface', *Lingua* 100:3–27.

GANGER, J., S. PINKER, E. G. WALLIS, 1997. 'Genetic contributions to vocabulary development'. Poster presented at the Biennial Meeting for the Society for Research in Child Development, Washington, DC.

GELDEREN, V., I. VAN DER MEULEN, 1998. 'Root infinitives in Russian: evidence from acquisition'. Ms. Leiden University.

GENTNER, D., 1982 . 'Why nouns are learned before verbs: linguistic relativity versus natural partitioning'. In S. A. Kuczaj (ed.) *Language Development*, volume II: *Language, Thought and Culture*, Hillsdale, NJ: Lawrence Erlbaum Associates.

GENTNER, D., M. IMAI, 1995. 'A Further examination of the Shape bias in early word learning'. In E. V. Clark (ed.) *The Proceedings of the 26th Annual Child Language Research Forum* (pp. 167–176), Center for the Study of Language and Information.

GERKEN, L. A., 1991. 'The metrical basis for children's subjectless sentences', *Journal of Memory and Language*, 30, 431–451.

248

GERKEN, L. A., B. J. McINTOSH, 1993. 'Interplay of function morphemes and prosody in early language', *Developmental Psychology* 29: 448–457.

GIBSON, E., K.WEXLER, 1994. 'Triggers', *Linguistic Inquiry* 25 (3): 407–454.

GILLETTE, J. A., L. R. GLEITMAN, 1995. 'Effects of situational cues on the identification of nouns and verbs'. Ms.

GLEITMAN, L., 1990. 'The structural sources of verb meaning', *Language Acquisition* 1: 3–55.

GLEITMAN, L., 1993. In *The Human Language Series*. Part 2: *Acquiring the Human Language*, New York: Ways of Knowing Inc.

GLEITMAN, L., J. GILLETTE, 1995. 'The role of syntax in verb learning'. In P. Fletcher , B. MacWhinney (eds.) *The Handbook of Child Language*, Blackwell.

GLEITMAN, L., H. GLEITMAN, B. LANDAU, E. WANNER, 1988. 'Where learning begins: initial representations for language learning'. In F. Newmeyer (ed.) *Linguistics:The Cambridge Survey*, Vol. 3 (pp.150–193), Cambridge, England: Cambridge University Press.

GLEITMAN, L., E. NEWPORT, H.GLEITMAN, 1984. 'Language acquisition: the state of the state of the art'. In E.Wanner, L.Gleitman (eds.) *Language Acquisition: the State of the Art* (pp.3–48), New York: Cambridge University Press.

GOODLUCK, H., 1991. *Language Acquisition. A Linguistic Introduction*, Oxford: Blackwell.

GOODLUCK, H., Roeper, T., (eds.) *Theoretical Issues in Language Acquisition. Continuity and Change in Development*, Hillsdale: Erlbaum, 249–267.

GRIMSHAW, J., 1991. 'Extended Projections'. Ms. Brandeis University.

GRIMSHAW, J., 1994. 'Lexical reconciliation', *Lingua* 92: 411–430.

GOPNIK, M., 1990. 'Feature blindness: A case study', *Language Acquisition* 1:139–164.

GOPNIK, A., S. CHI, 1995. 'Names, relational words, and cognitive development in English and Korean speakers: nouns are not always learned before verbs'. In Tomassello, M., W. E. Merriman (eds) *Beyond Names for Things*, Hillsdale, NJ: Lawrence Erlbaum Associates, 63–80.

GORDON, P., 1985. 'Level-ordering in lexical development', *Cognition* 21:483–503.

GOTTFRIED, G. M., 1997a. 'Using metaphors as modifiers: children's production of metaphoric compounds, *Journal of Child Language* 24:567–601.

GOTTFRIED, G. M., 1997b. 'Comprehending compounds: evidence for metaphoric skill?', *Journal of Child Language* 24:163–186.

GREENFIELD, P., J. SMITH, 1976. *The Structure of Communication in Early Language Development*. New York: Academic Press.

GRIMSHAW, J., 1981. 'Form, function and the language acquisition device'. In C. L. Baker, J. J. McCarthy (eds.) *The Logical Problem of Language Acquisition* (pp. 165–182), Cambridge, Mass.: MIT Press.

GRIMSHAW, J., 1989. 'Getting the dative alternation'. In I. Laka, A. Mahaajan (eds.) *Functional heads and clause structure* (pp. 113–122), *MIT Working Papers in Linguistics 10*.

GRIMSHAW, J., 1993. 'Minimal projection heads and optimality', Ms. Rutgers University.

GRIMSHAW, J., 1994. 'Lexical reconciliation', *Lingua* 92:411–430.

GRODZINSKY, Y., T. REINHART, 1992. The innateness of binding and coreference', *Linguistic Inquiry* 24:69–101.

GRUBER, J. S., 1967. 'Topicalisation in child language', *Foundations of Language* 3:37–65.

GUASTI, M.T. 1993/1994. 'Verb syntax in Italian child grammar: finite and non-finite verbs', *Language Acquisition* 3:1–40.

GUÉRON, J., T. HOEKSTRA, 1995. 'The temporal interpretation of predication'. In *Syntax and Semantics* 28:77–107.

GUILFOYLE, E., 1984. 'The Acquisition of tense and the emergence of lexical subjects', *McGill Working Papers in Linguistics*, McGill University.

GUILFOYLE, E., M. NOONAN, 1988. 'Functional categories and language acquisition'. Paper presented at Boston University Conference on Language Development.

HAAN, G. de, 1986. 'A theory-bound approach to the acquisition of verb placement in Dutch'. In G. de Haan, W. Zonneveld (eds.) *Formal Parameters of Generative Grammar 3*, 15–30, University of Utrecht.

HAEGEMAN, L., 1990. 'Non-overt subjects in diary contexts'. In J. Mascaro, M.Nespor (eds.) *Grammar in Progress*, Foris: Dordrecht.

HAEGEMAN, L., 1991/1994. *Introduction to Government and Binding Theory*, Oxford: Blackwell.

HAEGEMAN, L., 1995 'Root null subjects and root infinitives in early Dutch'. In C. Koster, F. Wijnen (eds.) *Proceedings of the GALA 1995* (pp. 239–250), Groningen: Center for Language and Cognition.

HAEGEMAN, L., 1995. 'Root infinitives, tense, and truncated structures in Dutch', *Language Acquisition* 4(3): 205–255.

HAEGEMAN, L., 2000. 'Adult null subjects in non pro-drop languages'. In M. A. Friedemann, L. Rizzi (eds.) *The Acquisition of Syntax: Studies in Comparative Developmental Linguistics* (pp. 129–168), Longman.

HALE, K., S.J. KEYSER, 1993. 'On argument structure and the lexical representation of syntactic relations'. In Hale, K., S. J. Keyser (eds.) *The View from Building 20*. Cambridge, MA: MIT Press.

HALLE, M., A. MARANTZ 1993. 'Distributed Morphology and the pieces of inflection'. In K. Hale, S. J. Keyser (eds.) *The View from Building 20* (pp. 111–176), Cambridge, Mass.: MIT Press.

HALLE, M., K. P. MOHANON, 1985. 'Segmental phonology of modern English', *Linguistic Inquiry* 16, 57–116.

