1 Grammar

1.1 Overview

In broad terms, this book is concerned with aspects of grammar. Grammar is traditionally subdivided into two different but inter-related 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 take a look at the approach to syntax adopted by Chomsky.

1.2 Universal 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 vehemently

it would traditionally be said that each of the three words in the sentence belongs to a specific grammatical category (*students* being a plural **noun**, *protested* a past tense **verb**, and *vehemently* an **adverb**) and that each serves a specific grammatical

function (*protested* being a **predicate**, *students* being its sole **argument** and functioning as the **subject** of *protested*, and *vehemently* being an **adjunct** – i.e. an expression which provides additional information about the time, place or manner of an event). The overall sentence *Students protested vehemently* 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 e.g. ask a question).

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 fluently: 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 fluent 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 Universal Grammar 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 provide 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

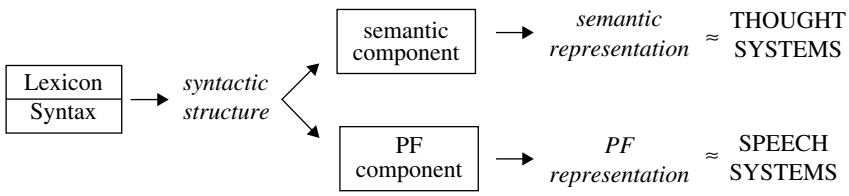
they do?' The requirement that a theory should explain why grammars have the properties they do is conventionally referred to as the criterion of **explanatory adequacy**.

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 Universal Grammar 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**, giving us a phonetic **spellout** for each word, 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:

(2)



In terms of the model in (2), 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.

1.3 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

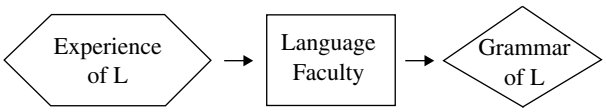
with the question of how children acquire grammars of their native languages. Children generally produce their first recognisable word (e.g. *Mama* or *Dada*) by the age of twelve months. For the next six months or so, there is little apparent evidence of grammatical development in their speech production, although the child's productive vocabulary typically increases by about five words a month until it reaches around 30 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 (3) below (where L is the language being acquired):

(3)



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 ungrammatical (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 to 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 (or gradually atrophies) at the onset of puberty. (For further discussion of the innateness hypothesis, see Antony and Hornstein 2002.)

1.4 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, 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:

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

In (4), 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 (4) is called an **echo question**. However, speaker B could alternatively have replied with a **non-echo question** like that below:

(5) Who had he said would do what?

If we compare the echo question *He had said who would do what?* in (4) with the corresponding non-echo question *Who had he said would do what?* in (5), we find that (5) involves two movement operations which are not found in (4). 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 (5) 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 closer look at questions like (5) provides evidence that there are UG principles which constrain the way in which movement operations may apply. An interesting property of the questions in (4) and (5) is that they contain two auxiliaries (*had* and *would*) and two wh-expressions (*who* and *what*). Now, if we compare (5) with the corresponding echo question in (4), we find that the *first* of the two auxiliaries (*had*) and the *first* of the wh-words (*who*) is moved to the front of the sentence in (5). 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 (6c–e) below (the key items are printed in bold/italics, and the corresponding echo question is given in parentheses; (6a) is repeated from the echo question in (4B), and (6b) is repeated from (5)):

(6) (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 (6b) with its echo-question counterpart (6a) *He had said who would do what?* we see that (6b) involves preposing the first wh-word *who* and the first auxiliary *had*, and that this results in a grammatical sentence. By contrast, (6c) involves preposing the first wh-word *who* and the second auxiliary *would*; (6d) involves preposing the second wh-word *what* and the first auxiliary *had*; and (6e) involves preposing the second wh-word *what* and the second auxiliary *would*. The generalisation which emerges from the data in (6) is that auxiliary