# Minimalist Syntax

**Exploring the structure of English**

Andrew Radford

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# Minimalist Syntax
## Exploring the Structure of English

Andrew Radford's latest textbook, *Minimalist Syntax: Exploring the Structure of English*, provides a clear and accessible introduction to current work in syntactic theory, drawing on the key concepts of Chomsky's Minimalist Program. Assuming little or no prior knowledge of syntactic theory, Radford takes students through a diverse range of topics in English syntax – such as categories and features, merger, null constituents, movement, case, split projections and phases – and shows how the 'computational component' works within the minimalist framework. Beginning at an elementary level, the book introduces grammatical concepts and sets out the theoretical foundations of Principles and Parameters and Universal Grammar, before progressing in stages towards more complex phenomena. Each chapter contains a workbook section, in which students are encouraged to make their own analyses of English phrases and sentences through exercises, model answers and 'helpful hints'. There is also an extensive glossary of terms.

Although designed primarily for courses on syntactic theory or English syntax, this book also provides an up-to-date, clear and straightforward introduction to the field.

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# Minimalist Syntax: Exploring the Structure of English

*In this series:*

# Minimalist Syntax
## Exploring the Structure of English

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# Contents

# Preface

## Aims

This book has two main aims, reflected in its title and subtitle. The first is to provide an intensive introduction to recent work in syntactic theory (more particularly to how the *computational component* operates within the model of grammar assumed in recent work within the framework of Chomsky's *Minimalist Program*). The second is to provide a description of a range of phenomena in English syntax, making use of minimalist concepts and assumptions wherever possible. The book can be seen as a successor to (or updated version of) my (1997a) book *Syntactic Theory and the Structure of English*. There is quite a lot of duplication of material between the earlier book and this one (particularly in the first few chapters), though the present book also contains substantial new material (e.g. on agreement, case, split projections and phases), and the analysis of many phenomena presented in this book differs from that in its predecessor (agreement being handled in terms of a *feature-matching* rather than a *feature-checking* framework, for example).

## Key features

The book is intended to be suitable both for people with only minimal grammatical knowledge, and for people who have already done quite a bit of syntax but want to know something (more) about Minimalism. It is not historicist or comparative in orientation, and hence does not presuppose knowledge of earlier or alternative models of grammar. It is written in an approachable style, avoiding unnecessary complexity. I've taught earlier versions of the book to more than 200 students over the past three years, and greatly benefited from their mutterings and mystification, as well as their assignments (which told me a lot about what they didn't understand, and about what I needed to explain more carefully). I've worked through (and refined) the exercise material with the students, and the *helpful hints* which the exercises contain have been developed in order to try and eliminate some of the commonest errors students make. The book is intensive and progressive in nature, which means that it starts at an elementary level but gets progressively harder as you get further into it. A group of students I taught

an earlier version of the book to gave the following mean degree-of-difficulty score to each chapter on a five-point scale ranging from 1 = *very easy* to 5 = *very hard*: chapter 1 = 1.6; chapter 2 = 1.8; chapter 3 = 2.2; chapter 4 = 2.7; chapter 5 = 2.9; chapter 6 = 3.2; chapter 7 = 3.4; chapter 8 = 3.7; chapter 9 = 4.2; chapter 10 = 4.4. Successive chapters become cumulatively more complex, in that each chapter presupposes material covered in previous chapters as well as introducing new material: hence it is helpful to go back and read material from earlier chapters every so often. In some cases, analyses presented in earlier chapters are subsequently refined or revised in the light of new assumptions made in later chapters.

## Organisation

Each of the ten chapters in the book contains a detailed text discussion of a particular topic (divided into sections to facilitate reading), together with an integral *workbook section* at the end of the chapter, containing exercise material (to be done as classwork or homework) with *model answers* and *helpful hints* provided. Although the book contains numerous references to (often highly technical) primary research works, the exercises are designed in such a way that they can be tackled on the basis of the coursebook material alone. The book also includes an extensive *glossary* which provides simple illustrations of how key technical terms are used (both theory-specific terms like **EPP** and traditional terms like **subject**): technical terms are written in **bold** print in the main text (*italics* being used for highlighting particular expressions – e.g. a key word appearing in an example sentence). The glossary contains entries for key technical terms in syntax which are used in a number of different places in the text (though not for terms which appear in only one part of the main text, and which are glossed in the text where they appear). The glossary also includes an integrated list of *abbreviations*.

## Companion volume

This book is being published in parallel with an abridged version entitled *English Syntax: an Introduction*. In this longer version of the text, the main text (particularly in the later chapters) is generally 30–50 per cent longer than the main text in the abridged version. This longer version is aimed primarily at students with (near-) native command of English who are taking syntax as a major rather than a minor course. The two books have an essentially parallel organisation into chapters and sections (though additional sections and technical discussion have been added in this longer version), and contain much the same exercise material (though with exercise material based on additional sections

of text included in the longer version). In keeping the two books parallel in structure and organisation as far as possible, I am mindful of the comment made in a review of two earlier books which I produced in parallel longer and shorter versions (Radford 1997a,b) that some readers may wish to read the short version of a given chapter first, and then look at the longer version afterwards, and that this 'is not facilitated by an annoyingly large number of non-correspondences' (Ten Hacken 2001, p. 2). Accordingly, I have tried to maximise correspondence between the 'long' and 'short' versions of these two new books.

## Acknowledgments

Particular thanks are due to three brave Musketeers (Hajime Hattori, Cris Lozano and Peter Evans) for shooting down some of the more inane parts of an earlier draft of the book when they had it inflicted on them as students. I'd also like to thank Cambridge University Press's series editor (Neil Smith) for patiently wading through and commenting on two drafts of the longer version and one of the shorter one, and managing to make his comments challenging and good-humoured at the same time. Thanks also go to Bob Borsley and Martin Atkinson for helpful thoughts on particular issues. And above all to my wife Khadija, for putting up with extended periods of authorial autism during the gestation period for the book.

## Dedication

This book (like my 1981 *Transformational Syntax* book) is dedicated to Joe Cremona, who sadly died shortly before it went to press. Joe was my tutor at Cambridge for three of my undergraduate courses (History of Italian, History of Romanian, Vulgar Latin and Romance Philology). As I wrote in the preface to my 1981 book, Joe 'did more than anyone to awaken my interest in language, and to persuade me that just maybe linguistic theory wasn't quite as pointless as it seemed at the time' (when linguistics seemed to most students to be designed solely to inflict taxonomic torture on them). Thanks for everything, Joe – you will be sorely missed by the many people you helped go on to successful academic careers.

# 1     Grammar

## 1.1     Overview

In broad terms, this book is concerned with aspects of grammar. Grammar is traditionally subdivided into two different but interrelated areas of study – **morphology** and **syntax**. Morphology is the study of how words are formed out of smaller units (called **morphemes**), and so addresses questions such as 'What are the component morphemes of a word like *antidisestablishmentarianism*, and what is the nature of the morphological operations by which they are combined together to form the overall word?' Syntax is the study of the way in which phrases and sentences are structured out of words, and so addresses questions like 'What is the structure of a sentence like *What's the president doing?* and what is the nature of the grammatical operations by which its component words are combined together to form the overall sentence structure?' In this chapter, we begin (in §1.2) by taking a brief look at the approach to the study of syntax taken in **traditional grammar**: this also provides an opportunity to introduce some useful grammatical terminology. In the remainder of the chapter, we look at the approach to syntax adopted within the theory of **Universal Grammar** developed by Chomsky.

## 1.2     Traditional grammar

Within traditional grammar, the syntax of a language is described in terms of a **taxonomy** (i.e. classificatory list) of the range of different types of syntactic structures found in the language. The central assumption underpinning syntactic analysis in traditional grammar is that phrases and sentences are built up of a series of **constituents** (i.e. syntactic units), each of which belongs to a specific **grammatical category** and serves a specific **grammatical function**. Given this assumption, the task of the linguist analysing the syntactic structure of any given type of sentence is to identify each of the constituents in the sentence, and (for each constituent) to say what category it belongs to and what function it serves. For example, in relation to the syntax of a simple sentence like:

(1)        Students protested

it would traditionally be said that the sentence consists of two constituents (the word *students* and the word *protested*), that each of these constituents belongs to a specific grammatical category (*students* being a plural **noun** and *protested* a past-tense **verb**) and that each serves a specific grammatical function (*students* being the **subject** of the sentence, and *protested* being its **predicate**). The overall sentence *Students protested* has the categorial status of a **clause** which is **finite** in nature (by virtue of denoting an event taking place at a specific time), and has the semantic function of expressing a **proposition** which is **declarative** in force (in that it is used to make a statement rather than, for example, ask a question). Accordingly, a traditional grammar of English would tell us that the simplest type of finite declarative clause found in English is a sentence like (1) in which a nominal subject is followed by a verbal predicate. Let's briefly look at some of the terminology used here.

In traditional grammar, words are assigned to grammatical categories (called **parts of speech**) on the basis of their **semantic** properties (i.e. meaning), **morphological** properties (i.e. the range of different forms they have), and **syntactic** properties (i.e. word-order properties relating to the positions they can occupy within sentences): a set of words which belong to the same category thus have a number of semantic, morphological and syntactic properties in common. For example, **nouns** are traditionally said to have the semantic property that they denote entities: so, *bottle* is a noun (since it denotes a type of object used to contain liquids), *horse* is a noun (since it denotes a type of animal), and *John* is a noun (since it denotes a specific person). Typical nouns (more specifically, **count nouns**) have the morphological property that they have two different forms: a **singular** form (like *horse* in *one horse*) used to denote a single entity, and a **plural** form (like *horses* in *two horses*) used to denote two or more entities. Nouns have the syntactic property that only (an appropriate kind of) noun can be used to end a four-word sentence such as *They have no* . . . In place of the dots here we could insert a singular noun like *car* or a plural noun like *friends*, but not other types of word (e.g. not *see*, or *slowly* or *up*, since these are not nouns).

In contrast to nouns, **verbs** are traditionally said to have the semantic property that they denote actions or events: so, *eat, sing, pull* and *resign* are all (action-denoting) verbs. From a syntactic point of view, verbs have the property that only an appropriate kind of verb (in its uninflected form) can be used to complete a three-word sentence such as *They/It can* . . . So, words like *stay, leave, hide, die, starve* and *cry* are all verbs and hence can be used in place of the dots here (but words like *apple, under, pink* and *if* aren't). From a morphological point of view, regular verbs like *cry* (in English) have the property that they have four distinct forms: e.g. alongside the dictionary **citation form** *cry* we find the **present-tense** form *cries*, the **past-tense/perfect participle/passive participle** form *cried* and the **progressive participle** form *crying*. Since chapter 2 is devoted to a discussion of grammatical categories, we shall have no more to say about them for the time being. Instead, we turn to look at some of the terminology used in

traditional grammar to describe the different **grammatical functions** that constituents fulfil.

Let's begin by looking at the following set of sentences:

(2) (a)      *John* smokes
    (b)      *The president* smokes
    (c)      *The president of Utopia* smokes
    (d)      *The former president of the island paradise of Utopia* smokes

Sentence (2a) comprises the noun *John* which serves the function of being the **subject** of the sentence (and denotes the person performing the act of smoking), and the verb *smokes* which serves the function of being the **predicate** of the sentence (and describes the act being performed). In (2a), the subject is the single noun *John*; but as the examples in (2b–d) show, the subject of a sentence can also be an (italicised) phrase like *the president*, or *the president of Utopia* or *the former president of the island paradise of Utopia*.

Now consider the following set of sentences:

(3) (a)      John smokes *cigars*
    (b)      John smokes *Cuban cigars*
    (c)      John smokes *Cuban cigars imported from Havana*
    (d)      John smokes *a specific brand of Cuban cigars imported by a friend of his from Havana*

Sentence (3a) comprises the **subject** *John*, the **predicate** *smokes* and the **complement** (or **direct object**) *cigars*. (The complement *cigars* describes the entity on which the act of smoking is being performed; as this example illustrates, subjects normally precede the verb with which they are associated in English, whereas complements typically follow the verb.) The complement in (3a) is the single noun *cigars*; but a complement can also be a **phrase**: in (3b), the complement of *smokes* is the phrase *Cuban cigars*; in (3c) the complement is the phrase *Cuban cigars imported from Havana*; and in (3d) the complement is the phrase *a specific brand of Cuban cigars imported by a friend of his from Havana*. A verb which has a noun or pronoun expression as its direct-object complement is traditionally said to be **transitive**.

