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Principles and parameters

1.1 Overview

The aim of this chapter is to outline contemporary ideas on *the nature of grammar* and *the acquisition of grammar*. The approach adopted here is that associated with the **principles-and-parameters** model developed by Noam Chomsky during the 1980s and 1990s, in works ranging from his 1981 book *Lectures on Government and Binding* to his 1995c book *The Minimalist Program*.

1.2 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 (traditionally called *morphemes*), and so addresses questions such as ‘What are the various component parts (= morphemes) of a word like *antidisestablishmentarianism*, and what kinds of principles determine the ways in which the parts are combined together to form the whole?’ Syntax is concerned with the ways in which words can be combined together to form phrases and sentences, and so addresses questions like ‘Why is it OK in English to say *Who did you see Mary with?*, but not OK to say **Who did you see Mary and?*’ (A star in front of an expression means that it’s ungrammatical.) ‘What kinds of principles determine the ways in which we can and cannot combine words together to form phrases and sentences?’

However, grammar is traditionally concerned not just with the principles which determine the *formation* of words, phrases and sentences, but also with the principles which govern their *interpretation* – i.e. with the principles which tell us how to *interpret* (= assign meaning to) words, phrases and sentences. For example, any comprehensive grammar of English will specify that compound words like *man-eater* and *man-made* have very different interpretations: in compounds like *man-eater*, the word *man* is traditionally said to have a *patient* interpretation, in the sense that man is the patient/hapless victim on whom the act of eating is going to be performed; by contrast, in compounds like *man-made*, the word *man* is said to have an *agent* interpretation, in the sense that *man* is the agent responsible for the act of making. Thus, structural aspects of meaning are traditionally said to be part of the domain of grammar. We

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might therefore characterize grammar as the study of *the principles which govern the formation and interpretation of words, phrases and sentences*. In terms of the traditional division of grammar into morphology and syntax, we can say that morphology studies the formation and interpretation of words, whereas syntax is concerned with the formation and interpretation of phrases and sentences.

In a fairly obvious sense, any native speaker of a language can be said to know the grammar of his or her native language. After all, native speakers clearly know how to form and interpret words, phrases and sentences in their 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*: thus, we might say that native speakers know how to negate sentences in their language. However, it is important to emphasize that this grammatical knowledge 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 psychological processes involved in speaking and understanding a language. To introduce a technical term, we might 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 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 what someone else says to us. However, this doesn't mean that we don't know our native language, or don't have competence (i.e. fluency) 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. Grammars traditionally set out to tell you what you need to know about a language in order to have native speaker competence in the language (i.e. to be able to speak the language like a 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. It seems reasonable to suppose that competence will play an important part in the study of performance, since you have to understand what native speakers tacitly know about their language before you can study the effects of tiredness, drunkenness, etc. on this knowledge.

1.2 Grammar

If we say that grammar is the study of grammatical competence, then we are implicitly taking a *cognitive* view of the nature of grammar. After all, if the term *grammatical competence* is used to denote what native speakers tacitly know about the grammar of their language, then grammar is part of the more general study of cognition (i.e. human knowledge). In the terminology adopted by Chomsky (1986a, pp. 19–56), we're studying language as a cognitive system *internalized* within the human brain/mind; our ultimate goal is to characterize the nature of the internalized linguistic system (or *I-language*, as Chomsky terms it) which enables humans to speak and understand their native language. Such a cognitive approach has obvious implications for the descriptive linguist who is interested in trying to describe the grammar of a particular language like English. What it means is that in devising a grammar of English, we are attempting to describe the grammatical knowledge possessed by the fluent native speaker of English. However, clearly this competence is not directly accessible to us: as noted above, you can't ask native speakers to introspect about the nature of the processes by which they produce and understand sentences in their native language, since they have no conscious awareness of such processes. Hence, we have to seek to study competence *indirectly*. But how?