HAMBURGER, H., 1980. A deletion ahead of its time', *Cognition* 8: 389–416.

HAMANN, C. , K. PLUNKETT, 1998. 'Subjectless sentences in child Danish', *Cognition* 69:35–72.

HAMANN, C., L. RIZZI, U. H. FRAUENFELDER, 1996. 'On the acquisition of subject and object clitics'. In H. Clahsen (ed.) *Generative Perspectives on Language Acquisition* (pp. 309–334), Amsterdam: John Benjamins.

HARNER, L., 1981. 'Children talk about the time and aspect of action', *Child Development* 52: 498–506.

HARRIS, T., K. WEXLER, 1996. 'The optional infinitive stage in child English. Evidence from negation'. In Clahsen, H. (ed.) *Generative Perspectives on Language Acquisition* (pp. 1–42), Amsterdam: John Benjamins.

HARRIS, T., T. HOEKSTRA, 1996. The optional infinitive stage in child English: evidence from negation'. In H. Clahsen (ed.) *Generative Perspectives on Language Acquisition*, Amsterdam: John Benjamins.

HEIM, I., 1982. *The Semantics of Definite and Indefinite Noun Phrases*, Doctoral dissertation, University of Massachusetts.

HIRSH-PASEK, K., R. MICHNICK GOLINKOFF, 1996. *The Origins of Grammar. Evidence from Early Language Comprehension*, Cambridge, Mass./London, England: MIT Press.

HIRSH-PASEK, K., R. TREIMAN, M. SCHNEIDERMAN, 1984. 'Brown and Hanlon revisited: mothers' sensitivity to ungrammatical forms', *Journal of Child Language* 11: 81–89.

HOEKSTRA, T., N. HYAMS, 1998 'Aspects of root infinitives', *Lingua* 106:81–112.

HOEKSTRA, T., N. HYAMS, M. BECKER, 1996. The underspecification of Number and the licensing of root infinitives', *Proceedings of the 20th Boston University Conference on Language Development*, 293–306.

HOEKSTRA, T., P JORDENS, 1994. 'From adjunct to head'. In T. Hoekstra & B.D.Schwartz (eds.) *Language Acquisition Studies in Generative Grammar*, Amsterdam: John Benjamins.

HOLLEBRANDSE, B., 1998. 'On the relation between the acquisition of theory of mind and sequence of tense'. In A. Greenhill, M. Hughes, H. Littlefield and H. Walsh (eds.) *Proceedings of the 22nd Annual Boston University Conference on Language Development*, 374–384.

HORNSTEIN, N., D. LIGHTFOOT, 1981. Introduction. In N. Hornstein, D. Lightfoot (eds.) *Explanations in Linguistics: the Logical Problem of Language Acquisition* (pp. 9–31), London: Longman.

HUANG, J., 1984. 'On the distribution and reference of empty pronouns', *Linguistic Inquiry* 15:531–574.

HUBEL, D. H., T. N. WIESEL, 1962. 'Receptive fields, binocular interactions and functional architecture in the cat" visual cortex', *Journal of Physiology* (London), 106–154.

HUBEL, D. H., T. N. WIESEL, 1970. 'The period of susceptibility to the physiological effects of unilateral eye closure in kittens', *Journal of Physiology* (London) 206:419–436.

HURFORD, J. R., 1991. 'The evolution of the critical period in language acquisition', *Cognition* 40:159–201.

HUXLEY, R., 1970. 'The development of the correct use of subject personal pronouns in two children'. In G. B. Flores d'Archais, W. J. M. Levelt (eds.) *Advances in Psycholinguistics* (pp. 141–165), Amsterdam: North-Holland.

HYAMS, N., 1986. *Language Acquisition and the Theory of Parameters*, Dordrecht: Reidel.

HYAMS, N., 1992. 'A reanalysis of null subjects in child language'. In J. Weissenborn, H. Goodluck, T. Roeper (eds.) *Theoretical Issues in Language Acquisition*, Hillsdale, NJ: Lawrence Erlbaum Associates.

HYAMS, N., 1994. 'Commentary: null subjects in child language and the implications of cross-linguistic variation'. In B. Lust, G. Hermon, J. Kornfilt (eds.) *Syntactic Theory and First Language Acquisition*, vol. 2 (pp. 287–299), Hillsdale, NJ: Lawrence Erlbaum Associates.

HYAMS, N., 1996. The underspecification of functional categories in early grammar'. In Clahsen, H. (ed.) *Generative Perspectives on Language Acquisition* (pp. 91–127), Amsterdam: John Benjamins.

IMAI, M., D.GENTNER, 1997. 'A cross-linguistic study of early word-meaning: universal ontology and linguistic influence', *Cognition* 62: 169–200.

IMAI, M., E. HARYU, 1999. 'Word learning without aid from syntax: How do Japanese children learn proper nouns and common nouns?' In A Greenhill, H. Littlefield, C. Tano (eds.) *Proceedings of the 23rd Boston University Conference on Language Development*, vol. 1, 277–288.

INGHAM, R. L., 1998. 'Tense without agreement in early clause structure', *Language Acquisition* 7(1): 51–81.

INGRAM, D., W. THOMSON, 1996. 'Early syntactic acquisition in German: evidence for the modal hypothesis', *Language* 72(1): 97–120.

JACKENDOFF, R. S., 1987. 'The status of thematic relations in linguistic theory', *Linguistic Inquiry* 18:369–411.

JACKENDOFF, R. S., 1990. *Semantic Structures*, Cambridge, Mass.: MIT Press.

JACKENDOFF, R. S., 1994. *Patterns in the Mind*, New York: Basic Books.

JAEGGLI, O., K. SAFIR, 1989. ' The null subject parameter and parametric theory'. In O. Jaeggli, K. Safir (ed.) *The Null Subject Parameter*, Dordrecht: Reidel.

JAKOBSON, R., 1941. *Child Language, Aphasia, and Phonological Universals*

JOHNSON, K., LAPPIN, 1997. 'A critique of the minimalist program', *Linguistics and Philosophy* 20(3):273–333.

JOHNSON J., E. L. NEWPORT, 1993. 'Critical period effects in L2 learning: the influence of maturational state on the acquisition of English as a second language'. In M. H. Johnson (ed.) *Brain Development and Cognition*, Blackwell.

JOHNSON , M. R., 1981. 'A unified temporal theory of tense and aspect'. In *Syntax and Semantics* 14, 145–168.

JONAS, D., 1995. 'On the acquisition of verb syntax in child Faroese'. In C.T. Schütze, J. Ganger, K.Broihier (eds.) *Papers on Language Processing and Acquisition, MIT Working Papers in Linguistics* 26, 265–280.

JORDENS, P., 1991. 'The acquisition of verb placement in Dutch and German', *Linguistics* 28: 1407–1448.

JUFFS, A., 1996. *Learnability and the Lexicon. Theories and Second Language Aquisition Research*, Amsterdam/ Philadelphia: John Benjamins.

JUSCZYK, P. W., K. HIRSH-PASEK, D. G. KEMLER NELSON, L. J. KENNEDY, A. WOODWARD, J. PIWOZ, 1992. 'Perception of acoustic correlates of major phrasal units by young infants', *Cognitive Psychology* 24: 252–293.

