

## **The ‘Chomskyan Turn’ in linguistics**

The appearance of so-called **Transformational Generative Grammar** on the scientific stage in the mid-1950s, in the work of the American scholar Noam Chomsky (born 1928), marked a major watershed moment in the still very young academic discipline called ‘linguistics’. In what follows, we will discuss the central ingredients of the ‘Chomskyan Turn’ in linguistics, with an eye towards separating the essential milestones from the misunderstandings and mistakes.

The name that Chomsky initially gave to his new theory of linguistics (‘Transformational Generative Grammar’) is made up of three words which each have given rise to misunderstandings and controversies. The third is often understood too narrowly, as signifying a myopic interest in syntax; but **grammar** for Chomsky refers to all structural aspects of linguistic theory, not just sentence structure. Once we get this straight, the term ‘grammar’ readily covers all of phonology, morphology, syntax and (non-lexical) semantics. There will be no need to dwell further on the third word, therefore. But the first two words of the theory’s title both deserve a closer look.

The **transformational** component of Chomskyan linguistics gives expression to the notion that an underlying representation of some linguistic expression can be transformed via the application of one or more grammatical rules into a surface representation that might be different in multiple ways from its underlier (and might not even be transparently related to its underlier). In phonology, transformations would take the form of one of a wide variety of phonological rules, including deletion, insertion, metathesis, and assimilation. In syntax, transformations were overwhelmingly given the form of **movement** rules (‘Move  $\alpha$ ’: ‘move anything anywhere, in keeping with the constraints imposed by the grammar’).

It is often said, and even more often thought, that transformations are the single most revolutionary ingredient of Chomsky’s linguistic theory. But already in the work of Chomsky’s linguistics professor at the University of Pennsylvania, Zellig Harris, we find a compendium of transformations that explicitly relate one linguistic form to another. He did not conceive of them as *processes*, but formulated them instead as *statements*. Harris postulated two kinds of such statements for syntax: (i) ‘statements which enable anyone to synthesize or predict utterances in the language’, and ‘form a deductive system with axiomatically defined initial elements and with theorems concerning the relations among them’; and (ii) ‘statements [which] transform certain sentences of the text into grammaticality equivalent sentences’ (Harris 1951:372–73). The former are what transformational generative grammar would later call ‘phrase-structure rules’; and the latter correspond to the transformational rules of transformational generative grammar. In his set of transformations of type (ii), Harris included nominalisation, VP-deletion, question formation, and particle placement. Thus, the string *John looked up the number* was related, via an explicit statement, to the string *John looked the number up*. In Chomskyan parlance, these purely representational statements would be rephrased in terms of the **derivational** (or transformational) process of movement (e.g., ‘particle shift’, for the case at hand). But derivationalism (or transformationalism) is rarely if ever essential, even in Chomsky’s own work. Much may be gained by approaching the question of the relatedness of linguistic expressions in representational terms.

At any rate, ‘movement’ was initially clearly understood to be a metaphor: there was no sense, originally, in which constituents literally moved around linguistic structures. With the advent and spread of the so-called Government-and-Binding theory, in the late 1970s and throughout the 1980s, however, ‘movement’ started to be taken more and more literally. It was said to ‘leave a trace behind’, just like real-life physical movement. The conditions on the distribution of these traces generated a tremendous amount research activity, and a very significant output. The Government-and-Binding era’s highly concentrated research on syntactic filler–gap (or ‘movement’) dependencies of various sorts deserves all the credit in the world for the fact that linguists today know a lot more about syntactic structure, and about the many points of variation among languages with respect to such filler–gap dependencies, than they did in the 1970s. The output of almost two decades of Government-and-Binding syntax remains extremely important today — although it is to a large extent independent of the question of whether the empty categories linked to displaced constituents are ‘left behind by movement’ or base-generated without movement being involved: the recent shift (in the so-called ‘minimalist programme’ of the late 1990s and early 21<sup>st</sup> century) away from ‘traces’ to silent ‘copies’ of displaced constituents is quite suggestive in this connection.

The emphasis, in the Government-and-Binding era, on both **principles** and **parameters** catalysed high-quality research that factored out many of the *ad hoc*, construction-specific and language-specific ingredients of early Chomskyan linguistics. It also made the Chomskyan approach profoundly **comparative** in nature, giving it a purchase on lots of data from ‘exotic’ languages and spreading the practice of Chomskyan linguistics to all corners of the world. The parametric approach that was pioneered in Chomsky’s (1981) *Lectures on Government and Binding* is one of the essential ingredients of the Chomskyan legacy. So is the book’s emphasis on principles, as opposed to *ad hoc* rules and conditions on rules. Because of these two major prongs of the Government-and-Binding approach, the approach is now generally referred to as **Principles-and-Parameters theory**.

(The name by which it had commonly been known in the first half of the 1980s, ‘Government-and-Binding theory’, was a bit of an awkward nomenclature. For although Chomsky’s *Lectures on Government and Binding* did certainly place a lot of emphasis on the structural notion called ‘government’ and on relations between referentially dependent elements such as pronouns and anaphors and their antecedents, usually referred to as ‘binding relations’, there is really no sense in which either of these two notions could be singled out as quintessential to the theory. The term ‘government’ is in fact thoroughly traditional in the study of language, scientific as well as practical: thus, teachers of German will tell their students that the preposition *aus* ‘governs’ dative case, whereas *durch* ‘governs’ accusative case, and *trotz* ‘governs’ genitive case.)

Let us now shift the focus of the discussion of ‘transformational generative grammar’ from the first word in its title to the second: **generative**. A generative theory of grammar is a grammar that generates all and only the grammatical utterances of human languages, does so in a formally explicit manner, and in so doing gives us an explanation for what Chomsky has called ‘the logical problem of **language acquisition**’ (to which we return presently). The emphasis here is on ‘formally explicit’, on ‘explanation’, and on ‘language acquisition’. By ‘generative’ we should primarily understand these three notions — NOT the idea that linguistic structures are generated by combinations of words and constituents, or that underlying linguistic structures can be regenerated into different surface outputs.

