

## Models of Generative Grammar

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### المخلص

نشر العالم اللغوي الأمريكي ، أستاذ علم اللغة في معهد MIT نعوم جومسكي عام ١٩٥٧ كتابه الموسوم syntactic structure . يعتبر صدور هذا الكتاب أهم معطف في تأريخ علم اللغة. حيث فجر ثورة قلب جميع الموازين و أسس مدرسة لغوية اكتسحت جميع المدارس و النظريات اللغوية و فتح آفاقا جديدة أمام الدراسات اللغوية العامة.

من أهم مبادئ هذه المدرسة هي نظرتها الشمولية إلى اللغة كسمة و ظاهرة إنسانية عامة ، تؤكد بأن جميع اللغات الإنسانية و بالرغم من انتمائها العرقي و الحضاري و التاريخي والجغرافي، متطورة و معقدة بنفس الدرجة. خلال الخمسة عقود الماضية تطورت و تشعبت هذه المدرسة بسرعة حيث ساهم في تطويرها جومسكي نفسه مع المناء من علماء اللغة الفطاحل و نمت في ظلها العديد من المدارس و قدمت (٩) نماذج مختلفة لهذه المدرسة ، حيث تعتبر كل مرحلة من مراحلها مدرسة مستقلة بحد ذاتها و متممة لما قبلها. يقدم الباحث و باختصار، مسار و مراحل التطور التاريخي لهذه المدرسة مع تبيان خصوصية كل مرحلة.

### Abstract

The publication of the Chomsky's *Syntactic Structure* in 1957 introduced the theory of Generative Grammar. It marked the start of a great revolution in Linguistics. Generative grammar refers to a particular approach to the study of syntax. It is an explicit description of the ideal speaker – hearers intuition. The theory centers on a very simple but essential observation (the native speaker of any language is able to produce and understand utterances he has never heard before).It attempts to give a set of rules that will correctly predict which combinations of words will form grammatical sentences. Generative Grammar aims at describing the native speaker's tacit grammatical knowledge, which reflects his infinite productive capacity, by a system of rules that specify all of the well-formed or grammatical, sentences of a language .

The hypothesis of generative grammar is that, language is a structure of the human mind. Its goal is to make a complete model of this inner language Chomsky has argued that the properties of a generative grammar arise from an "innate" universal grammar, it could be used to describe all human languages.

Chomsky believed that there would be considerable similarities between languages' deep structures, and that these structures would reveal properties, common to all languages, which were concealed by their surface structures.

Generative Grammar, since its inception in 1950s, has been constantly and dynamically developing and has had a profound influence on linguistics. Its tremendous affects are still being worked out. Chomsky himself and so many linguists throughout the world have been contributing in these developments. It has undergone numerous revisions.

## 1 - Syntactic Structure (1957)

In 1957, [Noam Chomsky](#) published [Syntactic Structures](#), in which he developed the idea of Kernel sentences.

Kernel sentence is a basic irreducible set of simple structure produced by the Phrase Structure Rules of a grammar. The output of these rules is a Kernel string. The (SS) model contains obligatory and optional transformational rules. Kernel sentence is derived from the string by a series of obligatory transformational rules. . Examples of such sentences are;

*John is a teacher.  
speaks  
bought the book.  
nice  
the cake*

*John  
John  
The cake is  
Marry bought*

According to this model different types of sentences ,(Negative , Interrogative, Passive..etc.), simple and complex, were derived from these kernels by successive optional [transformational](#) Rules.all the following sentences are related in that they are derived from the same underlying string.

- 1 - *The girl bought a house. (simple active, declarative )*
- 2 - *The girl did not buy a house.( Negative)*
- 3 - *Did the girl buy a house? (Interrogative)*
- 4 - *Didn't the girl buy a house?( Interrogative - Negative)*
- 5 - *The house was bought by the girl. (Passive)*
- 6 - *The house was not bought by the girl.(Passive - Negative)*
- 7 - *Was the house bough by the girl? (Passive - Interrogative)*
- 8 - *Wasn't the house bought by the girl?(Passive - interrogative - Negative)*