250

KARMILOFF-SMITH, A., 1991. 'Beyond modularity: innate constraints and developmental change'. In S. Carey, R. Gelman (eds.) *Epigenesis of the Mind: Essays in Biology and Knowledge*, Hillsdale, NJ: Lawrence Erlbaum Associates.

KARMILOFF-SMITH, A., 1992. *Beyond Modularity: A Developmental Perspective on Cognitive Science*, Cambridge, Mass.: The MIT Press.

KAYNE, R., 1989. 'Notes on English agreement'. Ms. CUNY.

KERN, S., S. GONNAND, 2001. 'Lexicon development in French-speaking toddlers'. Paper presented at ELA 2001, Lyon.

KIM, J., PINKER, S., PRINCE, A. & PRASADA, S., 1991. ' Why no mere mortal has ever flown out to center field', *Cognitive Science* 15: 173–218.

KIM, J., MARCUS, G. F., PINKER, S. HOLLANDER, M. & COPPOLA, M., 1994. 'Sensitivity of children's inflection to grammatical structure', *Journal of Child Language* 21: 173–209.

KIPARSKY, P., 1982. 'Lexical phonology and morphology'. In I. S. Yang (ed.) *Linguistics in the morning calm*. Seoul: Hansin.

KIPARSKY, P., 1983. 'Word-formation and the lexicon'. In F. Ingemann (ed.) *Proceedings of the 1982 Mid-America Linguistics Conference*. Lawrence, KS: University of Kansas.

KIPARSKY, P., L. MENN, 1977. 'On the acquisition of phonology'. In J. MacNamara (ed.) *Language Learning and Thought*, New York: Academic Press.

KLIMA, E., U.BELLUGI, 1964. 'Negation in English'. In J. A.Fodor, J. J.Katz (eds.) *The Structure of Language: Readings in the Philosophy of Language*, Eaglewood Cliffs, NJ: Prentice-Hall.

KUCZAI, S., 1978. 'Why do children fail to overgeneralize the progressive inflection?', *Journal of Child Language* 5:167–171.

LAKOFF, G., 1987. 'Connectionist explanations in linguistics: some thoughts on recent anti-connectionist papers'. Unpublished ms. ARPAnet.

LANDAU, B., L. GLEITMAN, 1985. *Language and Experience*. Cambridge, Mass.: Harvard University Press.

LANDAU, B., L. B. SMITH, S. S. JONES, 1988. 'The importance of shape in early lexical learning', *Cognitive Development* 3:299–321.

LASNIK, H., T. STOWELL, 1991. 'Weakest Crossover', *Linguistic Inquiry* 22:687–720.

LASNIK, H., J. URIAGEREKA, 1988. *A Course in GB Syntax. Lectures on Binding and Empty Categories*, Cambridge, Mass./London: MIT Press.

LEBEAUX, D., 1988. *Language Acquisition and the Form of Grammar*. Doctoral dissertation, University of Massachusetts, Amherst.

De LEMOS , C., 1981. 'Interactional processes in the child's construction of language'. In W.Deutsch (ed.) *The Child's Construction of Language*, London: Academic Press

VAN DER LELY, H., 1997. 'Characterising innate language-specific abilities: evidence from grammatical specific language impairment'. Talk at Maryland University.

LENNEBERG, E. H., 1967. *Biological Foundations of Language*, New York: Wiley.

LEONARD, L. B., U. BARTOLINI, M. C. CASELLI, K. K. MCGREGOR, L. SABBADINI, 1992. 'Morpho-logical deficits in children with specific language impairment: the status of features in the underlying grammar', *Language Acquisition* 2:151–179.

LEONARD, L. B., 1994. 'Some problems facing accounts of morphological deficits in children with specific impairment'. In R. Watkins, M. Rice (eds.) *Specific Language Impairments in Children* (pp. 91–105), Baltimore: Paul H. Brookes.

LEONARD, L. B., 1995. 'Functional categories in the grammars of children with specific language impairment', *Journal of Speech and Hearing Research* 38:1270–1283.

LEONARD, L.B., 1997. *Children with Specific Language Impairment*, Cambridge Mass./London, England: MIT Press.

LEVIN, B., 1993. *English Verb Classes and Alternations*, Chicago/London: The University of Chicago Press.

LI, P., M. BOWERMAN, 1998. The acquisition of lexical and grammatical aspect in Chinese, *First Language* 18:311–350.

LIGHTFOOT, D., 1989. 'The child's trigger experience', *Brain and Behavioral Sciences* 12:321–375.

LIGHTFOOT, D., 1991. *How to Set Parameters: Arguments from Language Change*, Cambridge, Mass.: MIT Press.

LIGHTFOOT, D., 1994. 'Degree-0 Learnability'. In B. Lust, G. Hermon, J. Kornfilt (eds.) *Syntactic Theory and First Language Acquisition: Crosslinguistic Perspectives*, vol. 2: *Binding Dependency and Learnability*, Hillsdale, NJ: Lawrence Erlbaum Associates.

LIGHTFOOT , D., 1997. 'Catastrophic change and learning theory', *Lingua* 100:171–192.

LIGHTFOOT, D., 1999. *The Development of Language. Acquisition, Change, and Evolution*. Mass./Oxford: Blackwell.

LILLO-MARTIN, D., 1992. 'Setting the null argument parameters: evidence from American Sign Language and Other Languages'. In Lust, B., Hermon, G., Kornfilt, J. (eds.) *Binding, Dependencies, and Learnability*, Hillsdale: Erlbaum, 301–318.

LONDEN, M. L., 1999. 'Incomplete L1 acquisition: the morphosyntax of Kaspar Hauser'. In Greenhill, A., H. Littlefield, C. Tano (eds.) *Proceedings of the 23rd Annual Boston University Conference on Language Development* (pp. 419–430), Somerville, Mass.: Cascadilla Press.

LONG, M. H., 1990. 'Maturational constraints on language development', *Studies in Second Language Acquisition* 12.

LONGOBARDI, G., 1994. 'Reference and proper names', *Linguistic Inquiry* 25:609–665.

LUST, B., 1994. Functional projections of CP and phrase structure parameterization: an argument for the strong Continuity Hypothesis. In B. Lust, M. Suner, J. Whitman (eds.) *Syntactic Theory and First Language Acquisition: Crosslinguistic Perspectives* (pp.85–118).

MacWHINNEY,B. J., 1978. *The acquisition of morphophonology. Monograph of the Society for Research in Child Development* 43.

MacWHINNEY, B., C. E. SNOW, 1985. The Child Language Data Exchange System.

MANZINI, R., K. WEXLER, 1987. 'Parameters, binding theory and learnability', *Linguistic Inquiry* 18:413–444.

MARCHMAN, V., E. BATES, 1994. 'Continuity in lexical and morphological development: a test for the critical mass hypothesis', *Journal of Child Language* 21: 339–366.

MARCHMAN, V., K. PLUNKETT, J. GOODMAN, 1997. 'Overregularization in English plural and past tense inflectional morphology: a response to Marcus (1995), *Journal of Child Language* 24(3).

MARCUS, G. F., 1995. 'Children's overregularization of English plurals: a quantitative analysis', *Journal of Child Language* 22, 447–459.

MARCUS, G. F., PINKER, S., ULLMAN, M., HOLLANDER, M., ROSEN, T. J., XU, F., 1992. 'Overregularization in language acquisition'. *Monographs of the Society for Research in Child Development* 57.