From a semantic perspective, subjects and complements share in common the fact that they generally represent entities directly involved in the particular action or event described by the predicate: to use the relevant semantic terminology, we can say that subjects and complements are **arguments** of the predicate with which they are associated. Predicates may have one or more arguments, as we see from sentences such as (4) below, where each of the bracketed nouns is a different argument of the italicised predicate:

(4) (a)      [John] *resigned*
    (b)      [John] *felt* [remorse]
    (c)      [John] *sent* [Mary] [flowers]

A predicate like *resign* in (4a) which has a single argument is said to function as a **one-place predicate** (in the relevant use); one like *feel* in (4b) which has two arguments is a **two-place predicate**; and one like *send* in (4c) which has three arguments is a **three-place predicate**.

In addition to predicates and arguments, sentences can also contain **adjuncts**, as we can illustrate in relation to (5) below:

(5) (a)      The president smokes a cigar *after dinner*
   (b)      The president smokes a cigar *in his office*

In both sentences in (5), *smokes* functions as a two-place predicate whose two arguments are its subject *the president* and its complement *a cigar*. But what is the function of the phrase *after dinner* which also occurs in (5a)? Since *after dinner* isn't one of the entities directly involved in the act of smoking (i.e. it isn't consuming or being consumed), it isn't an argument of the predicate *smoke*. On the contrary, *after dinner* simply serves to provide additional information about the time when the smoking activity takes place. In much the same way, the italicised expression *in his office* in (5b) provides additional information about the location of the smoking activity. An expression which serves to provide (optional) additional information about the time or place (or manner, or purpose etc.) of an activity or event is said to serve as an **adjunct**. So, *after dinner* and *in his office* in (5a,b) are both **adjuncts**.

So far, all the sentences we have looked at in (1)–(5) have been **simple sentences** which contain a single **clause**. However, alongside these we also find **complex sentences** which contain more than one clause, like (6) below:

(6)      Mary knows John smokes

If we take the traditional definition of a clause as a predication structure (more precisely, a structure containing a predicate which has a subject, and which may or may not also contain one or more complements and adjuncts), it follows that since there are two predicates (*knows* and *smokes*) in (6), there are correspondingly two clauses – the *smokes* clause on the one hand, and the *knows* clause on the other. The *smokes* clause comprises the subject *John* and the predicate *smokes*; the *knows* clause comprises the subject *Mary*, the predicate *knows* and the complement *John smokes*. So, the complement of *knows* here is itself a clause – namely the clause *John smokes*. More precisely, the *smokes* clause is a **complement clause** (because it serves as the complement of *knows*), while the *knows* clause is the **main clause** (or **principal clause** or **independent clause** or **root clause**). The overall sentence (6) *Mary knows John smokes* is a **complex sentence** because it contains more than one clause. In much the same way, (7) below is also a complex sentence:

(7)      The press clearly think the president deliberately lied to Congress

Once again, it comprises two clauses – one containing the predicate *think*, the other containing the predicate *lie*. The main clause comprises the subject *the*

*press*, the adjunct *clearly*, the predicate *think* and the complement clause *the president deliberately lied to Congress*. The complement clause in turn comprises the subject *the president*, the adjunct *deliberately*, the predicate *lied*, and the complement *to Congress*.

As was implicit in our earlier classification of (1) as a **finite** clause, traditional grammars draw a distinction between **finite clauses** (which describe events taking place at a particular time) and **non-finite clauses** (which describe hypothetical or projected future events). In this connection, consider the contrast between the italicised clauses below (all three of which function as the complement of *remember*):

(8) (a)     John couldn't remember *what pills he is taking*
    (b)     John couldn't remember *what pills he took*
    (c)     John couldn't remember *what pills to take*

In (8a), the clause *what pills he is taking* is finite by virtue of containing present-tense *is*: likewise, the clause *what pills he took* in (8b) is finite by virtue of containing past-tense *took*. However, the clause *what pills to take* in (8c) is non-finite by virtue of containing no tense specification – *take* here is an infinitive form which is not inflected for tense, as we see from the fact that it could not be replaced by the past-tense form *took* here (cf. *'John couldn't remember what pills to *took*' – the **star** indicating ungrammaticality).

Whether or not a clause is finite in turn determines the kind of subject it can have, in that finite clauses can have a **nominative** pronoun like *he* as their subject, but non-finite clauses cannot (as we see from the ungrammaticality of *'John couldn't remember what pills *he* to take'). Accordingly, one way of telling whether a particular clause is finite or not is to see whether it can have a nominative pronoun (like *I/we/he/she/they*) as its subject. In this connection, consider whether the italicised clauses in (9a,b) below are finite or non-finite:

(9) (a)     I didn't know *students have problems with syntax*
    (b)     I have never known *students have problems with syntax*

The fact that *students* in (9a) can be replaced by the nominative pronoun *they* (as in 'I didn't know *they* have problems with syntax') suggests that the italicised clause in (9a) is finite – as does the fact that the present-tense verb *have* can be replaced by its past-tense counterpart *had* in (9a). Conversely, the fact that *students* in (9b) can be replaced by the **accusative** pronoun *them* (as in 'I have never known *them* have problems with syntax') suggests that the italicised clause in (9b) is non-finite – as does the fact that we can optionally use the infinitive particle *to* in (9b) (as in 'I have never known students *to* have problems with syntax'), and the fact that we can replace the *have* expression by one containing the infinitive form *be* (as in 'I have never known students *be* worried about syntax').

In addition to being finite or non-finite, each clause within a sentence has a specific **force**. In this connection, consider the following simple (single-clause) sentences:

(10) (a)    He went home        (b) Are you feeling OK?
     (c)    You be quiet!       (d) What a great idea that is!

A sentence like (10a) is traditionally said to be **declarative** in force, in that it is used to make a statement. (10b) is **interrogative** in force in that it is used to ask a question. (10c) is **imperative** in force, by virtue of being used to issue an order or command. (10d) is **exclamative** in force, in that it is used to exclaim surprise or delight. In complex sentences, each clause has its own force, as we can see in relation to (11) below:

(11) (a)    He asked where she had gone
     (b)    Did you know that he has retired?
     (c)    Tell her what a great time we had!

In (11a), the main (*asked*) clause is declarative, whereas the complement (*gone*) clause is interrogative; in (11b) the main (*know*) clause is interrogative, whereas the complement (*retired*) clause is declarative; and in (11c), the main (*tell*) clause is imperative, whereas the complement (*had*) clause is exclamative.

   We can summarise this section as follows. From the perspective of traditional grammar, the syntax of a language is described in terms of a **taxonomy** (i.e. a classificatory list) of the range of different phrase-, clause- and sentence-types found in the language. So, for example, a typical traditional grammar of (say) English will include chapters on the syntax of negatives, interrogatives, exclamatives, imperatives and so on. The chapter on interrogatives will note (e.g.) that in main-clause questions in English like 'Is he winning?' the present-tense **auxiliary** *is* **inverts** with (i.e. moves in front of) the subject *he*, but not in complement-clause questions like the *if*-clause in 'I wonder if he *is* winning', and will typically not be concerned with trying to explain *why* **auxiliary inversion** applies in main clauses but not complement clauses: this reflects the fact that the primary goal of traditional grammar is *description* rather than *explanation*.

## 1.3      Universal Grammar

         In contrast to the **taxonomic** approach adopted in traditional grammar, Chomsky takes a **cognitive** approach to the study of grammar. For Chomsky, the goal of the linguist is to determine what it is that native speakers *know* about their native language which enables them to speak and understand the language: hence, the study of language is part of the wider study of **cognition** (i.e. what human beings know). In a fairly obvious sense, any native speaker of a language can be said to *know* the grammar of his or her native language. For example, any native speaker of English can tell you that the negative counterpart of *I like syntax* is *I don't like syntax*, and not e.g. *I no like syntax*: in other words, native speakers know how to combine words together to **form** expressions (e.g. negative sentences) in their language. Likewise, any native speaker of English can tell you that a sentence like *She loves me more than you* is ambiguous and has two

**interpretations** which can be paraphrased as 'She loves me more than she loves you' and 'She loves me more than you love me': in other words, native speakers also know how to **interpret** (i.e. assign meaning to) expressions in their language. However, it is important to emphasise that this grammatical knowledge of how to form and interpret expressions in your native language is **tacit** (i.e. subconscious) rather than **explicit** (i.e. conscious): so, it's no good asking a native speaker of English a question such as 'How do you form negative sentences in English?', since human beings have no conscious awareness of the processes involved in speaking and understanding their native language. To introduce a technical term devised by Chomsky, we can say that native speakers have grammatical **competence** in their native language: by this, we mean that they have tacit knowledge of the grammar of their language – i.e. of how to form and interpret words, phrases and sentences in the language.

In work dating back to the 1960s, Chomsky has drawn a distinction between **competence** (the native speaker's tacit knowledge of his or her language) and **performance** (what people actually say or understand by what someone else says on a given occasion). Competence is 'the speaker–hearer's knowledge of his language', while performance is 'the actual use of language in concrete situations' (Chomsky 1965, p. 4). Very often, performance is an imperfect reflection of competence: we all make occasional slips of the tongue, or occasionally misinterpret something which someone else says to us. However, this doesn't mean that we don't know our native language or that we don't have *competence* in it. Misproductions and misinterpretations are **performance errors**, attributable to a variety of performance factors like tiredness, boredom, drunkenness, drugs, external distractions and so forth. A grammar of a language tells you what you need to know in order to have native-like competence in the language (i.e. to be able to speak the language like a fluent native speaker): hence, it is clear that grammar is concerned with competence rather than performance. This is not to deny the interest of performance as a field of study, but merely to assert that performance is more properly studied within the different – though related – discipline of psycholinguistics, which studies the psychological processes underlying speech production and comprehension.

In the terminology adopted by Chomsky (1986a, pp. 19–56), when we study the grammatical competence of a native speaker of a language like English we're studying a cognitive system **internalised** within the brain/mind of native speakers of English; our ultimate goal in studying competence is to characterise the nature of the internalised linguistic system (or **I-language**, as Chomsky terms it) which makes native speakers proficient in English. Such a cognitive approach has obvious implications for the descriptive linguist who is concerned to develop a grammar of a particular language like English. According to Chomsky (1986a, p. 22) a grammar of a language is 'a theory of the I-language . . . under investigation'. This means that in devising a grammar of English, we are attempting to uncover the internalised linguistic system (= I-language) possessed by native speakers of English – i.e. we are attempting to characterise a mental state (a state of competence, and thus linguistic

knowledge). See Smith (1999) for more extensive discussion of the notion of I-language.

Chomsky's ultimate goal is to devise a theory of **Universal Grammar/UG** which generalises from the grammars of particular I-languages to the grammars of all possible natural (i.e. human) I-languages. He defines UG (1986a, p. 23) as 'the theory of human I-languages . . . that identifies the I-languages that are humanly accessible under normal conditions'. (The expression 'are humanly accessible' means 'can be acquired by human beings'.) In other words, UG is a theory about the nature of possible grammars of human languages: hence, a theory of UG answers the question: 'What are the defining characteristics of the grammars of human I-languages?'

There are a number of **criteria of adequacy** which a theory of Universal Grammar must satisfy. One such criterion (which is implicit in the use of the term *Universal Grammar*) is **universality**, in the sense that a theory of UG must supply us with the tools needed to provide a **descriptively adequate** grammar for any and every human I-language (i.e. a grammar which correctly describes how to form and interpret expressions in the relevant language). After all, a theory of UG would be of little interest if it enabled us to describe the grammar of English and French, but not that of Swahili or Chinese.

However, since the ultimate goal of any theory is explanation, it is not enough for a theory of Universal Grammar simply to list sets of universal properties of natural language grammars; on the contrary, a theory of UG must seek to explain the relevant properties. So, a key question for any adequate theory of UG to answer is: 'Why do grammars of human I-languages have the properties they do?' The requirement that a theory should explain why grammars have the properties they do is conventionally referred to as the criterion of **explanatory adequacy**.