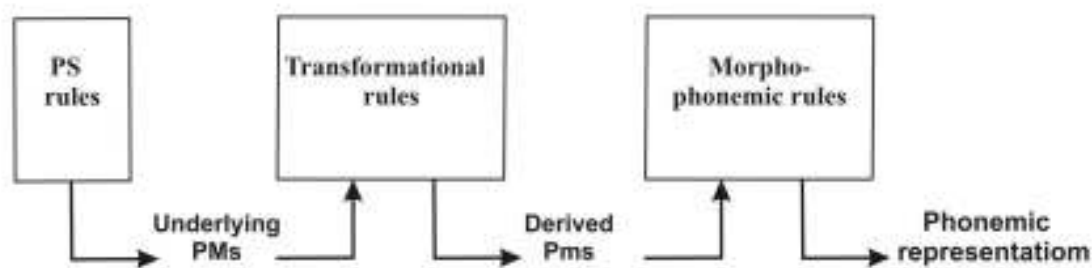
of these sentences the first (a simple active, declarative sentence ) is defined by Chomsky in **Syntactic Structure** as a **kernel sentence**.

Compound sentences in which two clauses are coordinated (*The student borrowed the book and went home*) and complex sentence in which one sentence is subordinated to another (*The cake which Marry bought is nice*) are generated by means of conjoining and embedding transformations respectively.

In Syntactic Structure model, syntax consisted of three kinds of rules:

- 1 - The phrase structure rules created the deep structures of sentences. ordered the parts of a sentence into linguistic categories and provided the lexical forms for nouns, verbs, prepositions, and adjectives.
- 2 - transformational rules operated on these deep structures to produce the surface structures of the language. By these transformational rules (Negative , Interrogative, Passive..etc.), simple and complex, were derived from these kernels by successive optional [transformational](#) Rules.
- 3 - Morphophonemic rules changed lexical forms where necessary ( e.g. go + past = went).

This diagram shows how the grammar outlined in syntactic structure:



## 2 - Standard Theory (1965)

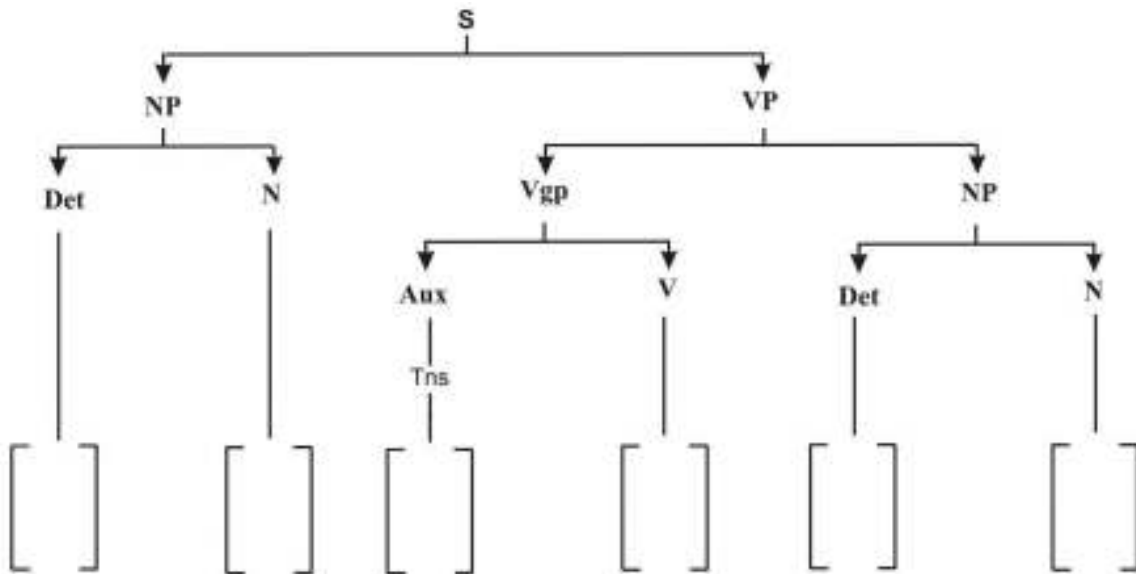
In 1965 Chomsky published his *Aspects of the theory of Syntax* in which he summarizes the development of TG theory from its beginning to 1965 and formalizes the version of the theory which is generally referred to as the standard theory. The most radical changes are:

- 1 - The notion of Kernel is abandoned and identified the underlying constituents of sentences as deep structure.
- 2 - Deep structures are generated by *phrase-structure rules*, and surface structures are derived from deep structures by a series of [transformations](#)
- 3 – Semantics is an integrated part of the theory.
- 4 – The recursive property of the grammar is accounted for in the Phrase Structure Rules.