Right from the outset of his linguistic work, Chomsky emphasised the importance of levels of adequacy in grammatical analysis, and he did so precisely with a view to the attainment of the ultimate goal of the generative linguistic enterprise: an explanation for the logical problem of language acquisition — the fact that children, all over the world, regardless of their IQ-level or socio-economic background, acquire their native language remarkably quickly and effortlessly, without explicit teaching, on the basis of an input that is both quantitatively and qualitatively poor. Successful attainment of this goal amounts to much more than ‘just’ delivering descriptions of individual languages: it requires an understanding of the universal principles underlying the structures of linguistic utterances and of the parameters of linguistic variation. Once such an understanding has been gained, theoretical linguistics will have succeeded in reaching the highest standard of adequacy, so-called explanatory adequacy.

Linguistics as a branch of science is extremely young. So it goes without saying that, though significant headway has been made in many respects, the goal of reaching explanatory adequacy has not been fully achieved at the present time. What should be emphasised is not the degree to which generative linguistics has, at the present time, managed to achieve explanatory adequacy — rather, the point to stress is the fact that generative linguistic theory sets itself this goal, and puts the focus of the enterprise squarely on the language learner, not on the language analyst. It is here that we see a night-and-day contrast between Chomskyan linguistics, from its inception, and its immediate predecessor, so-called structuralist linguistics — especially, American structuralism.

The American structuralists (who themselves preferred the epithet ‘descriptive linguistics’ to the one by which they were generally known, ‘structuralist linguistics’) did a great deal of fieldwork to uncover the grammars of languages that were hitherto unknown to science and for which no grammar existed as yet. To facilitate successful fieldwork expeditions, the structuralists insisted on a highly rigorous methodology. They postulated rigorous constraints which were designed to make it feasible for fieldworkers unfamiliar with a language to come up with an analysis of that language. The American structuralists focused single-mindedly on the language analyst, not the language learner. If a particular set of facts could only be reconciled with rigorous constraints by sacrificing parsimony and simplicity, then so be it. As Joos (1957:96) put it pointedly, ‘Children want explanations, and there is a child in each of us; descriptivism makes a virtue of not pampering that child’.

For Chomsky and his focus on the logical problem of language acquisition, this clearly would not do. He shifted the focus from the language analyst to the child. Descriptive adequacy is certainly an essential standard that any linguistic analysis must meet; but it is not the holy grail: the higher standard of explanatory adequacy compels us to make sure that the linguistic analysis helps us understand the logical problem of language acquisition. This is *the* most fundamental ingredient of the generative enterprise in linguistics — although, as Chomsky himself has stressed on several occasions, the emphasis on language acquisition is not as such original to generative grammar. Wilhelm von Humboldt already said, in the early nineteenth century, that ‘das Sprechenlernen der Kinder is nicht ein Zumessen von Wörtern, Niederlegen im Gedächtnis, und Wiedernachlallen mit den Lippen, sondern ein Wachsen des Sprachvermögens durch Alter und Übung’. Two centuries earlier, the Port Royal grammarians had anticipated Humboldt’s emphasis on the child’s innate language faculty, following the philosophies of René Descartes. Chomsky traces the roots of generative linguistics to these philosophies, even attaching the epithet ‘Cartesian’ to his approach.

Although Chomsky thus certainly was not the first to assign primacy to the innate language faculty and the language acquisition process, it was really only with the advent of generative grammar that this focus was developed into a formally explicit theory, culminating in the aforementioned Principles-and-Parameters approach of the 1980s, with its emphasis on innate principles (which are universal, i.e., they work the same way in all languages) and a limited inventory of parameters or choice-points (which accommodate language variation). These principles and parameters were designed in such a way that they clustered several properties of human languages together, making it possible for the child to reach a whole bunch of conclusions about his/her language just on the basis of a single, simple observation. Thus, it was thought that the discovery in his/her language of so-called ‘expletives’, meaningless proforms that cannot be omitted from the subject positions in which they occur (e.g., the word *there* in *There is a stranger in our midst*), immediately led the child to conclude that his/her language required the structural subject position to be overtly filled, and therefore could not sanction subject drop (of the type found in Hungarian *Beszél magyarul* ‘(she/he) speaks Hungarian’) or the placement of the subject in some position farther to the right than the structural subject position (as in Hungarian *Nem beszél magyarul az a srác* ‘that guy doesn’t speak Hungarian’), and moreover did not allow the subject of a clause to be removed from that clause in the presence of an overt complementiser (as in Hungarian *Ki gondolod, hogy nem beszél magyarul?* ‘who do you think doesn’t speak Hungarian’, whose English translation cannot feature a token of the complementiser *that* between *think* and *doesn’t*). This no doubt sounds rather abstract and opaque to you — but the theory of linguistics had by then advanced to a point at which this was really quite concrete and transparent, and it made very precise and, so it seemed, quite accurate cross-linguistic predictions. Linguistics had become truly scientific, and thanks to the theory’s abstraction from construction-specific and language-specific minutiae, a wealth of new discoveries were made.