MARKMAN, E., 1990. 'Constraints children place on word meanings', *Cognitive Science* 14:57–77. (also published in P. Bloom (ed.) 1994. *Language Acquisition: Core Readings*, Cambridge: Cambridge University Press).

MATSUO, A., B. HOLLENBRANDSE, 1999. 'The acquisition of sequence of tense in Japanese'. In A. Greenfield, H. Littlefield, C. Tano (eds.) *Proceedings of the 23rd Boston University Conference on Language Develoment*, 431–442.

McKEE, C., M. EMILIANI, 1993. 'Il clitico: c'è ma non si vede', *Natural Language and Linguistic Theory* 11: 415–437.

MEHLER, J., P. JUSCZYK, G. LAMBERTS, N. HALSTED, J. BERTONCINI, C. AMIELTISON, 1988. 'A precursor of language acquisition in young infants', *Cognition* 29: 143–178.

MEISEL, J., 1990. 'Inflection: Subjects and subject verb agreement'. In J. Meisel (ed.) *Two First Languages: Early Grammatical Development in Bilingual Children*, (pp. 237–300), Dordrecht: Foris.

MEISEL, J., N. MÜLLER, 1992. 'Finiteness and verb placement in early child grammars: evidence from simultaneous acquisition of French and German in bilinguals'. In J.Meisel (ed.) *The Acquisition of Verb Placement: Functional Categories and V2 Phenomena in Language Development* (pp. 109–138), Dordrecht: Kluwer .

MORGAN, J., 1986. *From Simple Input to Complex Grammar*, MIT Press.

MORGAN, J., L. TRAVIS, 1989. 'Limits on negative information in language input', *Journal of Child Language* 16:531–552.

MORO, A., 1993. *I predicatti nominali e la struttura dela frase*. Doctoral dissertation, University of Venice.

MOURELATOS, A., 1986. 'Events, processes and states'. In P. Tedeschi, A. Zaenen (eds.) *Syntax and Semantics 14, Tense and Aspect* (pp. 191–212), New York: Academic Press.

NAIGLES, L. R.., 1990. 'Children use syntax to learn verb meanings', *Journal of Child Language* 17:357–374.

NAIGLES, L., H. GLEITMAN, L. GLEITMAN, 1993. 'Children acquire word meaning components from syntactic evidence'. In E. Dromi (ed.) *Language and Cognition: A Developmental Perspective* (pp. 104–140), Norwood, NJ: Ablex.

NELSON, K., 1973. 'Structure and strategy in learning to talk', *Monographs of the Society for Research in Child Development* 38 (1–2).

NELSON, K., 1988. 'Constraints on word meaning?', *Cognitive Development* 3:221–246.

NELSON, K., HAMPSON, J., L. K. SHAW, 1993. 'Nouns in early lexicons. Evidence, explanations, and extensions', *Journal of Child Language* 20:61–84.

NEWPORT, E., 1990. 'Maturational constraints on language learning', *Cognitive Science* 14:11–28.

NEWPORT, E., H. GLEITMAN, L.R. GLEITMAN, 1977. 'Mother, I'd rather do it myself: some effects and non-effects of maternal speech style'. In C. Snow, C. Ferguson (eds.) *Talking to Children: Language Input and Acquisition* . Vol. 1 (pp.881–938), Cambridge: Cambridge University Press.

NICOLADIS, E., 2001. 'Choosing the right words for the context: evidence from Chinese-English bilinguals'. Poster presented at ELA 2001, Lyon.

NISHIGAUCHI, T., T. ROEPER, 1987. 'Deductive Parameters and the Growth of Empty Categories'. In T. Roeper and E. Williams (eds.) *Parameter Setting*. Dordrecht: Reidel.

NUNEZ DEL PRADO, Z., C. FOLEY, B. LUST, 1993. 'The significance of CP to the pro-drop parameter: an experimental study comparing Spanish and English'. In E. Clark (ed.) *The Proceedings of the 25th Annual Child Language Research Forum* (pp. 146–157), Stanford, CA: Center for the Study of Language and Information.

O'GRADY, W., 1997. *Syntactic Development*, Chicago/London: The University of Chicago Press.

O'GRADY, W., PETERS, A. M., MASTERSON, D., 1989. 'The transition from optional to required subjects', *Journal of Child Language* 16: 513–529.

OLSEN, M. B., A. WEINBERG, 1999. 'Innateness and the acquisition of grammatical aspect via lexical aspect'. In A.Greenfield, H.Littlefield, C.Tano (eds.) *Proceedings of the 23rd Boston University Conference on Language Development*, Vol. 2 (pp.528–540), Cascadilla Press.

PARK , T. Z., 1978. 'Plurals in Child Speech', *Journal of Child Language* 5 :237–250.

PARTEE, B., 1973. 'Some structural analogies between tenses and pronouns in English', *Journal of Philosophy* 70.

PENSALFINI, R., 1995. 'Pronoun case errors, both syntactic and morphological'. In C. T. Schütze, J. Ganger, K. Broihier (eds.) *Papers on Language Processing and Acquisition, MIT Working Papers in Linguistics* 26, 321–375.

PERLMUTTER, D., 1988. 'The split morphology hypothesis'. In M. Hammond, M. Noonan (eds.) *Theoretical Morphology* (pp. 79–100), San Diego: Academic Press.

PHILLIPS, C. 1995. 'Syntax at age two: cross-linguistic differences', *MITWPL* 26:265–280.

PIATELLI-PALMARINI, M., (ed.) 1988. *Teorii ale limbajului. Teorii ale învăţării. Dezbaterea dintre Jean Piaget şi Noam Chomsky*, Bucureşti: Editura Politică.

PIERCE, A., 1989. *On the Emergence of Syntax: A Cross-linguistic Study*. Doctoral dissertation, MIT.

PIERCE, A., 1992. *Language Acquisition and Syntactic Theory: A Comparative Analysis of French and English Child Grammars*, Dordrecht: Kluwer.

PINE, J., 1994. 'The language of primary caregivers'. In C. Gallaway, B. Richards (eds.) *Input and Interaction in Language Acquisition* (pp. 15–37), New York: Cambridge University Press.

PINKER, S., 1984. *Language Learnability and Language Development*. Cambridge, Mass.: MIT Press.

PINKER, S., 1987. 'The bootstrapping problem in language acquisition'. In B. MacWhinney (ed.) *Mechanisms of Language Acquisition*, Hillsdale, NJ.: Lawrence Erlbaum Associates.

PINKER, S., 1989. *Learnability and Cognition: the Acquisition of Argument Structure*, Cambridge, Mass.: MIT Press.

PINKER, S., 1991. 'Rules of language', *Science* 253:530–535.

PINKER, S., 1994a. *The Language Instinct*, Penguin Books.

PINKER, S., 1994b. 'How could a child use verb syntax to learn verb semantics?', *Lingua* 92:377–410.

PINKER, S., 1998. 'Words and rules', *Lingua* 106:219–242.

PINKER, S., A. S. PRINCE, 1988. 'On language and connectionism: analysis of a parallel distributed processing model of language acquisition', *Cognition* 28:73–93.

PINKER, S., A. S. PRINCE, 1992. 'Regular and irregular morphology and the psychological status of rules of grammar', *Proceedings of the 1991 Meeting of the Berkeley Linguistics Society*.