Since the theory of Universal Grammar is concerned with characterising the properties of natural (i.e. human) I-language grammars, an important question which we want our theory of UG to answer is: 'What are the defining characteristics of human I-languages which differentiate them from, for example, artificial languages like those used in mathematics and computing (e.g. Java, Prolog, C etc.), or from animal communication systems (e.g. the tail-wagging dance performed by bees to communicate the location of a food source to other bees)?' It therefore follows that the descriptive apparatus which our theory of UG allows us to make use of in devising natural language grammars must not be so powerful that it can be used to describe not only natural languages, but also computer languages or animal communication systems (since any such excessively powerful theory wouldn't be able to pinpoint the criterial properties of natural languages which differentiate them from other types of communication system). In other words, a third condition which we have to impose on our theory of language is that it be maximally **constrained**: that is, we want our theory to provide us with technical devices which are so constrained (i.e. limited) in their expressive power that they can only be used to describe natural languages, and are not appropriate for the description of other communication systems. A theory which

is constrained in appropriate ways should enable us to provide a principled explanation for why certain types of syntactic structure and syntactic operation simply aren't found in natural languages. One way of constraining grammars is to suppose that grammatical operations obey certain linguistic principles, and that any operation which violates the relevant principles leads to ungrammaticality: see the discussion below in §1.5 for a concrete example.

A related requirement is that linguistic theory should provide grammars which make use of the minimal theoretical apparatus required: in other words, grammars should be as simple as possible. Much earlier work in syntax involved the postulation of complex structures and principles: as a reaction to the excessive complexity of this kind of work, Chomsky in work over the past ten years or so has made the requirement to minimise the theoretical and descriptive apparatus used to describe language the cornerstone of the **Minimalist Program for Linguistic Theory** which he has been developing (in work dating back to Chomsky 1993, 1995). In more recent work, Chomsky (1998, 1999, 2001, 2002) has suggested that language is a **perfect** system with an **optimal design** in the sense that natural language grammars create structures which are designed to **interface** perfectly with other components of the mind – more specifically with speech and thought systems. (For discussion of the idea that language is a perfect system of optimal design, see Lappin, Levine and Johnson 2000a,b, 2001; Holmberg 2000; Piattelli-Palmarini 2000; Reuland 2000, 2001b; Roberts 2000, 2001a; Uriagereka 2000, 2001; Freidin and Vergnaud 2001; and Atkinson 2003.)

To make this discussion rather more concrete, let's suppose that a grammar of a language is organised as follows. One component of a grammar is a **Lexicon** (= dictionary = list of all the **lexical items/**words in the language and their linguistic properties), and in forming a given sentence out of a set of words, we first have to take the relevant words out of the Lexicon. Our chosen words are then combined together by a series of syntactic computations in the **syntax** (i.e. in the **syntactic/computational component** of the grammar), thereby forming a **syntactic structure**. This syntactic structure serves as input into two other components of the grammar. One is the **semantic component** which **maps** (i.e. 'converts') the syntactic structure into a corresponding **semantic representation** (i.e. to a representation of linguistic aspects of its meaning); the other is a **PF component**, so called because it maps the syntactic structure into a **PF representation** (i.e. a representation of its **Phonetic Form**, telling us how it is pronounced). The semantic representation interfaces with systems of thought, and the PF representation with systems of speech – as shown in diagrammatic form below:

(12)
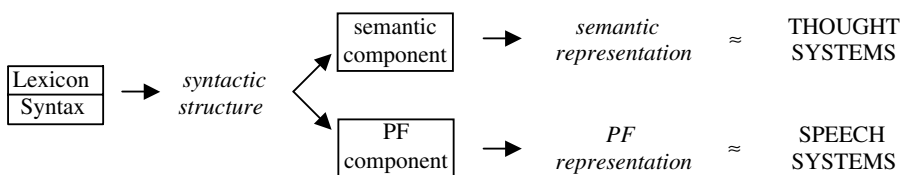
In terms of the model in (12), an important constraint is that the (semantic and PF) representations which are 'handed over' to the (thought and speech) interface systems should contain only elements which are **legible** by the appropriate interface system – so that the semantic representations handed over to thought systems contain only elements contributing to meaning, and the PF representations handed over to speech systems contain only elements which contribute to phonetic form (i.e. to determining how the sentence is pronounced).

The neurophysiological mechanisms which underlie linguistic competence make it possible for young children to acquire language in a remarkably short period of time. Accordingly, a fourth condition which any adequate linguistic theory must meet is that of **learnability**: it must provide grammars which are learnable by young children in a short period of time. The desire to maximise the **learnability** of natural language grammars provides an additional argument for minimising the theoretical apparatus used to describe languages, in the sense that the simpler grammars are, the simpler it is for children to acquire them.

## 1.4    The Language Faculty

Mention of learnability leads us to consider the related goal of developing a **theory of language acquisition**. An acquisition theory is concerned with the question of how children acquire grammars of their native languages. Children generally produce their first recognisable word (e.g. *Mama* or *Dada*) by the age of twelve months. For the next six months or so, there is little apparent evidence of grammatical development in their speech production, although the child's productive vocabulary typically increases by about five words a month until it reaches around thirty words at age eighteen months. Throughout this single-word stage, children's utterances comprise single words spoken in isolation: e.g. a child may say *Apple* when reaching for an apple, or *Up* when wanting to climb up onto her mother's knee. During the single-word stage, it is difficult to find any clear evidence of the acquisition of grammar, in that children do not make productive use of inflections (e.g. they don't add the plural -*s* ending to nouns, or the past-tense -*d* ending to verbs), and don't productively combine words together to form two- and three-word utterances.

At around the age of eighteen months (though with considerable variation from one child to another), we find the first visible signs of the acquisition of grammar: children start to make productive use of inflections (e.g. using plural nouns like *doggies* alongside the singular form *doggy*, and inflected verb forms like *going/gone* alongside the uninflected verb form *go*), and similarly start to produce elementary two- and three-word utterances such as *Want Teddy, Eating cookie, Daddy gone office* etc. From this point on, there is a rapid expansion in their grammatical development, until by the age of around thirty months they have typically acquired most of the inflections and core grammatical constructions used in English, and are able to produce adult-like sentences such as *Where's Mummy*

*gone? What's Daddy doing? Can we go to the zoo, Daddy?* etc. (though occasional morphological and syntactic errors persist until the age of four years or so – e.g. *We goed there with Daddy, What we can do?* etc.).

So, the central phenomenon which any theory of language acquisition must seek to explain is this: how is it that after a long drawn-out period of many months in which there is no obvious sign of grammatical development, at around the age of eighteen months there is a sudden spurt as multiword speech starts to emerge, and a phenomenal growth in grammatical development then takes place over the next twelve months? This **uniformity** and (once the spurt has started) **rapidity** in the pattern of children's linguistic development are the central facts which a theory of language acquisition must seek to explain. But how?

Chomsky maintains that the most plausible explanation for the uniformity and rapidity of first language acquisition is to posit that the course of acquisition is determined by a biologically endowed innate **Language Faculty** (or language acquisition program, to borrow a computer software metaphor) within the brain, which provides children with a genetically transmitted algorithm (i.e. set of procedures) for developing a grammar, on the basis of their linguistic **experience** (i.e. on the basis of the speech input they receive). The way in which Chomsky visualises the acquisition process can be represented schematically as in (13) below (where L is the language being acquired):

(13)

$$\text{Experience of L} \rightarrow \boxed{\text{Language Faculty}} \rightarrow \text{Grammar of L}$$
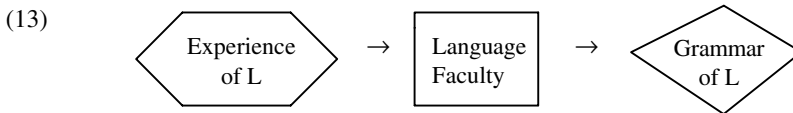
Children acquiring a language will observe people around them using the language, and the set of expressions in the language which a child hears (and the contexts in which they are used) in the course of acquiring the language constitute the child's linguistic **experience** of the language. This experience serves as input to the child's language faculty, which provides the child with a procedure for (subconsciously) analysing the experience and devising a grammar of the language being acquired. Thus, the input to the language faculty is the child's experience, and the output of the language faculty is a grammar of the language being acquired.

The hypothesis that the course of language acquisition is determined by an innate language faculty is known popularly as the **innateness hypothesis**. Chomsky maintains that the ability to speak and acquire languages is unique to human beings, and that natural languages incorporate principles which are also unique to humans and which reflect the nature of the human mind:

> Whatever evidence we do have seems to me to support the view that the ability to acquire and use language is a species-specific human capacity, that there are very deep and restrictive principles that determine the nature of human language and are rooted in the specific character of the human mind.      (Chomsky 1972, p. 102)

Moreover, he notes, language acquisition is an ability which all humans possess, entirely independently of their general intelligence:

> Even at low levels of intelligence, at pathological levels, we find a command of language that is totally unattainable by an ape that may, in other respects, surpass a human imbecile in problem-solving activity and other adaptive behaviour.    (Chomsky 1972, p. 10)

In addition, the apparent uniformity in the types of grammars developed by different speakers of the same language suggests that children have genetic guidance in the task of constructing a grammar of their native language:

> We know that the grammars that are in fact constructed vary only slightly among speakers of the same language, despite wide variations not only in intelligence but also in the conditions under which language is acquired. (Chomsky 1972, p. 79)

Furthermore, the rapidity of acquisition (once the grammar spurt has started) also points to genetic guidance in grammar construction:

> Otherwise it is impossible to explain how children come to construct grammars . . . under the given conditions of time and access to data. (Chomsky 1972, p. 113)

(The sequence 'under . . . data' means simply 'in so short a time, and on the basis of such limited linguistic experience.') What makes the uniformity and rapidity of acquisition even more remarkable is the fact that the child's linguistic experience is often **degenerate** (i.e. imperfect), since it is based on the linguistic performance of adult speakers, and this may be a poor reflection of their competence:

> A good deal of normal speech consists of false starts, disconnected phrases, and other deviations from idealised competence.    (Chomsky 1972, p. 158)

If much of the speech input which children receive is degenerate (because of performance errors), how is it that they can use this degenerate experience to develop a (competence) grammar which specifies how to form grammatical sentences? Chomsky's answer is to draw the following analogy:

> Descartes asks: how is it when we see a sort of irregular figure drawn in front of us we see it as a triangle? He observes, quite correctly, that there's a disparity between the data presented to us and the percept that we construct. And he argues, I think quite plausibly, that we see the figure as a triangle because there's something about the nature of our minds which makes the image of a triangle easily constructible by the mind.    (Chomsky 1968, p. 687)

The obvious implication is that in much the same way as we are genetically predisposed to analyse shapes (however irregular) as having specific geometrical properties, so too we are genetically predisposed to analyse sentences (however ungrammatical) as having specific grammatical properties. (For evaluation of this

kind of **degenerate input** argument, see Pullum and Scholz 2002; Thomas 2002; Sampson 2002; Fodor and Crowther 2002; Lasnik and Uriagereka 2002; Legate and Yang 2002; Crain and Pietroski 2002; and Scholz and Pullum 2002.)

A further argument Chomsky uses in support of the innateness hypothesis relates to the fact that language acquisition is an entirely subconscious and involuntary activity (in the sense that you can't consciously choose whether or not to acquire your native language – though you can choose whether or not you wish to learn chess); it is also an activity which is largely unguided (in the sense that parents don't teach children to talk):

> Children acquire . . . languages quite successfully even though no special care is taken to teach them and no special attention is given to their progress.     (Chomsky 1965, pp. 200–1)

The implication is that we don't learn to have a native language, any more than we learn to have arms or legs; the ability to acquire a native language is part of our genetic endowment – just like the ability to learn to walk.