## Constituency, hierarchy, and c-command

Let us now make this abstraction more precise. An essential thing to realise is that sentences are not simply strings of words: at a more abstract level of analysis, sentences are organised in the form of a **hierarchy of constituents**, which, although not directly observable, can be brought to light using several diagnostic tests.<sup>1</sup> To begin to appreciate this, consider first the fact that the sentence *Will she call you?* can be followed up with ... *or will he?* but not with \*... *or will him?*: in the former continuation, *call you* is dropped as a unit (a ‘constituent’) and a different subject (*he*) is chosen, and the result is grammatical; the latter is an attempt to drop *she call* as a unit and choose a different object (*him*), which fails miserably (in clear contrast to the version in which no dropping or ‘ellipsis’ takes

1 Organisation of subparts of strings into abstract hierarchically arranged constituents is not unique to syntax (or to linguistics, for that matter: imagine that you are looking at a photograph depicting the head of state, the head of government, and the government ministers, all standing in a single, randomly arranged row — there is a hierarchy to the relations between these persons, but the linear sequence in which they happen to be arranged fails to bring this directly to light). Every subbranch of linguistic analysis recognises hierarchy and constituency as fundamental. Hierarchy and constituency play a key role in the sound system (phonology, at all levels, from subsegmental to suprasegmental), in the structure of complex words (morphology), and in structure-based meaning (semantics); it is hardly surprising, therefore, that they also figure prominently in the analysis of the internal structure of sentences (syntax). The significance of hierarchy and constituency can be brought to light in the most microscopic (segmental features) and the most expansive (discourse) domains of linguistic analysis. But although within linguistics constituency and hierarchy are by no means the privilege of syntax alone, we can see them at work particularly vividly in the organisation of sentences, as the discussion in the ensuing text will endeavour to show.

place: ... *or will she call him?*). In both cases, the material dropped from the continuation is a contiguous string of words in the preamble clause: *call you* in the former case and *she call* in the latter. But only the substring *call you* can be dropped as a unit — the verb and its object (*call you*) form a constituent to the exclusion of the subject; but the verb and its subject (*she call*) do not form a constituent to the exclusion of the object. Now that we know this, we will want to translate this into a hierarchical organisation of the sentence that reflects this: we first combine the verb and the object into the constituent [*call you*] (a verb phrase), and after this we bring in the auxiliary *will* and the subject *she*, in structural positions that are outside and hence higher up the tree than the verb phrase; the final product is [*she will [call you]*], where the bracketing gives expression to the hierarchical structure of the sentence.

With this in mind, now consider the fact that in *Will she call you?* it is possible to replace *you* with *herself* (yielding *Will she call herself?*), in which case we understand *she* and *herself* to refer to the same individual; but we cannot achieve such coreference by switching the two pronominal elements around: *\*Will herself call her?* is ungrammatical. One might think that this is purely a matter of linear precedence: *herself* can be coreferent with something that precedes it, not with something that follows it, in the linear string. But a generalisation of this sort does not cover all the facts: *Do pictures of herself please her?* is perfectly fine, so it is not impossible for *herself* to linearly precede *her*. The correct generalisation once again makes reference to hierarchy: an anaphor (*herself*) cannot be hierarchically higher than what it is coreferent with; in *\*Will herself call her?*, the anaphor *herself* finds itself in the structure as the subject of the verb phrase that contains the pronoun *her*, and since we know from our experiment with dropping that the subject is hierarchically higher than the object, we correctly deduce that coreference between *herself* and *her* will fail in this situation.

In the technical vocabulary of the theory, we say that the subject asymmetrically **c(onstituent)-commands** the object: the subject ‘looks down on’ the object from its high vantage point in the sentence.<sup>2</sup> Coreference between an anaphor and its antecedent is impossible when the former asymmetrically c-commands the latter. Since the subject of the sentence asymmetrically c-commands the object, it follows that *\*Will herself call her?* is ungrammatical. Now reconsider *Do pictures of herself please her?* — here, the anaphor is contained *within* the subject; the subject as a whole still c-commands the object, but *herself*, which is only a *subpart* of the subject, does not. So in *Do pictures of herself please her?*, there is no c-command relation between *herself* and *her* in either direction. This means that coreference between *herself* and *her* is not proscribed in this sentence: it is only in cases in which an anaphor c-commands the element on which it depends for its reference that coreference is strictly impossible. The technical notion of c-command is one of the ingredients of the syntax toolkit that makes explicit and crucial reference to hierarchical structure — and it brings home the fact that the syntax of sentences is about more than ‘just’ linear order: it involves an abstract organisation of constituents into hierarchical structures.

2 The c-command domain of a node  $\alpha$  in the syntactic structure is calculated by going up from  $\alpha$  to a particular vantage point, and looking down the tree, ignoring the path travelled from  $\alpha$  up to the vantage point. A simple recipe for computing  $\alpha$ 's c-command domain is thus the following: ‘go up from  $\alpha$  to the first X above  $\alpha$ , and then look down the other way’. There has always been considerable variation in the generative syntax literature with respect to the height of the vantage point taken above  $\alpha$ . There are three definitions on the market: (i) X = the first node, (ii) X = the first branching node, and (iii) X = the first maximal projection. The most restrictive definition of c-command is the one that chooses the first node as the value for X (i.e., option (i), above). There are indications that this definition is also empirically the most adequate definition. We will assume it here.

There is no denying that linear order and c-command have a close relationship with one another. Indeed, if a syntactic constituent  $\alpha$  asymmetrically c-commands a constituent  $\beta$ , then  $\alpha$  will typically linearly precede  $\beta$  (the generative syntactician Richard Kayne has formulated a theory ‘translating’ syntactic hierarchical structures into linear strings which bases itself precisely on this contingency). But the converse is not true: if a syntactic constituent  $\alpha$  linearly precedes a constituent  $\beta$ , it does not have to be the case that  $\alpha$  asymmetrically c-commands  $\beta$  — we saw this in our discussion of *Do pictures of herself please her?*, where *herself* (our  $\alpha$ ) precedes *her* (our  $\beta$ ) but it is precisely thanks to the fact that there is *no* c-command relation between the two that we can get away with establishing a coreference relationship between them. The connection between asymmetric c-command and linear precedence is thus a one-way street: we can ‘translate’ from hierarchical structures to linear strings, but not the other way around. This emphasises the primacy of hierarchy in syntactic analysis: from hierarchy we can derive linearity; but we cannot have our syntactic analysis start out with linear strings and hope to algorithmically derive hierarchical structures from them.