PLATZACK, C., 1990. 'A grammar without functional categories: a syntactic study of early Swedish child language', *Working Papers in Scandinavian Syntax* 45:13–34.

PLATZACK, C., 1996. 'The initial hypothesis on syntax: a minimalist perspective on language acquisition and attrition'. In H. Clahsen (ed.) *Generative Perspectives on Language Acquisitioon. Empirical Findings, Theoretical Considerations, Crosslinguistic Comparisons* (pp. 161–200), Amsterdam: John Benjamins.

PLUNKETT, K., V. MARCHMAN, 1991. 'U-shaped learning and frequency effects in a multi-layered perceptron: implications for child language acquisition', *Cognition* 38: 1–60.

PLUNKETT, K., V. MARCHMAN, 1993. 'From rote learning to system-building: acquiring verb morphology in children and connectionist nets', *Cognition* 48:21–69.

PLUNKETT, K., S. STRÖMKVIST, 1990. 'The acquisition of Scandinavian languages', *Gothenburg Papers in Theoretical Linguistics* 59.

POEPPEL, D., K. WEXLER, 1993. 'The full competence hypothesis of clause structure in early German', *Language* 69:1–33.

POLLOCK, J. Y., 1989. 'Verb Movement, UG, and the structure of IP', *Linguistic Inquiry* 20: 365–424.

POULIN-DUBOIS, D., 1995. 'Object parts and the acquisition of the meaning of names'. In K. E. Nelson, Z. Reger (eds.) *Children's Language*, Volume 8 (125–143), Hillsdale, NJ: Lawrence Erlbaum Associates.

POWERS, S. M., 1996. *The Growth of the Phrase Marker: Evidence from Subjects*. Doctoral dissertation, University of Maryland.

POWERS, S. M., 1998. 'Binarity and singularity in child grammar'. Ms. University of Potsdam.

POWERS, S. M., 1999. '(E)merging functional structure'. To appear in U. Lakshmanan (ed.) *A Minimalist Account of Language Acquisition: Functional Categories and Case Checking*, Kluwer Academic Publishers.

PRASADA, S., S. PINKER, 1993. 'Generalization of regular and irregular morphological patterns', *Language and Cognitive Processes* 8: 1–56.

QUINE, W. V., 1960. *Word and Object*, Cambridge, Mass.: MIT Press.

RADFORD, A., 1988. *Transformational Grammar. A First Course*, Cambridge: Cambridge University Press.

RADFORD, A., 1990. *Syntactic Theory and the Acquisition of English Syntax: The Nature of Early Child Grammars of English*, Oxford: Blackwell.

RADFORD, A., 1994. ' The syntax of questions in child English', *Journal of Child Language*, 21:211–236.

RADFORD, A., 1996. 'Towards a structure-building model of acquisition'. In Clahsen, H. (ed.) *Generative Perspectives on Language Acquisition* (pp. 43–89), Amsterdam/Philadelphia: John Benjamins.

RADFORD, A., 1998. 'Genitive subjects in child language', *Lingua* 106: 113–131.

RASETTI, L., 2000. 'Null subjects and root infinitives in the child grammar of French'. In M. A. Friedemann, L. Rizzi (eds.) *The Acquisition of Syntax: Studies in Comparative Developmental Linguistics* (pp.236–268), Longman.

REICHENBACH, H., 1947. *Elements of Symbolic Logic*, New York: MacMillan Company.

REINHART, T., 1983. *Anaphora and Semantic Interpretation*, London: Croom Helm.

RHEE, J. , K. WEXLER, 1995. 'Optional infinitives in Hebrew', *MITWPL* 26: 383–402.

RICE, M., K. WEXLER, 1996. 'Toward tense as a clinical marker of Specific Language Impairment in English-speaking children', *Journal of Speech and Hearing Research* 39:1239–1257.

RISPOLI, M., 1990. 'Lexical assignability and perspective switch: the acquisition of verb subcategorization for aspectual inflections', *Journal of Child Language* 17:375–392.

RISPOLI, M., 1994. 'Pronoun case overextensions and paradigm building', *Journal of Child Language* 21: 152–172.

RIZZI, L., 1982. *Issues in Italian Syntax*, Dordrecht: Foris.

RIZZI, L., 1986. 'Null subjects in Italian and the theory of pro', *Linguistic Inquiry* 17, 501–557.

RIZZI, L., 1993/1994. 'Some notes on linguistic theory and language development', *Language Acquisition* 3: 371–394.

RIZZI, L., 1994; 'Early null subjects and root null subjects'. In T. Hoekstra, B. D. Schwartz (eds.) *Language Acquisition Studies in Generative Grammar* (pp. 151–176), Amsterdam: John Benjamins.

ROEPER, T., 1994. 'Merger theory in acquisition'. Ms. UMass.

ROEPER, T., 1996. 'The role of merger theory and formal features in acquisition'. In H. Clahsen (ed.) *Generative Perspectives on Language Acquisition. Empirical Findings, Theoretical Considerations, Crosslinguistic Comparisons*, Amsterdam: John Benjamins.

253

ROEPER, T., B. ROHRBACHER, 1994. 'Null subjects in early child English and the theory of economy of projection'. Ms. UMass., Amherst/U. Penn.

ROEPER, T., J. WEISSENBORN, 1990. 'How to make parameters work'. In L.Frazier, J. de Villiers (eds.) *Language Processing and Language Acquisition* (pp. 147–162), Dodrecht: Kluwer.

ROSCH, E., 1973. 'On the internal structure of perceptual and semantic categories. In T. E. Moore (ed.) *Cognitive Development and the Acquisition of Language*, NY: Academic Press.

ROSCH; E., 1975 'Cognitive representation of semantic categories', *Journal of Experimental Psychology: General*, 104.

ROSCH, E., 1978. 'Principles of categorization'. In E. Rosch, B. Lloyd (eds.) *Cognition and Categorization*, Hillsdale , NJ: Lawrence Erlbaum Associates.

ROSS, J. R., 1982. 'Pronoun deleting processes in German'. Ms. San Diego, California.

RUMEELHART, D. E., J. L. McCLELLAND, 1986. 'On learning the past tenses of English verbs'. Reprinted in P. Bloom (ed.) 1993. *Language Acquisition. Core Readings.* (pp. 423–471), New York: Harvester Wheatsheaf.

RUWET, N., 1967. *Introduction à la grammaire générative,* Paris: Librairie Plon.

SALEEMI, A. P., 1992. *Universal Grammar and Language Learnability,* Cambridge: Cambridge University Press.

SANO, T., N. HYAMS, 1994. 'Agreement, finiteness and the development of null arguments'. *Proceedings of NELS 24:* 543–558.

SAXTON, M., 1997. 'The Contrast Theory of negative input', *Journal of Child Language* 24: 139–161.

SCHAEFFER, J., 1990. *The Syntax of the Subject in Child Language: Italian compared to Dutch.* MA thesis, Utrecht University.

SCHOLTEN, C. G. M., 1987. *Principles of UG and the Auxiliary Verb ·Phenomena,* Doctoral dissertation, University of Maryland.

SCHÖNENBERGER, M., A. PIERCE, K. WEXLER, F. WIJNEN, 1995. 'Accounts of root infinitives and the interpretation of root infinitives', *Geneva Generative Papers* : 47–71.