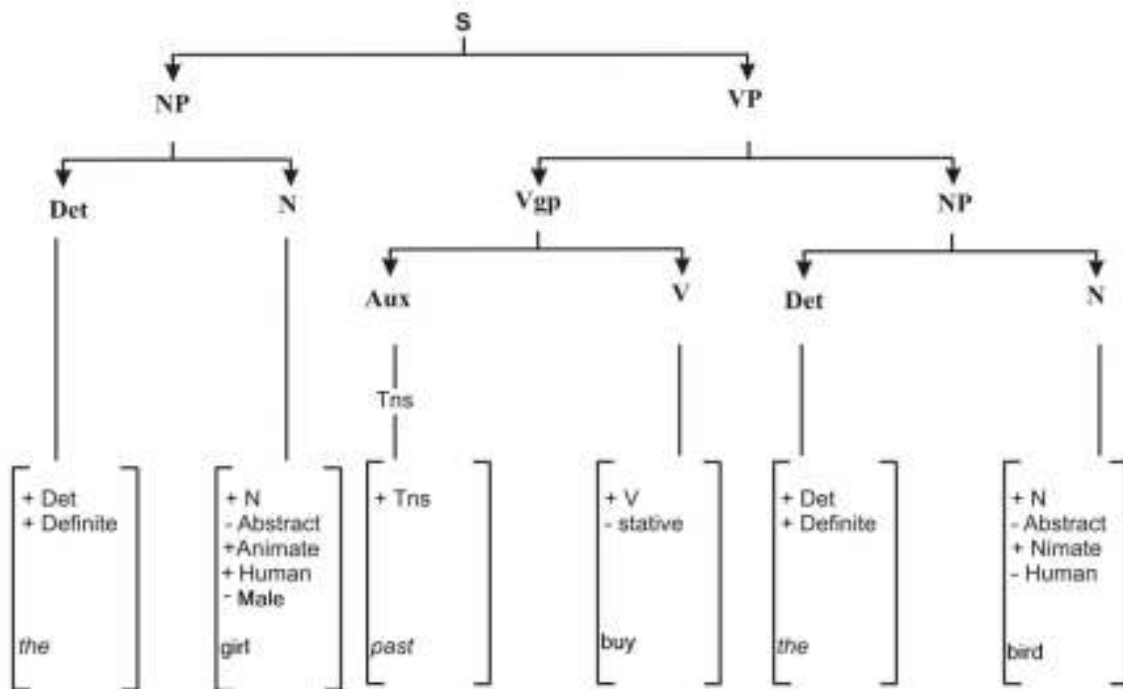
The main difference between **SS** model and **Aspect** Model is the insertion of (semantic component) into the theoretical framework of TG grammar. The core aspect of Standard Theory is the distinction between two different levels of a sentence, called [Deep structure](#) and [Surface structure](#). The two representations are linked to each other by [transformational grammar](#).

Deep structure is an abstract level of structural organization in which all the elements determining structural and semantic interpretation are represented. Chomsky modifies his theory in such a way that deep structures are generated in two stages:

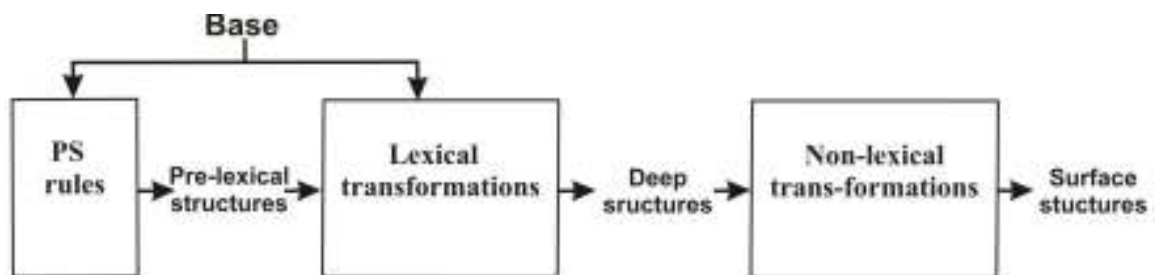
First a simple set of Phrase Structure rules generate Phrase Markers in which the terminal positions are empty slots for the lexical items to be inserted in the second stage . such PM are referred to as pre -lexical structure. The following is an example for Phrase Markers:



In the second stage the empty places are filled with complex symbols consisting of morphemes plus their syntactic and semantic features by the rules of lexical transformations. The PS rules and lexical transformations jointly constitute what is called the BASE component of the grammar. For example a deep structure for the sentence (The girl bought the bird) will be:



This diagram shows how the grammar outlined in the ASPECT theory:



### 3 - Extended Standard Theory (EST) (early 1970s).

By 1972 more revisions in the model took place and this led to a renaming of the standard theory to The Extended Standard Theory. This new insight generative grammar was presented by Ray Jackendoff. He proposed that transformations should be applied without having to mention semantic information such as referentiality within a table of coreference, the use of index markers, etc. This could be done, by changing the kind of information allowed in the deep structure in the Standard Theory.)

This introduction of abstract elements into the deep structure of sentences marked an important turning point in linguistic theory. It led to the emergence of GB Theory.

#### 4 - X-bar theory (1970)

X-bar theory was developed by [R. Jackendoff](#) and [Chomsky](#) in 1970. It is a theory about the internal structure of syntactic constituents proposed as an alternative system to traditional account of Phrase Structure and Lexical categories. The theory claims that there are certain structural similarities among all phrasal categories of all languages. It attempts to identify universal syntactic features common to all human languages presupposed in (1965) model.

When Chomsky developed his model of transformational grammar he argued that all languages should have similar parts of speech and there are universal phrase structure rules that operate across all languages. The universal parts of speech in the earliest model of his grammar were few in number (N, Det, AUX, V.) but with the passage of time they were expanded to include other lexical and phrasal categories as follows.

Lexical Categories (N- V- Aux – Adj – Adv – Det – DEG – Conj – PRO – Q)  
 Phrasal Categories ( S – NP – VP – AP – PP – ADVP – QP)

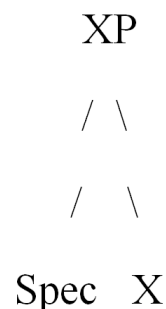
In the Aspect framework the most basic point was that a sentence consisted of a [NP](#) and a [VP](#), (S --- NP VP). Each element could be further rewritten as following:

A noun phrase consists of a [determiner](#) such as (*a*) or (*our*), an adjective, and the head noun *our small room* (NP --- Det Adj N).

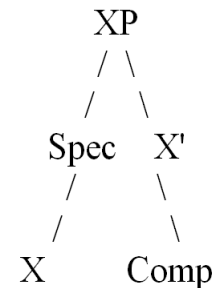
A verb phrase consisted of a verb and other elements, some optional, some depending on the nature of the verb: such as *went* or *play chess* or *gave her a flower*. (VP ---- V NP).

Linguists noticed that other kinds of categories were needed between lexical and phrasal categories. Intermediate categories such as *Very beautiful* or *very beautiful girl* in the phrase *the very beautiful girl* have no status in Aspects PSR. This new proposed level is called the X-Bar category.

In this theory three levels of categories are specified (Phrasal category **XP**), (X-bar category **X – bar**), and (Lexical category **X**). XP dominates a specifier and X-bar.



**X-bar**, in turn, dominates the head of the projection (XP - X-bar - X) X and one or more complements of X. The subject is usually assigned to the specifier position.



In X-Bar Theory [branching](#) is always [binary](#). So the top-level XP branches into X' and the [specifier](#). The lowest X' branches into X and something else, which is called the [complement](#). This gives the following basic structure:

The last rule in X-Bar Syntax is the recursive rule that allows X-Bar to duplicate itself. The recursiveness of constituents within a phrase marker is a fact about natural language and the theory must account for this generative capacity within the grammar.