Studies of language acquisition lend empirical support for the innateness hypothesis. Research has suggested that there is a **critical period** for the acquisition of syntax, in the sense that children who learn a given language before puberty generally achieve native competence in it, whereas those who acquire a (first or second) language after the age of nine or ten years rarely manage to achieve native-like syntactic competence: see Lenneberg (1967), Hurford (1991) and Smith (1998, 1999) for discussion. A particularly poignant example of this is a child called Genie (see Curtiss 1977; Rymer 1993), who was deprived of speech input and kept locked up on her own in a room until age thirteen. When eventually taken into care and exposed to intensive language input, her vocabulary grew enormously, but her syntax never developed. This suggests that the acquisition of syntax is determined by an innate 'language acquisition programme' which is in effect switched off at the onset of puberty. (For further discussion of the innateness hypothesis, see Antony and Hornstein 2002.)

## 1.5      Principles of Universal Grammar

If (as Chomsky claims) human beings are biologically endowed with an innate language faculty, an obvious question to ask is what is the nature of the language faculty. An important point to note in this regard is that children can in principle acquire *any* natural language as their native language (e.g. Afghan orphans brought up by English-speaking foster parents in an English-speaking community acquire English as their first language). It therefore follows that the language faculty must incorporate a theory of **Universal Grammar/UG** which enables the child to develop a grammar of *any* natural language on the basis of suitable linguistic experience of the language (i.e. sufficient speech input).

Experience of a particular language L (examples of words, phrases and sentences in L which the child hears produced by native speakers of L in particular contexts) serves as input to the child's language faculty which incorporates a theory of Universal Grammar providing the child with a procedure for developing a grammar of L.

If the acquisition of grammatical competence is indeed controlled by a genetically endowed language faculty incorporating a theory of UG, then it follows that certain aspects of child (and adult) competence are known without experience, and hence must be part of the genetic information about language with which we are biologically endowed at birth. Such aspects of language would not have to be learned, precisely because they form part of the child's genetic inheritance. If we make the (plausible) assumption that the language faculty does not vary significantly from one (normal) human being to another, those aspects of language which are innately determined will also be universal. Thus, in seeking to determine the nature of the language faculty, we are in effect looking for **UG principles** (i.e. principles of Universal Grammar) which determine the very nature of language.

But how can we uncover such principles? The answer is that since the relevant principles are posited to be universal, it follows that they will affect the application of every relevant type of grammatical operation in every language. Thus, detailed analysis of one grammatical construction in one language could reveal evidence of the operation of principles of Universal Grammar. By way of illustration, let's look at question-formation in English. In this connection, consider the following dialogue:

(14)      SPEAKER A: He had said someone would do something
          SPEAKER B: He had said who would do what?

In (14), speaker B largely echoes what speaker A says, except for replacing *someone* by *who* and *something* by *what*. For obvious reasons, the type of question produced by speaker B in (14) is called an **echo question**. However, speaker B could alternatively have replied with a **non-echo question** like that in (15) below:

(15)      Who had he said would do what?

If we compare the echo question *He had said who would do what?* in (14) with the corresponding non-echo question *Who had he said would do what?* in (15), we find that (15) involves two movement operations which are not found in (14). One is an **auxiliary inversion** operation by which the past-tense **auxiliary** *had* is moved in front of its subject *he*. (As we shall see in chapter 2, an *auxiliary* is a word like *had/would* in (15) which carries grammatical properties such as **tense/aspect/mood/modality**.) The other is a **wh-movement** operation by which the **wh-word** *who* is moved to the front of the overall sentence, and positioned in front of *had*. (A wh-word is a word like *who/what/where/when* etc. beginning with *wh*.)

A closer look at questions like (15) provides evidence that there are UG principles which constrain the way in which movement operations may apply. An

interesting property of the questions in (14) and (15) is that they contain two auxiliaries (*had* and *would*) and two wh-expressions (*who* and *what*). Now, if we compare (15) with the corresponding echo question in (14), we find that the *first* of the two auxiliaries (*had*) and the *first* of the wh-words (*who*) are moved to the front of the sentence in (15). If we try inverting the second auxiliary (*would*) and fronting the second wh-word (*what*), we end up with ungrammatical sentences, as we see from (16c–e) below (the preposed items are italicised, and the corresponding echo question is given in parentheses; (16a) is repeated from the echo question in (14B), and (16b) from (15)):

(16) (a)     He **had** said *who* **would** do *what*? (= echo question)
  (b)     *Who* **had** he said would do what? (cf. He **had** said *who* would do what?)
  (c)     \**Who* **would** he had said do what? (cf. He had said *who* **would** do what?)
  (d)     \**What* **had** he said who would do? (cf. He **had** said who would do *what*?)
  (e)     \**What* **would** he had said who do? (cf. He had said who **would** do *what*?)

If we compare (16b) with its echo-question counterpart (16a) *He had said who would do what?* we see that (16b) involves preposing the first wh-word *who* and the first auxiliary *had*, and that this results in a grammatical sentence. By contrast, (16c) involves preposing the first wh-word *who* and the second auxiliary *would*; (16d) involves preposing the second wh-word *what* and the first auxiliary *had*; and (16e) involves preposing the second wh-word *what* and the second auxiliary *would*. The generalisation which emerges from the data in (16) is that auxiliary inversion preposes the *closest* auxiliary *had* (i.e. the one nearest the beginning of the sentence) and likewise wh-fronting preposes the *closest* wh-expression *who*. The fact that two, quite distinct, different movement operations (auxiliary inversion and wh-movement) are subject to the same locality condition (which requires preposing of the *most local* – i.e. closest – expression of the relevant type) suggests that one of the principles of Universal Grammar incorporated into the language faculty is a **Locality Principle** which can be outlined informally as:

(17)     **Locality Principle**
         Grammatical operations are local

In consequence of (17), auxiliary inversion preposes the closest auxiliary, and wh-movement preposes the closest wh-expression. It seems reasonable to suppose that (17) is a principle of Universal Grammar (rather than an idiosyncratic property of question-formation in English). In fact, the strongest possible hypothesis we could put forward is that (17) holds of all grammatical operations in all natural languages, not just of movement operations; and indeed we shall see in later chapters that other types of grammatical operation (including **agreement** and **case assignment**) are subject to a similar locality condition. If so, and if we assume that abstract grammatical principles which are universal are part of our biological endowment, then the natural conclusion to reach is that (17) is a principle which

is biologically wired into the language faculty, and which thus forms part of our genetic make-up.

A theory of grammar which posits that grammatical operations are constrained by innate principles of UG offers the important advantage that it minimises the burden of grammatical learning imposed on the child (in the sense that children do not have to learn, for example, that auxiliary inversion affects the first auxiliary in a sentence, or that wh-movement likewise affects the first wh-expression). This is an important consideration, since we saw earlier that learnability is a criterion of adequacy for any theory of grammar – i.e. any adequate theory of grammar must be able to explain how children come to learn the grammar of their native language(s) in such a rapid and uniform fashion. The UG theory developed by Chomsky provides a straightforward account of the rapidity of the child's grammatical development, since it posits that there are a universal set of innately endowed grammatical principles which determine how grammatical operations apply in natural language grammars. Since UG principles which are innately endowed are wired into the language faculty and so do not have to be learned by the child, this minimises the learning load placed on the child, and thereby maximises the learnability of natural language grammars.

## 1.6    Parameters

Thus far, we have argued that the language faculty incorporates a set of universal principles which guide the child in acquiring a grammar. However, it clearly cannot be the case that all aspects of the grammar of languages are universal; if this were so, all natural language grammars would be the same and there would be no **grammatical learning** involved in language acquisition (i.e. no need for children to learn anything about the grammar of sentences in the language they are acquiring), only **lexical learning** (viz. learning the lexical items/words in the language and their idiosyncratic linguistic properties, e.g. whether a given item has an irregular plural or past-tense form). But although there are universal principles which determine the broad outlines of the grammar of natural languages, there also seem to be language-particular aspects of grammar which children have to learn as part of the task of acquiring their native language. Thus, language acquisition involves not only lexical learning but also some grammatical learning. Let's take a closer look at the grammatical learning involved, and what it tells us about the language acquisition process.

Clearly, grammatical learning is not going to involve learning those aspects of grammar which are determined by universal (hence innate) grammatical operations and principles. Rather, grammatical learning will be limited to those **parameters** (i.e. dimensions or aspects) of grammar which are subject to language-particular variation (and hence vary from one language to another). In other words, grammatical learning will be limited to parametrised aspects of grammar (i.e. those aspects of grammar which are subject to parametric variation from

one language to another). The obvious way to determine just what aspects of the grammar of their native language children have to learn is to examine the range of **parametric variation** found in the grammars of different (adult) natural languages.

We can illustrate one type of parametric variation across languages in terms of the following contrast between the Italian examples in (18a,b) below, and their English counterparts in (18c,d):

(18) (a)     Maria parla francese          (b) Parla francese
      (c)     Maria speaks French          (d) *Speaks French

As (18a) and (18c) illustrate, the Italian verb *parlare* and its English counter-part *speak* (as used here) are two-place predicates which require both a subject argument like *Maria* and an object argument like *francese/French*: in both cases, the verb is finite (more specifically it is a present-tense form) and agrees with its subject *Maria* (and hence is a third-person-singular form). But what are we to make of Italian sentences like (18b) *Parla francese* (= 'Speaks French') in which the verb *parla* 'speaks' has the overt complement *francese* 'French' but has no overt subject? The answer suggested in work over the past few decades is that the verb in such cases has a **null subject** which can be thought of as a silent or invisible counterpart of the pronouns *he/she* which appear in the corresponding English translation '*He/She* speaks French'. This null subject is conventionally designated as **pro**, so that (18b) has the structure *pro parla francese* 'pro speaks French', where *pro* is a null-subject pronoun.

There are two reasons for thinking that the verb *parla* 'speaks' has a null subject in (18b). Firstly, *parlare* 'speak' (in the relevant use) is a two-place predicate which requires both a subject argument and an object argument: under the null-subject analysis, its subject argument is *pro* (a null pronoun). Secondly, finite verbs agree with their subjects in Italian: hence, in order to account for the fact that the verb *parla* is in the third-person-singular form in (18b), we need to posit that it has a third-person-singular subject; under the null-subject analysis, we can say that *parla* 'speaks' has a null pronoun (*pro*) as its subject, and that *pro* (if used to refer to *Maria*) is a third-person-feminine-singular pronoun.

The more general conclusion to be drawn from our discussion is that in lan-guages like Italian, finite verbs (i.e. verbs which carry present/past etc. tense) can have either an overt subject like *Maria* or a null *pro* subject. But things are very different in English. Although a finite verb like *speaks* can have an overt subject like *Maria* in English, it cannot normally have a null *pro* subject – hence the ungrammaticality of (18d) *\*Speaks French*. So, finite verbs in a language like Italian can have either overt or null subjects, but in a language like English, finite verbs can generally have only overt subjects, not null subjects. We can describe the differences between the two types of language by saying that Italian is a **null-subject language**, whereas English is a **non-null-subject language**. More generally, there appears to be parametric variation between languages as to whether or not they allow finite verbs to have null subjects. The relevant parameter (termed the **Null-Subject Parameter**) would appear to be a binary one, with only

two possible settings for any given language L, viz. *L either does or doesn't allow finite verbs to have null subjects*. There appears to be no language which allows the subjects of some finite verbs to be null, but not others – e.g. no language in which it is OK to say *Drinks wine* (meaning 'He/she drinks wine') but not OK to say *Eats pasta* (meaning 'He/she eats pasta'). The range of grammatical variation found across languages appears to be strictly limited to just two possibilities – languages either do or don't systematically allow finite verbs to have null subjects. (A complication glossed over here is posed by languages in which only some finite verb forms can have null subjects: see Vainikka and Levy 1999 and the collection of papers in Jaeggli and Safir 1989 for illustration and discussion.)

A more familiar aspect of grammar which appears to be parametrised relates to word order, in that different types of language have different word orders in specific types of construction. One type of word-order variation can be illustrated in relation to the following contrast between English and Chinese questions:

(19) (a)    What do you think he will say?
    (b)    Ni    xiangxin ta  hui  shuo shenme
           You think     he will say   what?