Of course, when confronted with a sentence, what the language user is presented with on the surface is a string of sounds, not a hierarchical structure: though the analyst can place square brackets in his or her syntax for *Will [she [call you]]?* in order to indicate the hierarchical asymmetry between subjects and objects, these brackets have no correlates on the surface — for instance, there is no intonational break (a pause) between *she* and *call* to bring to light the left bracket placed between the two. Because the hierarchical structure that we have established for *Will [she [call you]]?* is not in any obvious way visible or audible in the surface signal, this abstract structure must reflect something ‘deep’ about the human language faculty. The language user apparently does not need explicit pointers to arrive at the correct hierarchical structure for *Will [she [call you]]?* — the syntactic structure unfolds inevitably, as a function of the way the language faculty (which is innate in the mind/brain of all humans) works: so long as the language faculty is not damaged (for instance, as a result of a stroke), it will reliably and consistently produce a hierarchically layered structure for sentences with a subject and an object such that the subject asymmetrically c-commands the object. Our theory of syntax must therefore be such that it inextricably forces such an organisation onto such sentences. It is the syntactician’s task (not the language user’s, obviously) to formulate such a theory.

It is worth noting at this point that the subject does not always asymmetrically c-command the object on the surface — and that, therefore, the subject also does not always linearly precede the object. Not only are there languages in the world in which the subject systematically follows the object (although they may at first seem outlandish, VOS languages are quite common on the many small islands dotting the Pacific Ocean), but even in languages that ordinarily produce SVO (subject–verb–object) strings, such as English, it is perfectly possible for the object to be placed before the subject. Just imagine that instead of asking the yes/no-question *Will she call you?*, we instead wanted to know about the identity of the person she called: in that case, we would ask *Who will she call?*, where *who* is the object and linearly precedes the subject. We know from the foregoing that whenever a constituent  $\alpha$  asymmetrically c-commands a constituent  $\beta$ ,  $\alpha$  will linearly precede  $\beta$ . A syntax for the question *Who will she call?* will straightforwardly ensure that *who* precedes *she* if in the structure of this question *who* asymmetrically c-commands *she*. But in *Will she call you?*, where *you* is the object, we found that *she* asymmetrically c-commands *you*. How can it be that the subject sometimes asymmetrically c-commands the object whereas at other times the object asymmetrically c-commands the subject? Is this random, or is there a system to it?

It would, of course, be nothing short of disastrous if we had to conclude that the c-command relation between the subject and the object is a matter of chance. We had found good reasons previously to convince ourselves that the subject asymmetrically c-commands the object. So let us stick to our guns and not call this conclusion into question now. We can make this conclusion rhyme with the fact that *who* asymmetrically c-commands *she* in *Who will she call?* if the syntax does something to *who* that causes it to end up in a position that is hierarchically higher than the subject. This ‘something’ is a **transformation**: in the process of building the syntax of a *wh*-question (so called because constituent questions are often introduced, in English, by a word that starts with the letters *wh*, such as *who*), an operation takes place that places the object in a position that c-commands (and consequently linearly precedes) the subject. We can graphically represent this in the following form: [*Who will [she [call ~~who~~]]*]? — the *wh*-constituent *who* is associated with the object position of the verb *call*, but finds itself pronounced in a position all the way at the left edge of the sentence. The knowledge that *who* is the object of *call* is not ‘lost’: indeed, *who* remains structurally represented in the object position of the verb phrase, as ‘silent copy’ ~~*who*~~. This approach to *Who will she call?* allows us, in a way, to have it both ways: *who* is simultaneously below and above the subject; the former is what is expected of objects, and the latter is what behaves a *wh*-constituent in an information question.

With the aid of transformations of various sorts, the syntax can take an initial representation and turn it into something that is quite different – but no matter what happens in the course of the syntactic derivation, the initial representation will always remain retrievable: transformations **preserve** the properties of their input (in the case of *wh*-movement, via the copy of the *wh*-constituent in the lower position). Movement transformations are characterised as a family by the fact that they always ‘land’ in a position that asymmetrically c-commands the position from which the moved element is ‘extracted’. Here again, we see the significance of hierarchy.

## Principles-and-Parameters theory as a modular theory of syntax

The principles and parameters that lie at the heart of Principles-and-Parameters theory are organised into several **subtheories** or ‘**modules**’ of the grammar, including Case theory (which is about the licensing of argumental noun phrases by structural Case, spelt with an initial capital to distinguish it from morphological case),  $\theta$ -theory (regulating the introduction and manipulation of arguments into syntactic structures), bounding theory (governing the distance that can be covered by the various displacement or movement operations), and binding theory (mentioned previously). For each of these modules, one or more central principles are postulated; and these principles may or may not be subject to parametric variation:<sup>3</sup>

- (1) a. **X-bar theory**  
*principle:* X-bar Principle  
 project X to X' ('X-bar') by combining X with at most one complement; project X' to XP by combining X' with at most one specifier  
*parameter:* complements are located to the {left, right} of the head X

3 For  $\theta$ -theory, no parametric variation exists. The  $\theta$ -Criterion leaves room for variation only if it can be partially or entirely suspended in certain languages. But suspending the  $\theta$ -Criterion would be tantamount to the *non*-universality of this principle. A cornerstone of the P&P approach is precisely the idea that the principles of the theory are universal.