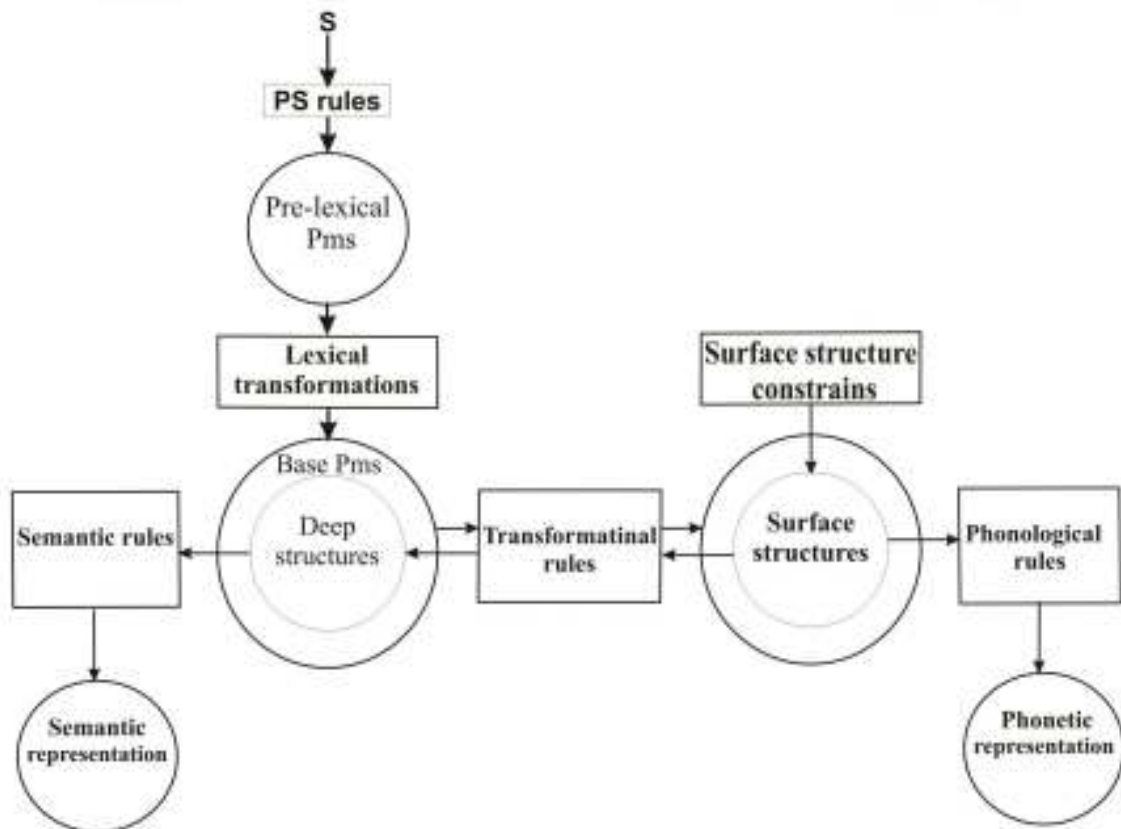
The XP consists of the X plus its various qualifiers, and the XP is semantically of the same nature as its head X: for example, *my little red book* is like *book*, and *slept well all night* is like *slept*. The XP is called a [projection](#) of its head.

## 5 - Revised Extended Standard Theory (REST) (1973-1976)

The Revised Extended Standard Theory was formulated between 1973 and 1976. It contains:

- 2 - Restrictions upon [X-bar theory](#).
- 2 - Assumption of the [COMP](#) position.

This diagram shows how the grammar outlined in the Revised Extended Standard Theory:



## 6 - Generative Smantics (late 1960s).

Generative semantics is an approach within the generative grammar initiated in late 1960s, by John Ross, Paul Postal, James McCawley. and George Lakoff.

GS proposes that the deep structure of a sentence is equivalent and sole input to semantic representation , from which the surface structure can be derived using only one set of rules that relate underlying meaning and surface form rather than separate sets of semantic and syntactic rules.

This approach necessitated more complex underlying structures than those proposed by Chomsky, and more complex transformations as a consequence. the approach was appealing in several respects.

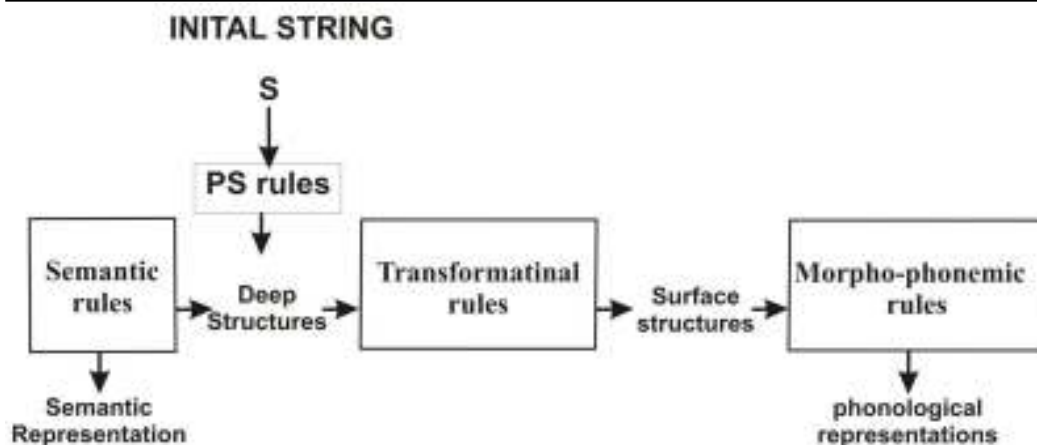
1 - it offered a clear insight for explaining synonymity.