In simple wh-questions in English (i.e. questions containing a single word beginning with *wh-* like *what/where/when/why*) the wh-expression is moved to the beginning of the sentence, as is the case with *what* in (19a). By contrast, in Chinese, the wh-word does not move to the front of the sentence, but rather remains **in situ** (i.e. in the same place as would be occupied by a corresponding non-interrogative expression), so that *shenme* 'what' is positioned after the verb *shuo* 'say' because it is the (direct object) complement of the verb, and complements of the relevant type are normally positioned after their verbs in Chinese. Thus, another parameter of variation between languages is the **wh-parameter** – a parameter which determines whether wh-expressions can be fronted (i.e. moved to the front of the overall interrogative structure containing them) or not. Significantly, this parameter again appears to be one which is binary in nature, in that it allows for only two possibilities – viz. a language either does or doesn't allow **wh-movement** (i.e. movement of wh-expressions to the front of the sentence). Many other possibilities for wh-movement just don't seem to occur in natural language: for example, there is no language in which the counterpart of *who* undergoes wh-fronting but not the counterpart of *what* (e.g. no language in which it is OK to say *Who did you see?* but not *What did you see?*). Likewise, there is no language in which wh-complements of some verbs can undergo fronting, but not wh-complements of other verbs (e.g. no language in which it is OK to say *What did he drink?* but not *What did he eat?*). It would seem that the range of parametric variation found with respect to wh-fronting is limited to just two possibilities: viz. a language either does or doesn't allow wh-expressions to be systematically fronted. (However, it should be noted that a number of complications are overlooked here in the interest of simplifying exposition: e.g.

some languages like English allow only one wh-expression to be fronted in this way, whereas others allow more than one wh-expression to be fronted; see Bošković 2002a for a recent account. An additional complication is posed by the fact that wh-movement appears to be optional in some languages, either in main clauses, or in main and complement clauses alike: see Denham 2000; Cheng and Rooryck 2000.)

Let's now turn to look at a rather different type of word-order variation, concerning the relative position of **heads** and **complements** within phrases. It is a general (indeed, universal) property of phrases that every phrase has a head word which determines the nature of the overall phrase. For example, an expression such as *students of philosophy* is a plural noun phrase because its head word (i.e. the key word in the phrase whose nature determines the properties of the overall phrase) is the plural noun *students*: the noun *students* (and not the noun *philosophy*) is the head word because the phrase *students of philosophy* denotes kinds of student, not kinds of philosophy. The following expression *of philosophy* which combines with the head noun *students* to form the noun phrase *students of philosophy* functions as the **complement** of the noun *students*. In much the same way, an expression such as *in the kitchen* is a prepositional phrase which comprises the head preposition *in* and its complement *the kitchen*. Likewise, an expression such as *stay with me* is a verb phrase which comprises the head verb *stay* and its complement *with me*. And similarly, an expression such as *fond of fast food* is an adjectival phrase formed by combining the head adjective *fond* with its complement *of fast food*.

In English all heads (whether nouns, verbs, prepositions, or adjectives etc.) normally precede their complements; however, there are also languages like Korean in which all heads normally follow their complements. In informal terms, we can say that English is a **head-first language**, whereas Korean is a **head-last language**. The differences between the two languages can be illustrated by comparing the English examples in (20) below with their Korean counterparts in (21):

(20) (a)     Close the door          (b) desire for change

(21) (a)     Muneul dadara          (b) byunhwa-edaehan galmang
             Door    close               change-for         desire

In the English verb phrase *close the door* in (20a), the head verb *close* precedes its complement *the door*; if we suppose that *the door* is a determiner phrase, then the head of the phrase (= the determiner *the*) precedes its complement (= the noun *door*). Likewise, in the English noun phrase *desire for change* in (20b), the head noun *desire* precedes its complement *for change*; the complement *for change* is in turn a prepositional phrase in which the head preposition *for* likewise precedes its complement *change*. Since English consistently positions heads before complements, it is a head-first language. By contrast, we find

precisely the opposite ordering in Korean. In the verb phrase *muneul dadara* (literally 'door close') in (21a), the head verb *dadara* 'close' follows its complement *muneul* 'door'; likewise, in the noun phrase *byunhwa-edaehan galmang* (literally 'change-for desire') in (21b) the head noun *galmang* 'desire' follows its complement *byunhwa-edaehan* 'change-for'; the expression *byunhwa-edaehan* 'change-for' is in turn a prepositional phrase whose head preposition *edaehan* 'for/about' follows its complement *byunhwa* 'change' (so that *edaehan* might more appropriately be called a **postposition**; prepositions and postpositions are differents kinds of **adposition**). Since Korean consistently positions heads after their complements, it is a head-last language. Given that English is head-first and Korean head-last, it is clear that the relative positioning of heads with respect to their complements is one word-order parameter along which languages differ; the relevant parameter is termed the **Head-Position Parameter**.

It should be noted, however, that word-order variation in respect of the relative positioning of heads and complements falls within narrowly circumscribed limits. There are many logically possible types of word-order variation which just don't seem to occur in natural languages. For example, we might imagine that in a given language some verbs would precede and others follow their complements, so that (e.g.) if two new hypothetical verbs like *scrunge* and *plurg* were coined in English, then *scrunge* might take a following complement, and *plurg* a preceding complement. And yet, this doesn't ever seem to happen: rather all verbs typically occupy the same position in a given language with respect to a given type of complement. (A complication overlooked here in the interest of expository simplicity is that some languages position some types of head before their complements, and other types of head after their complements: German is one such language, as you will see from exercise 1.2.)

What this suggests is that there are universal **constraints** (i.e. restrictions) on the range of parametric variation found across languages in respect of the relative ordering of heads and complements. It would seem as if there are only two different possibilities which the theory of Universal Grammar allows for: a given type of structure in a given language must either be **head-first** (with the relevant heads positioned before their complements), or **head-last** (with the relevant heads positioned after their complements). Many other logically possible orderings of heads with respect to complements appear not to be found in natural language grammars. The obvious question to ask is why this should be. The answer given by the theory of parameters is that the language faculty imposes genetic constraints on the range of parametric variation permitted in natural language grammars. In the case of the **Head-Position Parameter** (i.e. the parameter which determines the relative positioning of heads with respect to their complements), the language faculty allows only a binary set of possibilities – namely that a given kind of structure in a given language is either consistently head-first or consistently head-last.

We can generalise our discussion in this section in the following terms. If the **Head-Position Parameter** reduces to a simple binary choice, and if the **Wh-Parameter** and the **Null-Subject Parameter** also involve binary choices, it

seems implausible that **binarity** could be an accidental property of these particular parameters. Rather, it seems much more likely that it is an inherent property of parameters that they constrain the range of structural variation between languages, and limit it to a simple binary choice. Generalising still further, it seems possible that all grammatical variation between languages can be characterised in terms of a set of parameters, and that for each parameter, the language faculty specifies a binary choice of possible values for the parameter.

## 1.7    Parameter-setting

The theory of parameters outlined in the previous section has important implications for a theory of language acquisition. If all grammatical variation can be characterised in terms of a series of parameters with binary settings, it follows that the only grammatical learning which children have to undertake in relation to the syntactic properties of the relevant class of constructions is to determine (on the basis of their linguistic experience) which of the two alternative settings for each parameter is the appropriate one for the language being acquired. So, for example, children have to learn whether the native language they are acquiring is a null-subject language or not, whether it is a wh-movement language or not, and whether it is a head-first language or not . . . and so on for all the other parameters along which languages vary. Of course, children also face the formidable task of **lexical learning** – i.e. building up their vocabulary in the relevant language, learning what words mean and what range of forms they have (e.g. whether they are regular or irregular in respect of their morphology), what kinds of structures they can be used in and so on. On this view, the acquisition of grammar involves the twin tasks of **lexical learning** and **parameter-setting**.

This leads us to the following view of the language acquisition process. The central task which the child faces in acquiring a language is to construct a grammar of the language. The innate Language Faculty incorporates (i) a set of universal grammatical principles, and (ii) a set of grammatical parameters which impose severe constraints on the range of grammatical variation permitted in natural languages (perhaps limiting variation to binary choices). Since universal principles don't have to be learned, the child's syntactic learning task is limited to that of **parameter-setting** (i.e. determining an appropriate setting for each of the relevant grammatical parameters). For obvious reasons, the theory outlined here (developed by Chomsky at the beginning of the 1980s and articulated in Chomsky 1981) is known as **Principles-and-Parameters Theory/PPT**.

The PPT model clearly has important implications for the nature of the language acquisition process, since it vastly reduces the complexity of the acquisition task which children face. PPT hypothesises that grammatical properties which are universal will not have to be learned by the child, since they are wired into the language faculty and hence part of the child's genetic endowment: on the contrary, all the child has to learn are those grammatical properties which are subject to

parametric variation across languages. Moreover, the child's learning task will be further simplified if it turns out (as research since 1980 has suggested) that the values which a parameter can have fall within a narrowly specified range, perhaps characterisable in terms of a series of binary choices. This simplified **parameter-setting model** of the acquisition of grammar has given rise to a metaphorical acquisition model in which the child is visualised as having to set a series of switches in one of two positions (*up*/*down*) – each such switch representing a different parameter. In the case of the **Head-Position Parameter**, we can imagine that if the switch is set in the *up* position (for particular types of head), the language will show head-first word order in relevant kinds of structure, whereas if it is set in the *down* position, the order will be head-last. Of course, an obvious implication of the switch metaphor is that the switch must be set in either one position or the other, and cannot be set in both positions. (This would preclude, for example, the possibility of a language having both head-first and head-last word order in a given type of structure.)

The assumption that acquiring the grammar of a language involves the relatively simple task of setting a number of grammatical parameters provides a natural way of accounting for the fact that the acquisition of specific parameters appears to be a remarkably rapid and error-free process in young children. For example, young children acquiring English as their native language seem to set the Head-Position Parameter at its appropriate head-first setting from the very earliest multiword utterances they produce (at around eighteen months of age), and seem to know (tacitly, not explicitly, of course) that English is a head-first language. Accordingly, the earliest verb phrases and prepositional phrases produced by young children acquiring English consistently show verbs and prepositions positioned before their complements, as structures such as the following indicate (produced by a young boy called Jem/James at age twenty months; head verbs are italicised in (22a) and head prepositions in (22b), and their complements are in non-italic print):

(22) (a)   *Touch* heads. *Cuddle* book. *Want* crayons. *Want* malteser. *Open* door. *Want* biscuit. *Bang* bottom. *See* cats. *Sit* down

    (b)   *On* Mummy. *To* lady. *Without* shoe. *With* potty. *In* keyhole. *In* school. *On* carpet. *On* box. *With* crayons. *To* Mummy

The obvious conclusion to be drawn from structures like (22) is that children like Jem consistently position heads before their complements from the very earliest multiword utterances they produce. They do not use different orders for different words of the same type (e.g. they don't position the verb *see* after its complement but the verb *want* before its complement), or for different types of words (e.g. they don't position verbs before and prepositions after their complements).

A natural question to ask at this point is how we can provide a principled explanation for the fact that from the very onset of multiword speech we find English children correctly positioning heads before their complements. The **Principles-and-Parameters** model enables us to provide an explanation for why

children manage to learn the relative ordering of heads and complements in such a rapid and error-free fashion. The answer provided by the model is that learning this aspect of word order involves the comparatively simple task of setting a binary parameter at its appropriate value. This task will be a relatively straightforward one if the language faculty tells the child that the only possible choice is for a given type of structure in a given language to be uniformly head-first or uniformly head-last. Given such an assumption, the child could set the parameter correctly on the basis of minimal linguistic experience. For example, once the child is able to **parse** (i.e. grammatically analyse) an adult utterance such as *Help Daddy* and knows that it contains a verb phrase comprising the head verb *help* and its complement *Daddy*, then (on the assumption that the language faculty specifies that all heads of a given type behave uniformly with regard to whether they are positioned before or after their complements), the child will automatically know that all verbs in English are canonically (i.e. normally) positioned before their complements.