- b. **projection theory**<sup>4</sup>  
*principle:* Extended Projection Principle  
 (i) all lexical information must be syntactically projected  
 (ii) every finite clause (TP) must have a subject  
*parameter:* clause (ii) of the Extended Projection Principle can be satisfied {only by overt material, by overt or silent material}
- c. **licensing theory**  
*principle:* Empty Category Principle  
 an empty category must be licensed<sup>5</sup>  
*parameter:* different licensing restrictions apply to different empty categories (gaps, *pro*, PRO), potentially on a language-particular basis
- d. **Case theory**  
*principle:* Case Filter  
 every overt argumental noun phrase must be assigned Case in a particular structural configuration'  
*parameter:* the structural configuration for Case assignment is {government (downwards), the Spec–Head relation (upwards)}
- e. **θ-theory**  
*principle:* θ-Criterion  
 (i) every θ-role must be assigned to one and only one argument  
 (ii) every argument must be assigned one and only one θ-role  
*parameter:* —
- f. **binding theory**  
*principles:* A an anaphor must be locally bound  
 B a pronoun must not be locally bound  
 C a referential expression must not be bound  
*parameter:* the local domain for binding is the first {TP, CP} that contains the bound element and its governor<sup>6</sup>
- g. **bounding theory**  
*principle:* Subjacency  
 movement must not cross more than one bounding node, where 'bounding node' ∈ {NP, TP, CP}  
*parameters:* NP is a bounding node: {yes, no}  
 the bounding node for clausal constituents is: {TP, CP}

4 It is customary in the literature to understand the term 'Extended Projection Principle' in a narrow way, referring only to clause (ii) (often abbreviated as 'the EPP'). But strictly speaking, the Extended Projection Principle is the conjunction of the original Projection Principle (clause (i) of (1c)) and the requirement that finite clauses have subjects (clause (ii) of (1b)).

5 The Empty Category Principle of Chomsky (1981) is held to apply only to non-pronominal empty categories (esp. gaps left behind by movement, aka 'traces'). The formulation in (1c) is broader, governing *all* types of empty categories. The licensing of the various types of empty categories is not uniform; but all *ecs* require licensing.

6 This is a partial translation of Manzini & Wexler's (1987) seminal parametrisation of the local domain for binding, as the minimal category containing the bound element, its governor and {a subject, tense}: with subjects located in SpecTP and the feature [tense] originating in C (cf. Stowell 1982), {a subject, tense} translates as {TP, CP}.



Let us demonstrate the interplay of principles and parameters with reference to bounding theory (1g). The Subjacency Principle is universal: *all* human natural languages exhibit so-called ‘locality effects’ constraining syntactic filler–gap dependencies (i.e., dependencies of the type found in *Who did John invite?*, where *who* is a ‘filler’ construed with a ‘gap’ in the position where the direct object of *invite* is expected to be found: cf. *John invited Mary*); in no language can such dependencies cover distances that are truly unlimited (or ‘unbounded’, hence ‘bounding theory’). But languages differ with respect to which nodes they ‘count’ as bounding nodes. In English, taking a *wh*-constituent out of a subordinate question and placing it in a higher clause always gives rise to a degraded result: *\*Who does Bill know why John invited?* is poor; and doing this more than once is even worse (as in *\*Who are you wondering whether Bill knows why John invited?*, where *who* is extracted out of two questions — one introduced by *why* and the other by *whether*). In Italian, by contrast, it is quite okay to do this once — although you cannot do it a second time (i.e., the equivalent of the first English sentence above is grammatical in Italian, but translating the second sentence into Italian delivers a bad result). This can be understood, from the point of view of bounding theory, if TP is a bounding node (each transgression of which causes a Subjacency Principle violation) in English, while CP is the corresponding bounding node in Italian: in the derivation of English *\*Who does Bill know why John invited?*, the movement of *who* to the beginning of the root clause traverses two TPs (one per clause), causing a Subjacency violation; but in the corresponding Italian sentence, the *wh*-phrase crosses just one CP (that of the embedded clause), and since CP and not TP is what Subjacency is sensitive to in Italian, this allows Italian speakers to ‘get away with’ extraction of a *wh*-phrase out of a subordinate question – but only once: *\*Who are you wondering whether Bill knows why John invited?* is bad in both languages because extracting *who* out of these two subordinate questions inevitably crosses more than one bounding node (in Italian, two CPs are traversed, and the English example even involves the crossing of three TPs; in both cases, the Subjacency Principle is violated).

In general, the *modus operandi* in Principles-and-Parameters theory — for the analyst as well as the language learner/user — is as follows. In order to determine how to build or process a particular syntactic construct and whether a particular construct is grammatical or ungrammatical, we consult all the relevant modules, and verify for each of the modules that are applicable to the construct in question what the principles and parameters of these modules enjoin us (not) to do; and if a construct violates any of the relevant principles or parameters, the system gives it a \* (an ‘asterisk’ or ‘star’). Naturally, multiple violations of the same principle, or violations of multiple principles, make the penalty more severe. We might also expect, in principle, that a violation in one module could be worse than a violation in another. Indeed, it is often thought that a single violation of the Subjacency Principle is less ‘bad’ than a violation of a principle in any of the other modules in (1). Whether it is the case that the various modules are ‘weighted’ relative to one another on a scale of ‘severity’ is a question to which the theory has not managed to find a principled answer as yet.

In addition to the modules mentioned in (1) (which is not necessarily an exhaustive list), Principles-and-Parameters theory also inherits from earlier generative grammar the recognition of multiple **levels of linguistic representation**, which are also sometimes referred to as **modules**:

- (2) a. **D-structure** (the underlying or ‘deep’ level of syntactic representation)
- b. **S-structure** (‘shallow’ or ‘surface’ structure)
- c. **LF** (‘Logical Form’)
- d. **PF** (‘Phonological Form’),

The modules in (2a–c) are the *syntactic* levels of representation: ‘LF’, its name notwithstanding, is not ‘logic’ but syntax — ‘**covert syntax**’, as it is often called (the kind of syntax whose operations we cannot directly observe in the overt output spelled out at PF). In addition there is PF (2d), which is not part of syntax (though it has frequently been used by syntacticians as a convenient waste bin for constructions or phenomena that appear to be syntactic but seem to escape the restrictive powers of the P&P system). The LF and PF modules are jointly referred to as the ‘**interfaces**’ between syntax and the interpretive components — in particular, between syntax and the conceptual-intentional system (‘meaning’, broadly construed) in the case of LF, and between syntax and the sensorimotor system (‘hearing’ and ‘speaking/signing’) in the case of PF. Principles of the sort mentioned in (1), to the extent that they exist, are assumed to apply only at the interfaces. Chomsky (1995) has hypothesised that these principles ‘are motivated by properties of the interface, perhaps properly understood as modes of interpretation by performance systems’, and that ‘the linguistic expressions are the optimal realizations of the interface conditions, where “optimality” is determined by **economy conditions** of UG’. The hope is that (again in the words of Chomsky 1995) ‘with a proper understanding of such [economy] principles, it may be possible to move toward the minimalist design: a theory of language that takes a linguistic expression to be nothing other than a formal object that satisfies the interface conditions in the optimal way’.