Perhaps the richest vein of readily available evidence which we have about the nature of grammatical competence lies in native speakers' intuitions about the *grammaticality* and *interpretation* of words, phrases and sentences in their native language. For example, preschool children often produce past tense forms like *goed*, *comed*, *seed*, *buyed*, etc. and any adult native speaker of (Modern Standard) English will intuitively know that such forms are ungrammatical in English, and will know that their grammatical counterparts are *went*, *came*, *saw* and *bought*. Similarly, any native speaker of English would intuitively recognize that sentences like (1a) below are grammatical in English, but that sentences like (1b) are ungrammatical:

- (1) (a) If you don't know the meaning of a word, look it up in a dictionary
 (b) *If you don't know the meaning of a word, look up it in a dictionary

(Recall that a star in front of an expression means that it is ungrammatical; by convention, any expression which does not have a star in front of it is grammatical; note that stars go *before* – not *after* – ungrammatical words, phrases or sentences.) Thus, we might say that *intuitions about grammaticality* form part of the native speaker's grammatical competence. Equivalently, we can say that native speakers have the ability to make *grammaticality judgments* about words, phrases and sentences in their native language – i.e. the ability to judge whether particular expressions are grammatical or ungrammatical within their native language. An interesting implication of this fact is that if grammars model competence, a grammar of a language must tell you not only what you *can* say in the language, but also what you *can't* say, since native speaker competence includes not only the ability to make the judgment that certain types of

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sentence (e.g. (1a) above) are grammatical, but also the ability to judge that others (e.g. (1b) above) are ungrammatical. Indeed, much of contemporary work in syntax is concerned with trying to explain why certain types of structure are ungrammatical: it would perhaps not be too much of an exaggeration to say that whereas traditional grammars concentrate on *grammaticality* (i.e. on telling you how to form grammatical phrases and sentences), work on grammar within the Chomskyan paradigm tends to focus much more on explaining *ungrammaticality* (i.e. on explaining why certain types of structures are ungrammatical).

A second source of introspective evidence about the nature of grammatical competence relates to native speaker intuitions about the *interpretation* of words, phrases and sentences in their native language. For example, any native speaker of English can tell you that a sentence such as:

(2) Sam loves you more than Jim

is ambiguous, and has two different interpretations which can be paraphrased as in (3a–b) below:

- (3) (a) Sam loves you more than Jim loves you
 (b) Sam loves you more than Sam loves Jim

So, it seems that the native speaker's grammatical competence is reflected not only in intuitions about *grammaticality*, but also in intuitions about *interpretation*.

1.3 Criteria of adequacy

Given that a grammar of a language is a model of the competence of a fluent speaker of the language, and given that competence is reflected in intuitions about grammaticality and interpretation, an important criterion of adequacy for a grammar of any natural language is that of *descriptive adequacy*. We can say that a grammar of a given language is *descriptively adequate* if it correctly describes whether any given string (i.e. sequence) of words in a language is or isn't grammatical, and also correctly describes what interpretation(s) the relevant string has. So, for example, a grammar of English would be descriptively adequate in the relevant respects if it told us that sentences like (1a) above are grammatical in English but those like (1b) are ungrammatical, and if it told us that sentences like (2) are ambiguous as between the two interpretations paraphrased in (3a) and (3b): conversely, our grammar would be descriptively inadequate if it wrongly told us that both the sentences in (1a–b) are grammatical in English, or that (2) can be paraphrased as in (3a), but not as in (3b).

While the concern of the descriptive linguist is to devise grammars of particular languages, the concern of the theoretical linguist is to devise a *theory of grammar*. A theory of grammar is a set of hypotheses about the nature of possible and impossible grammars of *natural* (i.e. human) languages: hence, a theory of grammar answers

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1.3 *Criteria of adequacy*

questions like: ‘What are the inherent properties which natural language grammars do and don’t possess?’ Just as there are *criteria of adequacy* for grammars, so too there are a number of criteria which any adequate theory of grammar must satisfy. One obvious criterion is *universality*, in the sense that a theory of grammar should provide us with the tools needed to describe the grammar of *any* natural language adequately; after all, a theory of grammar would be of little interest if it enabled us to describe the grammar of English and French, but not that of Swahili or Chinese. So, what we mean by saying that *universality* is a criterion of adequacy for a theory of grammar is that a theory of grammar must enable us to devise a descriptively adequate grammar for every natural language: in other words, our ultimate goal is to develop a *theory of Universal Grammar*. In the linguistic literature, it is a standard convention to abbreviate the term *Universal Grammar* to *UG*, and hence to talk of devising a *theory of UG*.