## 1.8      Evidence used to set parameters

One of the questions posed by the parameter-setting model of acquisition outlined here is just how children come to arrive at the appropriate setting for a given parameter, and what kind(s) of evidence they make use of in setting parameters. As Chomsky notes (1981, pp. 8–9), there are two types of evidence which we might expect to be available to the language learner in principle, namely **positive evidence** and **negative evidence**. Positive evidence comprises a set of observed expressions illustrating a particular phenomenon: for example, if children's speech input is made up of structures in which heads precede their complements, this provides them with positive evidence which enables them to set the Head-Position Parameter appropriately. Negative evidence might be of two kinds – **direct** or **indirect**. Direct negative evidence might come from the correction of children's errors by other speakers of the language. However, (contrary to what is often imagined) correction plays a fairly insignificant role in language acquisition, for two reasons. Firstly, correction is relatively infrequent: adults simply don't correct all the errors children make (if they did, children would soon become inhibited and discouraged from speaking). Secondly, children are notoriously unresponsive to correction, as the following dialogue (from McNeill 1966, p. 69) illustrates:

(23)      CHILD: Nobody don't like me
          ADULT: No, say: 'Nobody likes me'
          CHILD: Nobody don't like me
          (8 repetitions of this dialogue)
          ADULT: No, now listen carefully. Say 'Nobody likes me'
          CHILD: Oh, nobody don't likes me

As Hyams (1986, p. 91) notes: 'Negative evidence in the form of parental dis-approval or overt corrections has no discernible effect on the child's developing syntactic ability.' (For further evidence in support of this conclusion, see McNeill 1966; Brown, Cazden and Bellugi 1968; Brown and Hanlon 1970; Braine 1971; Bowerman 1988; Morgan and Travis 1989; and Marcus 1993.)

Direct negative evidence might also take the form of self-correction by other speakers. Such self-corrections tend to have a characteristic intonation and rhythm of their own, and may be signalled by a variety of fillers (such as those italicised in (24) below):

(24) (a)    The picture was hanged . . . *or rather* hung . . . in the Tate Gallery
     (b)    The picture was hanged . . . *sorry* hung . . . in the Tate Gallery
     (c)    The picture was hanged . . . *I mean* hung . . . in the Tate Gallery

However, self-correction is arguably too infrequent a phenomenon to play a major role in the acquisition process.

Rather than say that children rely on direct negative evidence, we might instead imagine that they learn from **indirect negative evidence** (i.e. evidence relating to the non-occurrence of certain types of structure). Suppose that a child's experience includes no examples of structures in which heads follow their complements (e.g. no prepositional phrases like *dinner after* in which the head preposition *after* follows its complement *dinner*, and no verb phrases such as *cake eat* in which the head verb *eat* follows its complement *cake*). On the basis of such indirect negative evidence (i.e. evidence based on the non-occurrence of head-last structures), the child might infer that English is not a head-last language.

Although it might seem natural to suppose that indirect negative evidence plays some role in the acquisition process, there are potential **learnability** problems posed by any such claim. After all, the fact that a given construction does not occur in a given chunk of the child's experience does not provide conclusive evidence that the structure is ungrammatical, since it may well be that the non-occurrence of the relevant structure in the relevant chunk of experience is an accidental (rather than a systematic) gap. Thus, the child would need to process a very large (in principle, infinite) chunk of experience in order to be sure that non-occurrence reflects ungrammaticality. It seems implausible to suppose that children store massive chunks of experience in this way and search through it for negative evidence about the non-occurrence of certain types of structure. In any case, given the assumption that parameters are binary and single-valued, negative evidence becomes entirely unnecessary: after all, once the child hears a prepositional phrase like *with Daddy* in which the head preposition *with* precedes its complement *Daddy*, the child will have positive evidence that English allows head-first order in prepositional phrases; and given the assumptions that the Head-Position Parameter is a binary one and that each parameter allows only a single setting, then it follows (as a matter of logical necessity) that if English allows head-first prepositional phrases, it will not allow head-last prepositional phrases. Thus, in order for the child to know that English doesn't allow head-last prepositional

phrases, the child does not need negative evidence from the non-occurrence of such structures, but rather can rely on positive evidence from the occurrence of the converse order in head-first structures (on the assumption that if a given structure is head-first, UG specifies that it cannot be head-last). And, as we have already noted, a minimal amount of positive evidence is required in order to identify English as a uniformly head-first language (i.e. a language in which *all* heads precede their complements). Learnability considerations such as these have led Chomsky (1986a, p. 55) to conclude that 'There is good reason to believe that children learn language from positive evidence only.' The claim that children do not make use of negative evidence in setting parameters is known as the **No-Negative-Evidence Hypothesis**; it is a hypothesis which is widely assumed in current acquisition research. (See Guasti 2002 for a technical account of language acquisition within the framework used here.)

## 1.9     Summary

We began this chapter in §1.2 with a brief look at traditional grammar, noting that this is a **taxonomic** (i.e. classificatory) system in which the syntax of a language is essentially described in terms of a list of phrase, clause and sentence types found in the language. We noted that Chomsky adopts a very different **cognitive** approach to the study of language in which a grammar of a language is a model of the internalised grammatical **competence** (or **I-language**) of a native speaker of the language. We saw that Chomsky's ultimate goal is to develop a theory of **Universal Grammar/UG** which characterises the defining properties of the grammars of natural languages – a theory which is universal, explanatory and constrained, and which provides descriptively adequate grammars which are minimally complex and hence learnable. In §1.4, we went on to look at the nature of language acquisition, and argued that the most fundamental question for a theory of language acquisition to answer is why it should be that after a period of a year and a half during which there is little evidence of grammatical development visible in the child's speech output, most of the grammar of the language is acquired by children during the course of the following year. We outlined the **innateness hypothesis** put forward by Chomsky, under which the course of language acquisition is genetically predetermined by an innate **language faculty**. In §1.5, we noted Chomsky's claim that the language faculty incorporates a theory of **Universal Grammar/UG** which embodies a set of universal grammatical principles that determine the ways in which grammatical operations work; and we saw that the syntax of questions in English provides evidence for postulating that syntactic operations are constrained by a universal **Locality Principle**. In §1.6, we went on to argue that the grammars of natural languages vary along a number of **parameters**. We looked at three such parameters – the **Wh-Parameter**, the **Null-Subject Parameter**, and the **Head-Position Parameter**, arguing that each of these parameters is binary in nature by virtue of having two alternative

settings. In §1.7, we argued that the syntactic learning task which children face involves **parameter-setting** – i.e. determining which of two possible settings is the appropriate one for each parameter in the language being acquired. We further argued that if parameters have binary settings (e.g. so that a given kind of structure in a given language is either head-first or head-last), we should expect to find evidence that children correctly set parameters from the very onset of multiword speech: and we presented evidence to suggest that from their very earliest multiword utterances, children acquiring English as their mother tongue correctly set the Head-Position Parameter at the head-first value appropriate for English. We concluded that the acquisition of grammar involves the twin tasks of lexical learning (i.e. acquiring a **lexicon**/vocabulary) and parameter-setting. In §1.8, we asked what kind of evidence children use in setting parameters, and concluded that they use **positive evidence** from their experience of the occurrence of specific types of structure (e.g. head-first structures, or null-subject structures, or wh-movement structures).

## Workbook section

### Exercise 1.1

Below are examples of utterances produced by a girl called Lucy at age twenty-four months. Comment on whether Lucy has correctly set the three parameters discussed in the text (the Head-Position Parameter, the Wh-Parameter and the Null-Subject Parameter). Discuss the significance of the relevant examples for the parameter-setting model of acquisition.

| | Child sentence | Adult counterpart |
|---|---|---|
| 1 | What doing? | 'What are you doing?' |
| 2 | Want bye-byes | 'I want to go to sleep' |
| 3 | Mummy go shops | 'Mummy went to the shops'; this was in reply to 'Where did Mummy go?' |
| 4 | Me have yoghurt? | 'Can I have a yoghurt?' |
| 5 | Daddy doing? | 'What's Daddy doing?' |
| 6 | Think Teddy sleeping | 'I think Teddy's sleeping'; this was in reply to 'What d'you think Teddy's doing?' |
| 7 | What me having? | 'What am I having?'; this followed her mother saying 'Mummy's having fish for dinner' |
| 8 | No me have fish | 'I'm not going to have fish' |
| 9 | Where Daddy gone? | 'Where's Daddy gone?' |
| 10 | Gone office | 'He's gone to his office' |
| 11 | Want bickies | 'She wants some biscuits'; this was her reply to 'What does Dolly want?' |
| 12 | What Teddy have? | 'What can Teddy have?' |
| 13 | Where going? | 'Where are you going?' |
| 14 | Me go shops | 'I want to go to the shops' |
| 15 | Daddy drinking coffee | 'Daddy's drinking coffee' |
| 16 | What Nana eating? | 'What's Grandma eating?' |
| 17 | Want choc'ate | 'He wants some chocolate'; this was her reply to 'Teddy wants some meat, does he?' |

| 18 | Dolly gone? | 'Where's Dolly gone?' |
| 19 | Watch te'vision | 'I'm going to watch television' |
| 20 | Me have more | 'I want to have some more' |
| 21 | In kitchen | 'In the kitchen' (reply to 'Where's Mummy?') |
| 22 | Me play with Daddy | 'I want to play with Daddy' |
| 23 | Open door | '(Please) open the door!' |

## Helpful hints

If Lucy has correctly set the Wh-Parameter, we should expect to find that she systematically preposes wh-expressions and positions them sentence-initially. If she has correctly set the Head-Position Parameter, we should expect to find (e.g.) that she correctly positions the complement of a verb after the verb, and the complement of a preposition after the preposition; however, where the complement is a wh-expression, we expect to find that the complement is moved into sentence-initial position in order to satisfy the requirements of the Wh-Parameter (if the Wh-Parameter in some sense overrides the Head-Position Parameter). If Lucy has correctly set the Null-Subject Parameter, we should expect to find that she does not use null subjects in finite clauses: however, it seems clear that many of the sentences produced by two-year-old English children like Lucy do indeed have null subjects – and this led Nina Hyams in influential research (1986, 1992) to conclude that English children go through a **null-subject stage** in which they use Italian-style null finite (*pro*) subjects. If Hyams is right, this implies that children may sometimes start out with incorrect settings for a given parameter, and then later have to *re-set* the parameter – a conclusion which (if true) would provide an obvious challenge to the simple parameter-setting model of acquisition outlined in the main text.

However, the picture relating to the use of null subjects is complicated by the fact that in addition to **finite null subjects** (i.e. the *pro* subject found in finite clauses in languages like Italian but not English), there are three other types of null subject which occur in adult English (and other languages). One are **imperative null subjects**, found in imperatives such as *Shut up!* and *Don't say anything!* (Imperatives are sentences used to issue orders; they are the kind of sentences you can put *please* in front of – as in *Please don't say anything!*) Another are **non-finite null subjects** which are found in a range of non-finite clauses in English (i.e. clauses containing a verb which is not marked for tense and agreement), including main clauses like *Why worry?* and complement clauses like those bracketed in *I want* [*to go home*] and *I like* [*playing tennis*]: the kind of null subject found in non-finite clauses in English is usually designated as *PRO* and called 'big PRO' (whereas the kind of null subject found in a finite clause in a null-subject language like Italian is designated as *pro* and called 'little pro'. The terms *big* and *little* here simply reflect the fact that PRO is written in 'big' capital letters, and *pro* in 'small' lower-case letters). A third type of null subject found in English are **truncated null subjects** – so called because English has a process of **truncation** which allows one or more words at the beginning of a sentence to be truncated (i.e. omitted) in certain types of style (e.g. diary styles of written English and informal styles of spoken English). Hence in colloquial English, a question like *Are you doing anything tonight?* can be reduced (by truncation) to *You doing anything tonight?* and further reduced (again by truncation) to *Doing anything tonight?* Truncation is also found in abbreviated written styles of English: for example, a diary entry might read *Went to a party. Had a great time. Got totally smashed* (with the subject *I* being truncated in each of the three sentences). An important constraint on truncation is that it can only affect words at the beginning of a sentence, not, for example, words in the middle of a sentence: hence, although we can truncate *are* and *you* in *Are you doing anything tonight?* we

can't truncate them in *What are you doing tonight?* (as we see from the ungrammaticality of *What doing tonight?*) since here *are* and *you* are preceded by *what* and hence occur in the middle of the sentence.

What all of this means is that in determining whether Lucy has mis-set the Null-Subject Parameter and has misanalysed English as a null-subject language (i.e. a language which allows finite null 'little *pro*' subjects), you have to bear in mind the alternative possibility that the null subjects used by Lucy may represent one or more of the three kinds of null subject permitted in adult English (viz. imperative null subjects, truncated null subjects and non-finite null subjects).