## The minimalist programme for syntax

In the pursuit of optimality, let us concentrate first on the second way in which the Principles-and-Parameters system is modular: in its recognition of three syntactic levels of representation (the ones in (2a–c)). The central question is: Should the conditions on representations make reference to any level of representation other than LF (the only syntactic level of representation that interfaces directly with the conceptual-intentional system)? If it turns out that there is no urgent need to make reference to D-structure and S-structure, these levels of representation can safely be thrown out — they are, after all, theory-internal postulates. The case against these levels of representation is strengthened if it can be shown that if we *did* insist on satisfaction of the principles of the theory at D- or S-structure, we would get the wrong results. Chomsky builds three arguments to this effect – one for Case theory, one for  $\theta$ -theory, and one for binding theory. We will look at just one of these arguments, the one based on Case.<sup>7</sup>

For **Case**, early minimalism unfolds what was at the time a completely new outlook: Case is not a feature that is assigned by a head to a noun phrase that does not yet have a Case feature; rather, the noun phrase enters the syntax with an unvalued Case feature already in place, and it is the task of syntax to give it a value by matching the NP’s Case feature to that of a Case-checking head. On the further assumption that this **valuation/checking** relationship can be established only in a **Spec–Head configuration**, the Case-bearing NP must move to the specifier position of the Case-checking head. Such movement does not happen in overt syntax in all languages — it is plainly not the case in all languages that both the subject and the object (the two checkers of structural Case in the clause) leave the VP before the product of syntax is handed over to PF: thus, in English, while the subject does move to its Case-checking position overtly, the object appears to stay ‘at home’; and in (some)

7 Chapter 3’s discussion of  $\theta$ -theory is based on the null-operator movement analysis of *tough*-movement (*John is tough to please*), from which Chomsky distils an argument against D-structure and against the tandem of the  $\theta$ -Criterion and the Projection Principle. We must leave this argument aside since discussing it would take too much space.

VSO languages, where both the subject and the object follow the verb, it may well be that neither argument travels to its Case-checking position in the overt syntax. The existence of this kind of variation tells us that the demands of the Case Filter cannot universally be met at S-structure (which is what syntacticians had generally assumed previously). So this is an **argument against S-structure** — albeit one that is theory-internal, based as it is on the hypothesis that Case-feature checking can happen only via movement of the Case-dependent element to the Case-checking head (a hypothesis which has in the meantime been abandoned).

Assuming that we reach the point at which we are satisfied that the number of levels of syntactic representations can safely be reduced, perhaps all the way down to just (2c), we are led to ask next whether perhaps some of the subtheories of Principles-and-Parameters theory given in (1) could be put on the chopping block. By way of an example, let us direct our focus to (1a), **X-bar theory**. Chomsky (1995:Ch. 4) calls for its abolition, and for its replacement with what he calls ‘bare phrase structure’ — a syntax in which no bar-level distinctions are made. Bar levels (X' and XP) are symbols that do not pop up in syntactic representations because they are a part of the lexical baggage of material that is projected onto syntax from the lexicon: the lexicon only contains heads (X<sup>0</sup>s), not X's or XPs; the ‘first-bar’ and ‘phrase’ levels of heads emerge as a function of the X-bar Principle, but the symbols (‘ and P) that this principle introduces are ‘extraneous’ – they come out of nowhere; they are not handed down to syntax from the lexicon. The **Inclusiveness Condition** holds that extraneous symbols are bad: the idea is that syntax only trades in symbols that come straight from the lexicon. The Inclusiveness Condition is evidently desirable from a conceptual point of view, and limiting the material that syntax deals with to just the stuff that it receives from the lexical elements that are merged into its structures is fundamentally minimalist in spirit. The abolition of X-bar theory is thus forced upon us by the logic of the minimalist programme.

Linguistic minimalism in its boldest guise is a continuation of Principles-and-Parameters theory which departs from its immediate predecessor by eradicating many of its basic notions:

- ☛ government
- ☛ binding (in the sense of ‘binding theory’)
- ☛ different levels of syntactic representation
- ☛ different subtheories
- ☛ X-bar structures

If successful in its efforts to wipe the slate inherited from *Lectures on Government and Binding* almost completely clean, minimalist syntax is left with the following:

- ☛ features — not as syntactic constructs but as elements which, when they are merged into a syntactic structure, set the syntactic derivation in motion
- ☛ a mechanism used for feature valuation (called Agree)
- ☛ a basic structure-building mechanism (called Merge), which subsumes movement
- ☛ a notion of locality
- ☛ a notion of economy of derivation and representation

Most, perhaps all, of these ingredients of the minimalist recipe may not be specific to syntax, or even to language.