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 natural language grammars 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 characterizing the properties of *natural* (i.e. human) language grammars, an important question which we want our theory of UG to answer is: ‘What are the essential defining characteristics of natural languages which differentiate them from, for example, artificial languages like those used in mathematics and computing (e.g. Basic, Prolog, 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 *restrictive*: that is, we want our theory to provide us with technical devices which are so *constrained* 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. Any such restrictive theory would then enable us to characterize the very essence of natural language.

The neurophysiological mechanisms which underlie linguistic competence make it possible for young children to *acquire* language in a remarkably short period of time: children generally start to form elementary two-word structures at around 18 months of

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age, and by the age of 30 months have acquired a wide range of different grammatical constructions and are able to produce sentences of considerable grammatical complexity. 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 relatively short period of time.

A related requirement is that linguistic theory should provide grammars which make use of the *minimal* theoretical apparatus required to provide a descriptively adequate characterization of linguistic phenomena: in other words, grammars should be as simple as possible. Much of the work in syntax in the 1980s involved the postulation of ever more complex structures and principles: as a reaction to the excessive complexity of this kind of work, Chomsky in the 1990s has made **minimalism** (i.e. the requirement to minimize the theoretical and descriptive apparatus used to describe language) the cornerstone of linguistic theory. The *minimalist program for linguistic theory* which he has been developing (cf. Chomsky 1995c) is motivated to a large extent by the desire to minimize the acquisition burden placed on the child, and thereby maximize the learnability of natural language grammars.

1.4 Language faculty

Our brief discussion of learnability leads us naturally to consider the goal of developing a *theory of the acquisition of grammar*. An acquisition theory is concerned with the question of how children acquire grammars of their native languages. One of the most fundamental questions which an acquisition theory seeks to answer is: 'How and when do children develop an initial grammar of the language they are acquiring, and what are the subsequent stages they go through in their grammatical development?'

Children generally produce their first recognizable word (e.g. *Mama* or *Dada*) by the age of 12 months. For the next 6 months or so, there is little apparent evidence of grammatical development, although the child's productive vocabulary typically increases by about three words a month until it reaches around a couple of dozen words at age 18 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 get on her mother's knee. During the single-word stage, there is no 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 18 months, we find the first 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 participles like *going* alongside the uninflected verb form *go*), and similarly start to produce elementary two- and three-word utterances such as *Want Teddy*, *Eating cookie*, *Dolly go bed*, etc. From this point on, there is a rapid expansion in their grammatical

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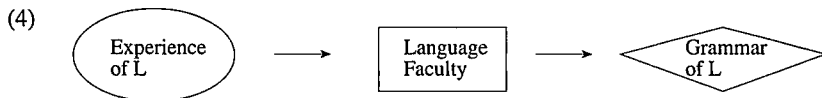
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1.4 Language faculty

development, so that by the age of around 30 months, children have typically acquired most of the inflections and core grammatical constructions used in English, and are able to produce adultlike sentences such as *Where's Mummy gone? What's Daddy doing? Can we go to the zoo, Daddy?* etc. (though of course occasional morphological or syntactic errors occur – cf. e.g. *We goed there with Daddy, What we can do?* etc.).

Thus, 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 18 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 visualizes the acquisition process can be represented schematically as in (4) below (where *L* is the language being acquired):



Children acquiring a language will observe people around them using the language, and the set of expressions in the language which the 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 in such a way as to devise 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 language acquisition is an activity unique to human beings, and different in kind from any other type of learning which human beings experience, so that learning a language involves mental processes entirely distinct from those involved in e.g. learning to play chess, or learning to ride a bicycle.