Since truncation occurs only sentence-initially (at the beginning of a sentence), but finite null (little *pro*) subjects in a genuine null-subject language like Italian can occur in any subject position in a sentence, one way of telling the difference between a finite null subject and a truncated null subject is to see whether children omit subjects only when they are the first word in a sentence (which could be the result of *truncation*), or whether they also omit subjects in the middle of sentences (as is the case in a genuine null-subject language like Italian). Another way of differentiating the two is that in null-subject languages we find that overt pronoun subjects are only used for emphasis, so that in an Italian sentence like *L'ho fatto io* (literally 'It have done I') the subject pronoun *io* 'I' has a contrastive interpretation, and the relevant sentence is paraphraseable in English as '*I* was the one who did it' (where italics indicate contrastive stress); by contrast, in a non-null-subject language like English, subject pronouns are not intrinsically emphatic – e.g. *he* doesn't necessarily have a contrastive interpretation in an English diary-style sentence such as *Went to see Jim. Thought he might help*. A third way of telling whether truncation is operative in Lucy's grammar or not is to see whether expressions other than subjects can be truncated, as can happen in adult English (e.g. *What time is it?* can be reduced to *Time is it?* via truncation in rapid spoken English).

At first sight, it might seem unlikely that (some of) Lucy's null subjects could be non-finite ('big PRO') subjects, since all the clauses she produces in the data given above occur in finite contexts (i.e. in contexts where adults would use a finite clause). Note, however, that two-year-old children typically go through a stage which Wexler (1994) calls the **Optional Infinitives/OI** stage during which (in finite contexts) they sometimes produce finite clauses, and sometimes non-finite clauses (the relevant non-finite clauses typically containing an infinitive form like *go* or a participle like *going/gone*). Hence, an additional possibility to bear in mind is that some of Lucy's clauses may be non-finite and have non-finite ('big PRO') null subjects.

In relation to the sentences in 1–23, make the following assumptions. In 1 *doing* is a verb which has a null subject and the complement *what*; in 2 *want* is a verb which has a null subject and the complement *bye-byes*; in 3 *go* is a verb which has the subject *Mummy* and the complement *shops*; in 4 *have* is a verb which has the subject *me* and the complement *yoghurt*; in 5 *doing* is a verb which has the subject *Daddy*, and its complement is a null counterpart of *what*; in 6 *think* is a verb with a null subject and its complement is *Teddy sleeping* (with *Teddy* serving as the subject of the verb *sleeping*); in 7, *having* is a verb which has the subject *me* and the complement *what*; in 8 *no* is a negative particle which has the complement *me have fish* (assume that *no* is the kind of word which doesn't have a subject), and *have* is a verb which has the subject *me* and the complement *fish*; in 9 *gone* is a verb which has the subject *Daddy* and the complement *where*; in 10 *gone* is a verb which has a null subject and the complement *office*; in 11 *want* is a verb which has a null subject and the complement *bickies*; in 12 *have* is a verb which has the subject *Teddy* and the complement *what*; in 13 *going* is a verb which has a null subject and the complement *where*; in 14

*go* is a verb which has the subject *me* and the complement *shops*; in 15 *drinking* is a verb which has the subject *Daddy* and the complement *coffee*; in 16 *eating* is a verb which has the subject *Nana* and the complement *what*; in 17 *want* is a verb which has a null subject and the complement *choc'ate*; in 18 *gone* is a verb which has the subject *Dolly* and its complement is a null counterpart of *where*; in 19 *watch* is a verb which has a null subject and the complement *te'vision*; in 20 *have* is a verb which has the subject *me* and the complement *more*; 21 is a prepositional phrase in which the preposition *in* has the complement *kitchen* (assume that phrases don't have subjects); in 22 *play* is a verb which has the subject *me* and the complement *with Daddy* (and in turn *Daddy* is the complement of the preposition *with*); and in 23 *open* is a verb whose subject is null and whose complement is *door*.

## Model answer for sentence 1

In *What doing?* the two-place predicate *doing* has an overt object *what* and a null subject of some kind. Since the object *what* does not occupy the normal postverbal position associated with objects in English (cf. the position of the object *something* in *Do something!*), *what* has clearly undergone wh-movement: this suggests that Lucy has correctly set the wh-parameter at the 'requires wh-movement' value appropriate for English. Because the object complement *what* has undergone wh-movement, we cannot tell (from this sentence) whether Lucy generally positions (unmoved) complements after their heads: in other words, this particular sentence provides us with no evidence of whether Lucy has correctly set the Head-Position Parameter or not (though other examples in the exercise do). Much more difficult to answer is the question of whether Lucy has correctly set the Null-Subject Parameter at the value appropriate to English, and hence (tacitly) 'knows' that finite clauses do not allow a null finite *pro* subject in English. At first sight, it might seem as if Lucy has wrongly analysed English as a null-subject language (and hence mis-set the Null-Subject Parameter), since *What doing?* has a null subject of some kind. But the crucial question here is: what kind of null subject does the verb *doing* have? It clearly cannot be an imperative null subject, since the sentence is interrogative in force, not imperative. Nor can it be a truncated null subject, since truncated subjects only occur in sentence-initial position (i.e. as the first word in a sentence), and *what* is the first word in the sentence in *What doing*? (since preposed wh-words occupy sentence-initial position in questions). This leaves two other possibilities. One is that the null subject in *What doing?* is the 'little *pro*' subject found in finite clauses in genuine null-subject languages like Italian: since the verb *doing* is non-finite, this would entail positing that the sentence *What doing?* contains a null (i.e. 'silent' or 'invisible') finite auxiliary (raising questions about why the auxiliary is null rather than overt); this in turn would mean that Lucy has indeed mis-set the Null-Subject Parameter (raising questions about how she comes to do so, and why she doesn't mis-set the other two parameters we are concerned with here). However, an alternative possibility is that the structure *What doing?* is a non-finite clause (like adult questions such as *Why worry?*) and has the kind of non-finite ('big PRO') null subject found in non-finite clauses in many languages (English included). If so (i.e. if *What doing* is a non-finite clause which has the structure *What PRO doing?*), there would be no evidence that Lucy has mis-set the Null-Subject Parameter – i.e. no evidence that she ever produces finite clauses with a 'little *pro*' subject. This in turn would mean that we can maintain the hypothesis put forward in the main text that children correctly set parameters at their appropriate value from the very earliest stages of the acquisition of syntax. The error Lucy makes in producing sentences like *What doing*? would be in not knowing that main clauses generally have to be finite in English, and that main clause questions generally have to contain a finite auxiliary.

Exercise 1.2

In the text, we noted that the Head-Position Parameter has a uniform head-first setting (in the sense that all heads precede their complements) in English, and a uniform head-last setting (in the sense that all heads follow their complements) in Korean. However, we also noted that there are languages in which *some* heads precede their complements (giving rise to head-first structures), and *others* follow them (giving rise to head-last structures). German is argued by some to be a language of this latter type, in which (e.g.) prepositions, determiners and complementisers canonically precede their complements, but (auxiliary and main) verbs canonically follow their complements. Discuss the extent to which German sentences like those in 1–5 below (kindly provided for me by Harald Clahsen) bear out this claim, and say which examples prove problematic and why.

1      Hans muss stolz  auf seine Mutter sein
       Hans must  proud of  his    mother be
       'Hans must be proud of his mother'

2      Hans muss auf seine Mutter stolz  sein
       Hans must  of  his    mother proud be
       'Hans must be proud of his mother'

3      Hans geht den Fluss entlang
       Hans goes the river  along
       'Hans goes along the river'

4      Hans muss die Aufgaben lösen
       Hans must  the exercises do
       'Hans must do the exercises'

5      Ich glaube dass Hans die Aufgaben lösen muss
       I    think   that Hans the exercises do    must
       'I think that Hans must do the exercises'

Likewise, in the text we claimed that the Wh-parameter has a uniform setting in that languages either do or don't systematically prepose wh-expressions. Discuss the potential problems posed for this claim by colloquial French interrogative structures such as those below:

6      Où    tu   vas?
       Where you go?
       'Where are you going?'

7      Tu   vas où?
       You go   where?
       'Where are you going?'

8      Dis-moi où    tu   vas
       Tell-me  where you go
       'Tell me where you are going'

9      *Dis-moi tu   vas où
       Tell-me   you go  where
       (intended as synonymous with 8)

*Helpful hints*

In relation to the German sentences 1–5, make the following assumptions about their structure. In 1 and 2 *muss* is a finite (modal) verb, *Hans* is its subject and *stolz auf seine Mutter sein* is its complement; *sein* is an infinitive verb form and *stolz auf seine Mutter* is its complement; *stolz* is an adjective, and *auf seine Mutter* is its complement; *auf* is a preposition and *seine Mutter* is its complement; *seine* is a determiner, and *Mutter* is its complement. In 3 *geht* is a verb, *Hans* is its subject and *den Fluss entlang* is its complement; *entlang* is a preposition (or, more precisely, a **postposition**) and *den Fluss* is its complement; *den* is a determiner and *Fluss* is its complement. In 4 *muss* is a finite verb, *Hans* is its subject and *die Aufgaben lösen* is its complement; *lösen* is a non-finite verb in the infinitive form, and *die Aufgaben* is its complement; *die* is a determiner and *Aufgaben* is its complement. In 5 *glaube* is a finite verb, *ich* is its subject and *dass Hans die Aufgaben lösen muss* is its complement; *dass* is a complementiser (i.e. a complement-clause-introducing particle or conjunction) and *Hans die Aufgaben lösen muss* is its complement; *muss* is a finite verb, *Hans* is its subject, and *die Aufgaben lösen* is its complement; *lösen* is a non-finite verb in the infinitive form and *die Aufgaben* is its complement; *die* is a determiner and *Aufgaben* is its complement.

In relation to the examples in 1–5, identify all the prepositions, complementisers and determiners you can find in the sentences, and say whether (as claimed above) these precede their complements. Likewise, identify all the (auxiliary and main) verbs found in the sentences and say whether they do (or do not) follow their complements, as claimed above. Pay particular attention to heads which are exceptions to the relevant generalisations about head position. Assume that exceptional word order can be accounted for either in lexical terms (e.g. that the lexical entry for a particular preposition may say that it does not occupy the canonical head-first position found in typical prepositional phrases), or in structural terms (in that a particular kind of head may undergo a movement operation which moves it out of its canonical position). In relation to possible structural factors which mask the underlying word order in German, bear in mind that German is traditionally claimed to be a **verb-second/V2** language – i.e. a language in which a finite verb (= V) in a main clause is moved out of its canonical position into second position in the clause, e.g. into a position where it immediately follows a subject expression like *Hans* or *ich* 'I'. In addition, comment on the problems posed by determining the canonical setting of the Head-Position Parameter for adjectival phrases in German.

In relation to the French sentences 6–9, bear in mind that *Où tu vas* and *Tu vas où* are main clauses in 6 and 7 and complement clauses in 8 and 9 (in that they serve as the complement of the imperative verb *dis* 'tell' in 8 and 9). Is there an asymmetry between how wh-movement works in main clauses and in complement clauses? Does this suggest that it may be too simplistic to posit a Wh-Parameter under which wh-expressions either are or aren't systematically preposed? Why?

*Model answer for sentence 1*

In 1, the determiner *seine* 'his' precedes its complement *Mutter* 'mother', and the preposition *auf* 'of' precedes its complement *seine Mutter* 'his mother', in accordance with the suggested generalisation that determiners and prepositions in German show canonical head-first order and hence are typically positioned before their complements. The adjective *stolz* 'proud' also precedes its complement *auf seine Mutter* 'of his mother' in 1. By contrast, the verb *sein* 'be' follows its complement *stolz auf seine Mutter* 'proud of his mother'. One possible generalisation which this might suggest is the following:

(i)            In German, verbs are canonically positioned after their complements, but
               other heads are canonically positioned before their complements

However, an apparent exception to the claim made in (i) is posed by the fact that the finite verb
*muss* 'must' in the main clause precedes its own complement *stolz auf seine Mutter sein* 'proud of
his mother be'. This apparently exceptional word order is arguably attributable to the status of
German as a so-called **verb-second** language – i.e. a language which has a verb-fronting
operation which moves a finite verb in a main clause out of the canonical clause-final position
occupied by verbs (including by the verb *muss* in 5) into second position within the clause: as a
result of this movement operation, the verb *muss* comes to follow the main clause subject *Hans*.
(For a discussion of the structure of verb-second clauses in German, see Radford et al. 1999,
pp. 349–54 – though some of the material there may not be clear to you until you have read the
first six chapters in this book.)