There is a basic core of morphological **features** that all ‘minimalists’ agree are syntactically relevant. These prominently include [tense], [wh], and the so-called  $\phi$ -features: [person], [number] and [gender] (the Greek letter  $\phi$  is used as a cover for these features by convention — rooted in the fact that the sound represented by the symbol  $\phi$  is roughly the same as the initial fricative of the word ‘feature’). Another likely player is the feature [aspect], which is about the way the eventuality expressed by the verb and its arguments unfolds: an eventuality can be stative or dynamic, and if it is dynamic, it can be unbounded (an ‘activity’) or bounded (an ‘achievement’ or an ‘accomplishment’). In several languages (incl. Finnish and Turkish), the Case of the direct object is closely related to the aspectual properties of the eventuality: when the event is bounded, the object is likely to be accusative-marked; when it is unbounded, it usually is not. This suggests that the traditional feature [accusative] may be recastable as a manifestation of the feature [aspect] on the object. For [nominative], the close connection between it and the feature [tense] (in particular, *finite* [tense]) has long been well known — and in conjunction with the relationship between [accusative] and [aspect] that we just called attention to, this opens up the prospect that the familiar [Case]-feature set can be dispensed with, such that Case on nominals is entirely a reflex of features independently needed for the verbal inflectional system.<sup>8</sup>

It is important to observe that morphological features are **meaningless**, not themselves associated with a semantic correlate. It means nothing for a (pro)noun to be nominative (i.e., [tense]-specified): nominatives can be agents (*She kissed the boy*), patients (*He was kissed*), themes (*They were killed*), recipients (*We were given the key*), instruments (*The key opened the door*), etc. Nor does possession of the feature [wh] give its bearer any particular meaning: [wh] is found in questions (*How did he do it?*), relative clauses (*How he did it is what matters*), exclamatives (*How smart he is!*), and on indefinite (*somehow*). And although for nouns and pronouns it certainly makes a difference how they are specified for the  $\phi$ -features (a third person singular masculine pronoun and a second person plural pronoun plainly have different meanings associated with them), for the verbs with which these nominals agree in  $\phi$ -features these specifications are meaningless: the copular form *is* in *He is smart* does not mean anything different compared to the copular form *are* in *You are smart*.

Another thing about features that is important to emphasise is that many have no **value** specified for them in the initial syntactic representation. For a (pro)noun to be nominative/[tense]-marked or accusative/[aspect]-marked is a function of the syntactic environment in which it occurs: no (pro)noun is ‘predestined’ to be nominative or accusative; the very same argument (say, a patient or ‘undergoer’) can be accusative in one context (e.g., in *Someone kissed him*) and nominative in another (*He was kissed*). Similarly, a finite verb will bear the feature bundle [3<sup>rd</sup> person singular] when its subject is specified for these features (as in *He was/\*were kissed*) but not if the subject has a different feature bundle (e.g., in *We/They were/\*was kissed*). In many cases, the values of the features borne by a head or phrase are determined by the establishment of a syntactic relationship with an element that bears matching features — a relationship called **Agree**.

8        Though there is a general consensus that the features mentioned in this paragraph are syntactically active morphological features, there is as yet no principled answer to general question of exactly which are the features that are involved in syntactic relations. Information-structural features (i.e., [topic] and [focus]) are frequently introduced in minimalist syntactic analyses — inadvisably so. These features are fundamentally different from inflectional features such as [accusative] or [3<sup>rd</sup> person]. Whether a particular syntactic phrase serves as a topic or focus is a *discourse* property of the *referent* of the phrase, not a *lexical* attribute of an element in the lexical array.

The desire to establish a local Agree relationship can often be held responsible for displacement or movement in syntax. In the syntax underlying the sentence *He seems to be assumed to have been assassinated*, the pronoun starts out in the object position of *assassinated*, which is the pronoun's position of (first or External) **Merge**. This position is structurally very far removed from the verb with which the pronoun agrees in  $\phi$ -features, viz., *seems*. It is impossible for the pronoun and *seems* to engage in an Agree relationship if the pronoun 'stays put' in the position in which it was first merged: *\*Seems to be assumed to have been assassinated he* is entirely impossible. To bring the two terms involved in the Agree relation (*he* and *seems*) closer together, the syntax performs an operation that places the pronoun in a position next to the finite verb with which it agrees — another instance of Merge, called Internal Merge (because the remerged element is already a part of (i.e., internal to) the syntactic structure when this second instance of Merge applies to it). With this knowledge in place, we can readily understand the displacement of *wh*-constituents to the left edge of the sentence as a function of Internal Merge as well — driven (or '**triggered**') once again by the need to establish a local Agree relationship between two terms of the structure which have a matching feature (this time, the feature [wh], represented on both *wh*-phrases and the head functional head C, up in the high left periphery of the sentence). In the syntactic structure underlying the question *What do you think that Bill believes that Bob said?*, the *wh*-constituent *what* starts out life (via External Merge) as the object of *said*; but the C-head of the root clause (realised as *do*) triggers movement (Internal Merge) of *what* to a position to C's immediate left so that C and the *wh*-constituent can enter in a local Agree relationship for the feature [wh], which they both bear. As in the case of the *seem*-example, it is not possible to forgo Internal Merge: *\*Do you think that Bill believes that Bob said what?* is ill-formed. We can understand this once we bear in mind that C=*do* and *what* share a feature (viz., [wh]), and can only enter into a valuation relation for this feature if the two terms are sufficiently close to one another.

In the two cases of Internal Merge discussed in the previous paragraph, the need for feature valuation relations to be **local** was emphasised. Locality restrictions play themselves out in syntax in a variety of ways, some involving an intuitively natural notion of 'absolute distance' (there is just 'too much stuff' in between *seems* and *he* in *\*Seems to be assumed to have been assassinated he*, and between *do* and *what* in *\*Do you think that Bill believes that Bob said what?*), and others appealing to some other sense in which local relations can fail. Take, for instance, the difference between *What do you think that Bill believes that Bob said?*, on the one hand, and *\*What do you think that Bill knows when Bob said?* or *\*What do you wonder if Bill believes that Bob said?*, on the other: all three of these questions have a considerable amount of complexity to them; but native speakers are unanimous in their conviction that the first is much better than the other two, even though the absolute number of words between *what*'s position of Internal Merge and its position of External Merge is exactly the same in all three examples: in each case, *what* is spelled out to the immediate left of *do* in the root clause, and originates as the object of *said*; there are nine words between *what* and its External Merge site in each of the three sentences. For the second example, it makes intuitive sense to hold the appearance of *when*, another *wh*-element, in between *what*'s Internal and External Merge positions responsible for the degradation of the sentence: *what* and *when* belong to the same family (they are both *wh*-elements), so it is natural to think that *when* interferes with *what*'s movement to the front of the sentence — *what* 'bumps into' *when* along the way, and *when* stops *what* from moving across it. This effect is what has come to be known as **relativised minimality**: you must make the shortest possible move, so you cannot move across something very much like yourself