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One piece of evidence which Chomsky adduces in support of positing an innate language faculty unique to humans is that language acquisition is a *species-specific* ability, possessed only by human beings: cf.

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 1972a, p. 102)

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

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 behavior. (Chomsky 1972a, p. 10)

In addition, the apparent *uniformity* in the pattern of acquisition suggests that children have genetic guidance in the task of constructing a grammar of their native language: cf.

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 1972a, p. 79)

Moreover, there is similar *uniformity* in the types of grammars developed by different speakers of a given language: cf.

Different speakers of the same language, with somewhat different experience and training, nonetheless acquire grammars that are remarkably similar. (Chomsky 1972a, p. 13)

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 1972a, 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: cf.

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

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1.5 Creativity

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. 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): cf.

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.

1.5 Creativity

An essential tenet of Chomsky's theory is that the nature of the language acquisition process in humans is profoundly different in character from animal learning processes with which we are familiar – for instance, the process by which animals learn to respond to specific stimuli (e.g. learn to press buttons in specific combinations in order to get food), and so develop a *habit structure* (i.e. a conditioned response to a specific type of stimulus). If language acquisition involved this kind of conditioned response, we should expect it to be a purely *imitative* process – i.e. a process in which children simply memorize lists of sentences which they have heard people around them produce. However (Chomsky argues), language acquisition is not a purely imitative process, but rather an inherently *creative* process. Evidence which supports this conclusion is that when we acquire a language, we are capable of producing and understanding not only sentences we have previously heard, but also *novel sentences* which we have never encountered before: cf.

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The most striking aspect of linguistic competence is what we may call the *creativity* of language, that is, the speaker's ability to produce new sentences, sentences that are immediately understood by other speakers although they bear no physical resemblance to sentences which are familiar. (Chomsky 1966, p. 11)

(By *resemblance* here, Chomsky means *identity*: i.e. he is saying that we can produce and understand sentences which are not exact word-for-word repetitions of any sentences we have ever heard before.) To cite one of Chomsky's own examples (from p. 132 of the published version of *The Logical Structure of Linguistic Theory* – written in 1955 but published in 1975), you have probably never encountered any of the following sentences before:

- (5) (a) Look at the cross-eyed elephant
 (b) Look at the cross-eyed kindness
 (c) Look at the cross-eyed from

And yet – if you are a native speaker of English – you intuitively know that (5a) is perfectly OK in English (though of course, the zoo-keepers among you might object that elephants can't be cross-eyed). By contrast, (5b) is decidedly odd, and (5c) seems nonsensical. Any native speaker is capable of producing and understanding such *novel utterances*, or making judgments about their acceptability. What is the significance of the fact that all native speakers have the ability to produce, understand and make judgments about sentences that they have not come across before? Chomsky argues that this essential creativity of language shows that language can't simply be learned by imitation: i.e. learning a language doesn't simply involve rote-learning a list of sentences produced by others, and repeating them parrot-fashion. On the contrary, as Chomsky notes:

The normal use of language is innovative in the sense that much of what we say in the course of normal language use is entirely new, not a repetition of anything that we have heard before, and not even similar in pattern – in any useful sense of the terms 'similar' and 'pattern' – to sentences or discourse that we have heard in the past. (Chomsky 1972a, p. 12)

The novelty of most sentences that we produce or hear provides a strong argument against the claim made by behavioural psychologists that language-learning is a purely imitative process which involves the acquisition of a set of *linguistic habits*.

Empirical studies of children acquiring their native languages would seem to bear out Chomsky's claim that language acquisition is not an imitative but a creative process. Consider, for example, the process by which children acquire grammatical inflections. On the *imitative* view, acquisition would involve memorization of a set of inflected forms which children have previously encountered (so that e.g. children would only be able to form the plural of a noun which they have previously heard used in the plural). By contrast, on the *creative* view, acquisition would be a very different