SCHÜTZE, C. T., 1995. 'Children's subject case errors: evidence for case-related functional projections'. In *Proceedings of FSML VI,* vol. I, 155–166.

SCHÜTZE, C. T., 1997. *Infl in Child and Adult Language: Agreement, Case and Licensing,* Doctoral Dissertation, MIT.

SCHÜTZE, C. T., K. WEXLER, 1996. 'Subject case licensing and English root infinitives'. In A. Stringfellow, D.Cahana-Amitay, E.Hughes, A. Zukowski (eds.) *Proceedings from the 20th Boston University Conference on Language Development,* 670–681.

SELIGER, H. W., 1978. 'Implications of a multiple critical periods hypothesis for second language learning'. In W. Ritchie (ed.) *Second Language Research* (pp. 11–19), New York: Academic Press.

SELKIRK, E., 1982. *The Syntax of Words,* Cambridge, Mass.: MIT Press.

SERBAN, D., 1982. *English Syntax,* volume I, Tipografia Universităţii Bucureşti.

SHADY, M., L. GERKEN. 1995. 'Grammatical and caregiver cues in early sentence comprehension'. In E. V. Clark (ed.) *Proceedings of the 26th Annual Child Language Research Forum* (pp. 94–103), Center for the Study of language and Information.

SHIPLEY, E. F., B. SHEPPERSON, 1990. 'Countable entities: developmental changes', *Cognition* 34:109–136.

SHIRAI, Y., 1997. 'Is regularization determined by semantics, or grammar, or both? Comments on Kim, Marcus, Pinker, Hollander & Coppola (1994)', *Journal of Child Language* 24: 495–501.

SHIRAI, Y., 1998 'The emergence of tense-aspect morphology in Japanese: universal predisposition?', *First Language* 18:281–309.

SHIRAI, Y., R.W.ANDERSEN, 1995. 'The acquisition of tense-aspect morphology: A prototype account', *Language* 71:743– 762.

SIEGEL, D., 1977. The adjacency condition and the theory of morphology. In M. J. Stein (ed.) *Proceedings of the 8th Annual Meeting of the North East Linguistics Society,* University of Massachusetts, Amherst.

SKINNER, B. F., 1957. *Verbal Behavior* , New York: Appleton-Century-Crofts.

SLOBIN, D., 1973. 'Cognitive prerequisites for the development of grammar'. In C. Ferguson, D. Slobin (eds.) *Studies in Child Language Development,* New York: Holt, Rinehart & Winston.

SLOBIN, D., 1985. 'Crosslinguistic evidence for the language-making capacity'. In D. Slobin (ed.) *The Crosslinguistic Study of Language Acquisition,* Hillsdale, NJ: Lawrence Erlbaum Associates.

SMITH, C., 1980. 'The acquisition of time talk: relations between child and adult grammars', *Journal of Child Language* 7: 263–278.

SMITH, C., 1991. *The Parameter of Aspect,* Dordrecht: Kluwer.

SMITH, C., R. M. WEIST, 1987. 'On the temporal contour of child language: a reply to Rispoli and Bloom', *Journal of Child Language* 14:387–392.

SMITH, N. , D. WILSON, 1979. *Modern Linguistics. The Results of Chomsky's Revolution,* Penguin Books.

SMITH, N., I. M. TSIMPLI, 1995. *The Mind of a Savant. Language Learning and Modularity,* Oxford/ Cambridge, Mass.: Blackwell.

SNEDEKER, J., L. GLEITMAN, M. BRENT, 1999. 'The successes and failures of word-to-world mapping' . In Greenhill, A., H. Littlefield, C.Tano (eds.) *Proceedings of the 23rd Annual Boston University Conference on Language Development,* vol. 2 (pp. 654–665), Somerville, Mass.: Cascadilla Press.

SNOW, C., C. FERGUSON, 1977. *Talking to Children: Language Input and Acquisition,* Cambridge: Cambridge University Press.

SNYDER, W., 1995. *Language Acquisition and Language Variation: the Role of Morphology.* Doctoral Dissertation, MIT.

SNYDER, W., K. STROMSWOLD, 1997. 'The structure and acquisition of English Dative constructions', *Linguistic Inquiry* 2:281–317.

SOJA, N. N., S. CAREY, E. S. SPELKE, 1991. 'Ontological categories guide children's inductions of word meaning: object terms and substance terms', *Cognition* 51:267–284.

SORRENTINO, C. M., 1999. 'Children's use of syntactic, pragmatic, and semantic information in learning proper names'. In Greenhill, A., H. Littlefield, C. Tano (eds.) *Proceedings of the 23rd Annual Boston University Conference on Language Development*, vol. 2 (pp. 675–686), Somerville, Mass.: Cascadilla Press.

SPEAS, M., 1993. 'Null Arguments in a Theory of Economy of Projections'. In E. Benedicto, J. Runner (eds.) *Functional Projections*. University of Massachusetts Occasional Papers 17.

SPROAT, R., 1992. *Morphology and Computation*. Cambridge, Mass.: MIT Press.

STARKE, M., 1995. 'On the format of small clauses'. In *Syntax and Semantics* 28, 237–276.

STOLL, S., 1998 'The role of Aktionsart in the acquisition of Russian aspect', *First Language* 18, 351–377.

STEVENSON, R., 1992. 'Maturation and learning: linguistic knowledge and performance. A Commentary on Clahsen and Felix'. In J. Weissenborn, H. Goodluck, T. Roeper (eds.) *Theoretical Issues in Language Acquisition. Continuity and Change in Development* (pp. 77–92), Hillsdale, NJ: Lawrence Erlbaum Associates.

STEPHANY, U., 1986. 'Aspekt, Tempus und Modalität: Zur Entwicklung der Verbalgrammatik in der neugriechischen Kindersprache', Tübingen: Gunther Naar.

STOWELL, T., 1981. *Origins of Phrase Structure*. Doctoral dissertation, MIT.

STOWELL, T., 1994. 'The Syntax of tense', Ms. MIT.

STROMSWOLD, K., 1990. *Learnability and the Acquisition of Auxiliaries*. Doctoral dissertation, Department of Brain and Cognitive Sciences, MIT.

SUBRAHMAYAM, K., B. LANDAU, 1995. 'Modulation of object perception by count and mass syntax'. In In E.V.Clark (ed.) *Proceedings of the 26th Annual Child Language Research Forum* (pp. 117–126), Center for the Study of Language and Information.

SUPPES, P., 1973. 'The semantics of children's language', *American Psychologist* 88: 103–114.

TALLAL, P., R. ROSS, B. CURTISS, 1989. 'Familial aggregationin specific language impairment', *Journal of Speech and Hearing Disorders* 54:167–173.

TARDIF, T., 1995. 'Nouns are not *always* learned before verbs, but why? Evidence from Mandarin Chinese'. In E. V. Clark, (ed.) *The Proceedings of the 26th Annual Child Language Research Forum* (pp. 224–230), Center for the Study of Language and Information.

TARDIF, T., M. SHATZ, L. NAIGLES, 1997. 'Caregiver speech and children's use of nouns versus verbs: a comparison of English, Italian, and Mandarin', *Journal of Child Language* 24:535–565.

THORNTON, R., 1998. 'Accounts of root infinitives'. Class lecture University of Maryland at College Park.