2 - the theory had a pleasingly intuitive structure: the form of a sentence was quite literally *derived* from its meaning via transformations.

This diagram shows how the grammar outlined in the Revised Extended Standard Theory:

Generative semantics approach is outlined in the following diagram





## 7 - Government and binding (1980)

Government and binding is a theory of [syntax](#) developed by [Chomsky](#) in the 1980s. It assumes that sentences have three levels: D – Structure , S – Structure and Logical form. S – structure is derived from D – Structure and logical form from S – Structure by a single transformation called MOVE ALPHA. Many subtheories overlap with itnamly X – Bar, THETA, CASE, BINDING,CONTROL and GOVERNMENT theory The name refers to two central of these subtheories

- 1) - government, which is an abstract syntactic relation. The main application of the government relation concerns the assignment of case.

Abstract case is taken to be universal. Some languages have rich morphological case marking and others show very limited morphological case marking, , all these presumed to have full systems of abstract case that differ only in the morphological realization. In GB, abstract case is assigned to NP's by case assigners, namely verbs, prepositions, and INFL. Verbs and prepositions are said to assign accusative case to NP's that they govern, and INFL assigns nominative case to NP's that it governs. The government relation makes case assignment unambiguous..

- 2) - binding, deals with the referents of [anaphors](#), [pronouns](#), and [referential expressions](#). GB distinguishes three types of NP. The applicable rules are called Binding Principle A, Binding Principle B, and Binding Principle C.

**Principle A:** .. reciprocal and reflexive NPs, whose reference is bound by a preceding NP in the same clause, e.g. *John bought himself a new car*, where *himself* refers to *John*, or *The girl washes herself*, where *herself* refers to the *girl*.

Anaphors are bound within a specific syntactic domain, they have a local antecedent which c-commands them within their governing category.

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**Principle B:** Personal pronouns, which can be interpreted anaphorically or deictically . e.g. *Kate still thinks she was right* where *she* can refer either to *Kate* or another person not mentioned in the sentence.

Personal pronouns are not bound within their governing categories; they can be bound only by elements outside of the governing category

**Principle C:** All NPs which do not fall into (A) or (B), e.g. proper nouns, labels, traces.

## 8 - Principles and Parameters approach (1979)

The Principles and Parameters( P &P) approach is a theoretical framework within generative linguistics presented by Chomsky in his paper [Lectures on Government and Binding](#) in 1979. According to this theory the syntax of a language is described in accordance with general **principles** (i.e. abstract rules or grammars) and specific parameters (i.e. markers, switches) .This theory stresses on the point that the grammatical principles underlying languages are innate and fixed, and the differences among the languages are characterized in terms of parameter settings in the brain. This indicates the fact that a child learning a language needs only acquire the necessary [lexical](#) items (words, grammatical [morphemes](#), and idioms), and( the appropriate parameter settings),

The central idea of principles and parameters is that a person's [syntactic](#) knowledge consist of two aspects:

- 1 - A finite set of fundamental principles that are common to all languages;
- 2 - A finite set of parameters that determine syntactic variability amongst languages.

Within this framework, the goal of linguistics is to identify all of the principles and parameters that are universal to human language ([Universal Grammar](#)). As such, any attempt to explain the syntax of a particular language using a principle or parameter is cross-examined with the evidence available in other languages.

## 9 - Minimalist Program (1993)

The "Minimalist Program ( MP)", has been developing inside [Generative Grammar](#) since the early nineties. It started in 1993 with the publication of a paper by [Chomsky](#) entitled (*A minimalist program for linguistic theory*) . It aims at the further development of ideas involving *economy of derivation* and

*economy of representation*. Chomsky presents MP as a program, and not as a theory, the Minimalist Program works on the assumption that

Universal Grammar constitutes a perfect design in the sense that it contains only what is necessary to meet our conceptual, physical and biological needs. This approach proposes the existence of a fixed set of principles valid for all languages.

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