which is occupying exactly the same type of position into which you yourself are looking to move. Concretely, in the case at hand, *when* is sitting on the left edge of the lowest of the three clauses (in the specifier position of the C-projection of that clause), and movement of *what* out of that clause onto the left edge of the root clause (the specifier of the root C-projection) across *when* is blocked. This notion of relativised minimality covers a range of other ‘intervention effects’ as well — but at first blush, it does not seem to have anything to say about the third member of our trio: *\*What do you wonder if Bill believes that Bob said?*. Here *what* does not appear to be moving past anything that looks very much like it and is occupying the same type of structural position: *if* is a complementiser (a C-head), not a *wh*-constituent in SpecCP. The thing to bear in mind here is that *if*, in subordinate yes/no-questions, can be replaced with *whether*, which IS a *wh*-constituent in SpecCP — and on this basis, it is plausible to think that in the third member of our trio, there is in fact something occupying the specifier position of the middle CP: a silent counterpart to *whether*. An English subordinate yes/no-question can be introduced either by *whether* (in SpecCP, with C occupied by a silent complementiser), or by *if* (in C, with SpecCP occupied by a silent *wh*-element); no matter which of these options we choose, the syntax always features a [wh]-specified element in the specifier position of the yes/no-CP, and this element (whether overt or silent) causes the establishment of a different *wh*-dependency across this SpecCP to be blocked.

The locality restrictions on Internal Merge that we talked about in the previous paragraph are part and parcel of a general ‘economy drive’ pervading syntax. The idea is that the system should never do more than is strictly speaking necessary: it should not perform more instances of External and Internal Merge than are needed for convergence; and it should not perform any instances of Merge in structural configurations that are not local. We have already seen that syntax cannot perform Agree and Internal Merge over greater-than-minimal distances. This is called **economy of derivation** because Agree and Internal Merge are both operations that apply in the course of the derivation to terms that have previously been externally merged. It can also be shown that syntax should not perform External Merge more than is needed: syntax must not contain unnecessary symbols. This is called **economy of representation**. Thus, we are allowed to externally merge an ‘expletive’ in a structural subject position only if the notional subject (for whatever reason) does not move into a structural subject position itself — *Someone seems to be standing in the corner* and *There seems to be someone standing in the corner* are both well-formed (the latter calling for ‘expletive’ *there* because *someone* is not undergoing movement), but moving the subject up AND using ‘expletive’ *there* at the same time is not: both *\*Someone seems there to be standing in the corner* and *\*There seems someone to be standing in the corner* are irredeemable.

The emphasis on economy, both of derivation (Internal Merge, Agree) and of representation (External Merge), is motivated by the desire to achieve **computational efficiency**. A question that arises in this connection is whether External Merge and Internal Merge put different amounts of weight on the economy scale: given a choice, is it better to do External Merge or Internal Merge (a.k.a. Move)? The debate concerning Merge-over-Move has mostly been concentrated on ‘expletive’ constructions: the contrast between *There seems to be someone in the closet* and *\*There seems someone to be in the closet* has been interpreted as an indication that *there* should be merged in the subject position of the embedded clause instead of having the noun phrase *someone* move into this position — and if this is the right way of thinking about these facts, they show that External Merge of the expletive *there* takes precedence over Move or Internal Merge of the noun phrase *someone*.

But note that *\*There seems someone to be in the closet* is already excluded by what we said at the end of the previous paragraph: *someone* here has moved into the structural subject position of the infinitival clause (to the left of *to*), which immediately rules out External Merge of *there*. The message is that the grammar, confronted with the need to build a particular dependency in a particular sentence, will try to make do EITHER just with External Merge OR with Internal Merge; it will not mix the two if it can get away without doing so. Thus, *There seems to be someone in the closet* (whose derivation builds the dependency between *someone* and *seems* by involving only External Merge, of *someone* and the ‘expletive’ *there*) and *Someone seems to be in the closet* (featuring Internal Merge of *someone* and no External Merge of *there*) are grammatical; but *\*There seems someone to be in the closet*, which involves a mix of Internal Merge of *someone* (moved into the subject position of the infinitival clause) and External Merge of *there* (in the subject position of the matrix clause), is rejected because there are more economical alternatives. It may not be possible to establish the relative ‘cost’ of Internal and External Merge: neither may be intrinsically ‘more economical’ than the other. But what is of great importance is that the grammar will never go out of its way to do more than is strictly necessary for convergence. And this can readily be understood from the point of view of the fact that the language learner/user has a great deal of other stuff to deal with besides constructing sentences: (s)he also needs to breathe, eat, bathe, dress, walk, etc. Economy of derivation and representation are there to ensure that a language learner/user does not ‘waste’ an inordinate amount of brain power on just the construction of sentences.

This brings us to the end of this overview of Principles-and-Parameters theory and the goals of the minimalist programme for syntactic analysis. Though many questions remain open, a general understanding of the objectives of the programme will be helpful as a framework within which to couch one’s thinking about the syntax of human natural language. Understanding syntax is at the centre of the effort to understand the workings of the human language faculty, and the amazing ease and efficacy with which healthy individuals acquire the knowledge of the language of their environment. Understanding this is within reach only with the aid of a model that is both principled and efficient.

### **Some useful references for further study**

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