THORNTON, R., 1999. 'No lack of focus before two'. Poster presented at Gala 1999, Potsdam University.

THORNTON, R., S. CRAIN, 1998. *Investigations in Universal Grammar. A Guide to Experiments on the Acquisition of Syntax and Semantics*, Cambridge, Mass.: MIT Press.

TOMBLIN, J. B.,1989. 'Familial concentration of developmental language impairment', *Journal of Speech and Hearing Disorders* 54: 287–295.

TORRENS, V., 1995. 'The Acquisition of the functional category inflection in Spanish and Catalan'. In C. T. Schütze (ed.) *Papers on Language Processing and Acquisition* (pp. 451–472), *MIT Working Papers in Linguistics* 26.

TSIMPLI, I. M., 1991. 'On the maturation of functional categories: early child speech', *UCL Working Papers in Linguistics*, 123–147.

URIAGEREKA, J., 1998. *Rhyme and Reason. A Minimalist Dialogue,* Cambridge, Mass.: MIT Press.

URIAGEREKA, J., 1999 'In defense of D-Structure'. Ms. University of Maryland at College Park.

VAINIKKA, A., 1993/1994. 'Case in the development of English syntax', *Language Acquisition* 3: 257–325.

VALIAN, V., 1990. 'Null subjects: A problem for parameter-setting models of language acquisition', *Cognition* 35:105–122.

VALIAN, V., 1991. 'Syntactic subjects in the early speech of American and Italian children', *Cognition* 40:21–81.

VALIAN, V., 1994. 'Children's postulation of null subjects: parameter setting and language acquisition'. In Lust, B., Hermon, G., Kornfilt, J. (eds.), pp. 273– 286.

VALIAN, V., 1990. 'Logical and psychological constraints on the acquisition of syntax'. In L. Frazier, J. de Villiers (eds.) *Language Processing and Language Acquisition* (pp. 147–162), Dordrecht: Kluwer.

VALIAN, V., J. HOEFFNER, 1992. 'Young children's imitation of subjects'. Ms., Hunter College, New York.

VARLOKOSTA, S., A. VAINIKKA, B. ROHRBACHER, 1996. Root infinitives without without infinitives. In Stringfellow, A. D. Cahana-Amitay, E. Hughes and A. Zukowski (eds.) *Proceedings of the 20th Annual Boston University Conference on Language Development*, volume 2 (pp. 816–827), Somerville, Mass.: Cascadilla Press.

VERRIPS, M., J. WEISSENBORN, 1992. 'Routes to verb placement in early German and French: the independence of finiteness and agreement'. In J. Meisel (ed.) *The Acquisition of Verb Placement: Functional Categories and V2 Phenomena in Language Acquisition* (pp. 283–331), Dordrecht: Kluwer.

VYGOTSKY, L., 1962. *Thought and Language*, Cambridge, Mass.: MIT Press.

WAGNER, L., 1999 Acquiring tense in form and meaning. In Greenhill, A., H. Littlefield, T. Cheryl (eds.) *Proceedings of the 23rd Annual Boston Conference on Language Development*, 708–719.

WEISSENBORN, J., 1990. 'Functional categories and verb movement: the acquisition of German syntax reconsidered'. In M. Rothweiler (ed.) *Spracherwerb und Grammatik: Linguistische Untersuchungen zum Erwerb von Syntax und Morphologie, Linguistische Berichte, Sonderheft 3*.

WEISSENBORN, J., 1992. 'Null subjects in early grammars: implications for parameter-setting theories'. In J. Weissenborn, H. Goodluck, T. Roeper (eds.) *Language Acquisition. Continuity and Change in Development* (pp. 269–299), Hillsdale, NJ: Lawrence Erlbaum Associates.

WEISSENBORN, J., 1994. 'Constraining the child's grammar: local well-formedness in the development of verb movement in German and French'. In B. Lust, M. Suner, J. Whitman (eds.) *Syntactic Theory and First Language Acquisition: Cross-Linguistic Perspectives* (pp. 215–248), Hillsdale, NJ: Lawrence Erlbaum Associates.

WEISSENBORN, J., 1999. 'The Acquisition of V2'. In Penner, Z., P. Schulz, K. Wymann (eds.) *Normal and Impaired Language Acquisition II. Studies in Lexical, Syntactic, and Phonological Development* (pp.109–138), Universität Konstanz.

WEISSENBORN, J., H. GOODLUCK, T. ROEPER, 1992. 'Introduction: old and new problems in the study of language acquisition'. In Weissenborn, J., H.Goodluck, T. Roeper (eds.) *Theoretical Issues of Language Acquisition* (pp. 1–24), Hillsdale, NJ: Lawrence Erlbaum Associates.

WEISSENBORN, J., B. HÖHLE, D. KIEFER, D. CAVAR, 1998. 'Children's sensitivity to word-order violation in German: evidence from very early parameter-setting'. In A. Greenhill et al. (eds.) *Proceedings of the 22nd Boston University Conference on Language Development*, vol. 2, 756–767.

WEIST, R. M., H. WYSOCKA, K. WITKOWSKA-STADNIK, E. BUCZOWSKA, E. KONIECZNA, 1984. 'The defective tense hypothesis: on the emergence of tense and aspect in child Polish', *Journal of Child Language* 11: 347–374.

WEIST, R. M., 1986. 'Tense and Aspect'. In P. Fletcher, M. Garman (eds.) *Language Acquisition*, Cambridge: Cambridge University Press.

WEIST, R. M., P. LYYTINEN, J. WYSOCKA, M. ATANASSOVA, 1997. 'The interaction of language and thought in children's language acquisition: a crosslinguistic study', *First Language* 24: 81–121.

WEXLER, K., 1982. A principle theory of language acquisition'. In E. Wanner, L. R. Gleitman (eds.) *Language Acquisition: The State of the Art,* Cambridge: Cambridge University Press.

WEXLER, K., 1992. 'Optional infinitives, head movement and the economy of derivation in child grammar'. Occasional paper 45. Center for Cognitive Science , MIT.

WEXLER, K., 1993. 'The Subset principle is an intensional principle'. In E. Reuland, W. Abraham (eds.) *Knowledge and Language*, vol. I: *From Orwell's Problem to Plato's Problem* (pp. 217–293), Kluwer Academic Publishers.

WEXLER, K., 1994. 'Optional infinitives, head movement and the economy of derivations'. In D. Lightfoot and N. Hornstein (eds.) *Verb Movement* (pp. 305–350), Cambridge: Cambridge University Press.

WEXLER, K., 1997. 'D-Interpretability and Interpretation in the optional infinitive stage', Hand-out at Workshop on Interpretation of Root Infinitives and Bare Nominals, MIT, January 13, 1997.

WEXLER, K., 1998. 'Very early parameter setting and the unique checking constraint: a new explanation of the optional infinitive stage', *Lingua* 106:23–79.

WEXLER, K., P. CULICOVER, 1980. *Formal Principles of Language Acquisition*, Cambridge, Mass.: MIT Press.

WEXLER, K., H. HAMBURGER, 1973. 'On the insufficiency of surface data for the learning of transformational languages'. In K. J. J. Hintikka, J. M. E. Moravcsik, P. Suppes (eds.) *Approaches to Natural Language*, Dordrecht: Reidel.