# 2 Words

## 2.1 Overview

In this chapter, we look at the grammatical properties of words. We begin by looking at the categorial properties of words and at how we determine what grammatical category a given word belongs to (in a given use): in the course of our discussion we introduce some new categories which will not be familiar from traditional grammar. We go on to show that categorial information alone is not sufficient to describe the grammatical properties of words, ultimately concluding that the grammatical properties of words must be characterised in terms of sets of **grammatical features**.

## 2.2 Grammatical categories

In §1.2, we noted that words are assigned to grammatical categories in traditional grammar on the basis of their shared semantic, morphological and syntactic properties. The kind of semantic criteria (sometimes called 'notional' criteria) used to categorise words in traditional grammar are illustrated in much-simplified form below:

(1)       (i) Verbs denote actions (*go, destroy, buy, eat* etc.)
       (ii) Nouns denote entities (*car, cat, hill, John* etc.)
     (iii) Adjectives denote states (*ill, happy, rich* etc.)
     (iv) Adverbs denote manner (*badly, slowly, painfully, cynically* etc.)
      (v) Prepositions denote location (*under, over, outside, in, on* etc.)

However, semantically based criteria for identifying categories must be used with care: for example, *assassination* denotes an action but is a noun, not a verb; *illness* denotes a state but is a noun, not an adjective; in *fast food*, the word *fast* denotes the manner in which the food is prepared but is an adjective, not an adverb; and *Cambridge* denotes a location but is a noun, not a preposition.

The **morphological** criteria for categorising words concern their **inflectional** and **derivational** properties. Inflectional properties relate to different forms of the same word (e.g. the plural form of a noun like *cat* is formed by adding the

plural inflection *-s* to give the form *cats*); derivational properties relate to the processes by which a word can be used to form a different kind of word by the addition of an **affix** of some kind (e.g. by adding the suffix *-ness* to the adjective *sad* we can form the noun *sadness*). Although English has a highly impoverished system of inflectional morphology, there are nonetheless two major categories of word which have distinctive inflectional properties – namely **nouns** and **verbs**. We can identify the class of nouns in terms of the fact that they generally inflect for **number**, and thus have distinct **singular** and **plural** forms – cf. pairs such as *dog/dogs, man/men, ox/oxen* etc. Accordingly, we can differentiate a noun like *fool* from an adjective like *foolish* by virtue of the fact that only (regular, countable) nouns like *fool* – not adjectives like *foolish* – can carry the noun plural inflection *-s*:

(2)        They are *fools* [noun]/*\*foolishes* [adjective]

There are several complications which should be pointed out, however. One is the existence of irregular nouns like *sheep* which are invariable and hence have a common singular/plural form (cf. *one sheep, two sheep*). A second is that some nouns are intrinsically singular (and so have no plural form) by virtue of their meaning: only those nouns (called **count/countable nouns**) which denote entities which can be counted have a plural form (e.g. *chair* – cf. *one chair*, *two chairs*); some nouns denote an uncountable mass and for this reason are called **mass/uncountable/non-count nouns**, and so cannot be pluralised (e.g. *furniture* – hence the ungrammaticality of *\*one furniture*, *\*two furnitures*). A third is that some nouns (like *scissors* and *trousers*) have a plural form but no countable singular form. A fourth complication is posed by noun expressions which contain more than one noun; only the **head** noun in such expressions can be pluralised, not any preceding noun used as a **modifier** of the head noun: thus, in expressions such as *car doors*, *policy decisions*, *skate boards*, *horse boxes*, *trouser presses*, *coat hangers* etc. the second noun is the head and can be pluralised, whereas the first noun is a modifier and so cannot be pluralised.

   In much the same way, we can identify **verbs** by their inflectional morphology in English. In addition to their uninflected **base** form (= the citation form under which they are listed in dictionaries), verbs typically have up to four different inflected forms, formed by adding one of four inflections to the appropriate stem form: the relevant inflections are the perfect/passive participle suffix *-n*, the past-tense suffix *-d*, the third-person-singular present-tense suffix *-s*, and the progressive participle/gerund suffix *-ing*. Like most morphological criteria, however, this one is complicated by the irregular and impoverished nature of English inflectional morphology; for example, many verbs have irregular past or perfect forms, and in some cases either or both of these forms may not in fact be distinct from the (uninflected) base form, so that a single form may serve two or three functions (thereby **neutralising** or **syncretising** the relevant distinctions), as the table (3) below illustrates:

(3)  **Table of verb forms**

| Base | Perfect | Past | Present | Progressive |
|---|---|---|---|---|
| show | shown | showed | shows | showing |
| go | gone | went | goes | going |
| speak | spoken | spoke | speaks | speaking |
| see | seen | saw | sees | seeing |
| come | | came | comes | coming |
| wait | waited | | waits | waiting |
| meet | met | | meets | meeting |
| cut | | | cuts | cutting |

(The largest class of verbs in English are regular verbs which have the morphological characteristics of *wait*, and so have past, perfect and passive forms ending in the suffix *-d*.) The picture becomes even more complicated if we take into account the verb *be*, which has eight distinct forms (viz. the base form *be*, the perfect form *been*, the progressive form *being*, the past forms *was/were*, and the present forms *am/are/is*). The most regular verb suffix in English is *-ing*, which can be attached to the base form of almost any verb (though a handful of defective verbs like *beware* are exceptions).

   The obvious implication of our discussion of nouns and verbs here is that it would not be possible to provide a systematic account of English inflectional morphology unless we were to posit that words belong to grammatical categories, and that a specific type of inflection attaches only to a specific category of word. The same is also true if we wish to provide an adequate account of **derivational morphology** in English (i.e. the processes by which words are derived from other words): this is because particular derivational affixes can only be attached to words belonging to particular categories. For example, the negative prefixes *un-* and *in-* can be attached to adjectives to form a corresponding negative adjective (as in pairs such as *happy/unhappy* and *flexible/inflexible*) but not to nouns (so that a noun like *fear* has no negative counterpart *\*unfear*), nor to prepositions (so that a preposition like *inside* has no negative antonym *\*uninside*). Similarly, the adverbialising (i.e. adverb-forming) suffix *-ly* in English can be attached only to adjectives (giving rise to adjective/adverb pairs such as *sad/sadly*) and cannot be attached to a noun like *computer*, or to a verb like *accept*, or to a preposition like *with*. Likewise, the nominalising (i.e. noun-forming) suffix *-ness* can be attached only to adjective stems (so giving rise to adjective/noun pairs such as *coarse/coarseness*), not to nouns, verbs or prepositions. (Hence we don't find *-ness* derivatives for a noun like *boy*, or a verb like *resemble*, or a preposition like *down*.) In much the same way, the comparative suffix *-er* can be attached to adjectives (e.g. *tall/taller*) and some adverbs (e.g. *soon/sooner*) but not to other types of word (e.g. *woman/\*womanner*); and the superlative suffix *-est* can attach to adjectives (e.g. *tall/tallest*) but not other types of word (e.g. *down/\*downest*; *donkey/\*donkiest*, *enjoy/\*enjoyest*). There is no point in multiplying examples

here: it is clear that derivational affixes have categorial properties, and any account of derivational morphology will clearly have to recognise this fact (see e.g. Aronoff 1976 and Fabb 1988).

As we noted earlier, there is also *syntactic* evidence for assigning words to categories: this essentially relates to the fact that different categories of words have different **distributions** (i.e. occupy a different range of positions within phrases or sentences). For example, if we want to complete the four-word sentence in (4) below by inserting a single word at the end of the sentence in the — position:

(4)       They have no —

we can use an (appropriate kind of) noun, but not a verb, preposition, adjective, or adverb, as we see from:

(5) (a)       They have no *car/conscience/friends/ideas* [nouns]
    (b)       *They have no *went* [verb]/*for* [preposition]/*older* [adjective]/*conscientiously* [adverb]

So, using the relevant syntactic criterion, we can define the class of nouns as the set of words which can terminate a sentence in the position marked — in (4).

Using the same type of syntactic evidence, we could argue that only a verb (in its infinitive/base form) can occur in the position marked — in (6) below to form a complete (non-elliptical) sentence:

(6)       They/it can —

Support for this claim comes from the contrasts in (7) below:

(7) (a)       They can *stay/leave/hide/die/starve/cry* [verb]
    (b)       *They can *gorgeous* [adjective]/*happily* [adverb]/*down* [preposition]/*door* [noun]

And the only category of word which can occur after *very* (in the sense of *extremely*) is an adjective or adverb, as we see from (8) below:

(8) (a)       He is *very* **slow** [*very*+**adjective**]
    (b)       He walks *very* **slowly** [*very*+**adverb**]
    (c)       **Very* **fools** waste time [*very*+**noun**]
    (d)       *He *very* **adores** her [*very*+**verb**]
    (e)       *It happened *very* **after** the party [*very*+**preposition**]

(But note that *very* can only be used to modify adjectives/adverbs which by virtue of their meaning are **gradable** and so can be qualified by words like *very/rather/somewhat* etc; adjectives/adverbs which denote an absolute state are **ungradable** by virtue of their meaning, and so cannot be qualified in the same way – hence the oddity of *!Fifteen students were very present, and five were very absent*, where ! marks semantic anomaly.)

Moreover, we can differentiate adjectives from adverbs in syntactic terms. For example, only adverbs can be used to end sentences such as *He treats her —*, *She behaved —*, *He worded the statement —*:

(9) (a)    He treats her *badly* [adverb]/\**kind* [adjective]/\**shame* [noun]/\**under* [preposition]

(b)    She behaved *abominably* [adverb]/\**appalling* [adjective]/\**disgrace* [noun]/\**down* [preposition]

(c)    He worded the statement *carefully* [adverb]/\**good* [adjective]/\**tact* [noun]/\**in* [preposition]

And since adjectives (but not adverbs) can serve as the complement of the verb *be* (i.e. can be used after *be*), we can delimit the class of (gradable) adjectives uniquely by saying that only adjectives can be used to complete a four-word sentence of the form *They are very —*:

(10) (a)    They are very *tall/pretty/kind/nice* [adjective]

(b)    \*They are very *slowly* [adverb]/*gentlemen* [noun]/*astonish* [verb]/*outside* [preposition]

Another way of differentiating between an adjective like *real* and an adverb like *really* is that adjectives are used to modify nouns, whereas adverbs are used to modify other types of expression:

(11) (a)    There is a *real* **crisis** [*real*+**noun**]

(b)    He is *really* **nice** [*really*+**adjective**]

(c)    He walks *really* **slowly** [*really*+**adverb**]

(d)    He is *really* **down** [*really*+**preposition**]

(e)    He must *really* **squirm** [*really*+**verb**]

Adjectives used to modify a following noun (like *real* in *There is a real crisis*) are traditionally said to be **attributive** in function, whereas those which do not modify a following noun (like *real* in *The crisis is real*) are said to be **predicative** in function.

As for the syntactic properties of prepositions, they alone can be intensified by *right* in the sense of 'completely', or by *straight* in the sense of 'directly':

(12) (a)    Go *right* **up** the ladder

(b)    He went *right* **inside**

(c)    He walked *straight* **into** a wall

(d)    He fell *straight* **down**

By contrast, other categories cannot be intensified by *right/straight* (in Standard English):

(13) (a)    \*He *right/straight* **despaired** [*right/straight*+**verb**]

(b)    \*She is *right/straight* **pretty** [*right/straight*+**adjective**]

(c)    \*She looked at him *right/straight* **strangely** [*right/straight*+**adverb**]

(d)    \*They are *right/straight* **fools** [*right/straight*+**noun**]

It should be noted, however, that since *right/straight* serve to intensify the meaning of a preposition, they can only be combined with those (uses of) prepositions which express the kind of meaning which can be intensified in the appropriate way (so that *He made right/straight for the exit* is OK, but \**He bought a present right/straight for Mary* is not).