WEXLER, K., R. MANZINI, 1987. 'Parameters and learnability in binding theory'. In T. Roeper, E.Williams (eds.) *Parameter setting* (pp. 41–76), Dordrecht: Reidel.

WHITE, L., 1989. *Universal Grammar and Second Language Acquisition*, Amsterdam/Philadelphia: John Benjamins.

WHITMAN, J., 1994. 'In defense of the strong continuity account of the acquisition of verb-second'. In M. Suner, B. Lust, J. Whitman (eds.) *Syntactic Theory and First Language Acquisition: Cross Linguistic Perspectives* (pp.273–287), Hillsdale, NJ: Lawrence Erlbaum Associates.

WHITMAN, J., K.-O. LEE, B. LUST, 1991. 'Continuity of the principles of Universal Grammar in first language acquisition'. In *NELS* 21: 383–397.

WIJNEN, F., 1996. 'Temporal reference and eventivity in root infinitives', *MIT Occasional Papers in Linguistics 12:* 1–25.

WIJNEN, F., 1997. 'The temporal interpretation of root infinitivals: the effect of eventivity'. Paper presented at the Workshop on the Interpretation of Root Infinitives and Bare Nouns in Child Language, MIT.

WIJNEN, F., 1998. 'The temporal interpretation of Dutch children's root infinitivals: the effect of eventivity', *First Language* 18:379–402.

WILLIAMS, E., 1994. 'Remarks on lexical knowledge'. In L. Gleitman, B. Landau (eds.) *The Acquisition of the Lexicon* (pp. 7–34), Cambridge, Mass.: MIT Press.

XU, F., S. CAREY, K. RAPHAELIS, A. GINZBURSKY, 1995. '12-month-old infants have the conceptual resource to support the acquisition of count nouns'. In In E.V.Clark (ed.) *Proceedings of the Twenty-Sixth Annual Child Language Research Forum*, Center for the Study of Language and Information.

XU, F., S. PINKER , 1995. 'Weird past tense forms', *Journal of Child Language* 22:531–556.

YAMADA, J., 1990. *Laura : A Case for the Modularity of Language*. Cambridge, Mass.: The MIT Press.

YAMASHITA, Y., 1999. 'The acquisition of nouns and verbs in young Japanese children: why do verbal nouns emerge early?'. In Greenhill, A., H. Littlefield, C. Tano (eds.) *Proceedings of the 23rd Annual Boston University Conference on Language Development* (pp. 741–752), Somerville, Mass.: Cascadilla Press.

ZANUTTINI, R., 1991. *Syntactic Properties of Sentential Negation: A Comparative Study of Romance Languages*, Doctoral Dissertation, University of Pennsylvania.

Index

English, 16, 22–23, 27, 33, 57, 60, 69, 96,107, 108, 109, 119, 121, 126, 127, 128, 134, 135, 147, 148, 150, 152, 159, 162, 163, 165, 167, 168, 171, 175, 176, 178–179, 180, 181, 184, 225, 235, 242 – 243
    agreement in early, 126, 140, 169
    and optional infinitive, 134, 135, 136, 137, 138, 140, 142, 146–147, 232
    aspect in early, 119, 233
Endocentricity, 94, 95
Equal-detail assumption, 206
Evaluation measure, 50, 60
Event Category Labelling, 215
Existential status, 229, 230
Exocentricity, 94, 95

F

Fantuzzi, C., 233, 240, 242–243
Faroese, 133
Felix, S., 14, 110, 120–121
Fenson , L., 195
Ferdinand, A., 137
File cards, 151
Fisher, C. L., 211, 216, 218
Fletcher, P., 163, 196
Focus, 164, 189
Fodor, J. A., 34–35
Fodor, J. D., 59 fn20, 63, 64, 67–69,
Fremgen, A., 221
French, 27, 115, 119, 128, 159, 160, 162, 172, 173, 175, 225
    and optional infinitive, 133, 134, 135, 137, 138, 139, 144
Friedemann, M.A., 135, 160, 177
Fromkin, V., 35 fn15, 42
Functional categories, 56, 57, 59, 72, 108, 112,
    absence of, 108, 118, 119, 124–126
    and aphasia, 119–120
    and Case, 184
    and maturation, 120
    and optional infinitive, 138, 139, 155
    and the Strong Continuity   Hypothesis, 110, 113, 117, 118, 130
    and the Weak Continuity Hypothesis, 110, 122–125, 129, 130, 174, 175
    and truncation theory, 127–128
    emergence of, 124
    underspecification of, 112, 145, 170–172

G

Ganger, J., 196
Gelderen, Van, E., 137

General Congruence Principle, 124
Generic level assumption, 206
Genie, 40
Genitive Case
    as default, 185, 186
    assignment of, 141, 185, 188
    overextension of, 183, 184
    subjects in, 162–163, 164–165, 185
Gentner, D. , 205
Gerken, L.A., 108, 161, 178 fn16, 180–181
German, 27, 41, 65, 70, 97, 112–113, 114, 115–118, 119, 122, 128, 129, 134, 135, 138, 139, 149, 150, 152–154, 159, 168, 172, 173, 176, 225, 230 fn3, 241–242
    and optional infinitive, 133, 134, 135, 137, 152–153, 230
Gibson, E., 63 fn28, 64, 69
Gillette, J., 205
Gleitman, L., 24, 28, 38, 197, 205, 208, 211, 216
Goldfield, B. A., 204, 205
Goodluck, H., 42, 63 fn25, 96, 102, 108, 109, 189, 222, 244
Grimshaw, J., 112, 122, 123, 218
Gopnik, M., 33, 34
Gordon, P., 99, 100, 101
Gottfried, G. M., 96
Government and Binding, 47, 55
Grammar
    wild, 120, 122
Greek, 119, 133, 134, 150, 159, 225, 232
Greenfield, P., 161, 178
Grimshaw, J., 22, 56 fn16, 214
Grodzinsky, Y., 146
Gruber, J. S., 162, 164
Guasti, M.T., 119, 133
Guéron, J., 145, 15, 152
Guilfoyle, E., 122, 167, 169, 174

H

Haan, G. de, 134
Haegeman, L., 21 fn2, 55 fn13, 79, 115, 128, 133, 134, 135, 136, 152, 159 fn1, 162
Halle, M., 84
Hamburger, H., 164
Hamann, C., 135, 159, 160, 161, 189
Harner, L., 237
Harris, T., 119, 140
Head movement, 113–114
Hebrew, 119, 134
Heim, I., 151
Hirsh-Pasek, K., 26 fn8, 38, 107, 219
Hoekstra, T., 122, 133, 136–137, 144, 155, 226, 230 fn3
Hollebrandse, B., 241, 244

259

DATA RESTITUIRII		
22. IAN. 2003	17. MAI. 2005	22 MAR 2018
25. IUN. 2003		04 MAR. 2019
25. AUG. 2003	10. IUN. 2005	
11. SEP. 2003	22. IUN. 2005	
28. MAI 2004	12 MAY 2009	
27. AUG. 2004	15 JAN 2011	
01. SEP. 2004	05 JUN 2013	
02. SEP. 2004		
13. SEP. 2004	27 AUG 2014	
29. IAN. 2005	08 SEP 2014	
30 IAN. 2005	17 DEC 2015	

153750 lei