

Noam Chomsky's

UNIVERSAL GRAMMAR

&

The Current State of The Theory

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**Abstract**

Noam Chomsky's Theory of Universal Grammar has been the defining theory behind linguistics for the past several decades. Many linguists have based their career around how they stand in relation to it, and no matter one's stance on the matter, it is impossible to refute the Theory's monumental impact on the field as a whole. This paper aims to outline — very briefly — what the theory entails, how it has evolved since it was first proposed in the 1960s, and what the most current consensus on the matter is.

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# 1 Universal Grammar

To begin with, what is universal grammar exactly, and what does it entail? Well, contrary to what I originally thought, it is not a defined linguistic grammar that applies to all human languages. The theory of universal grammar mainly consists of the hypothesis that language is an innate human faculty that is defined — at least, to some extent — by our biology and genetics. One of the well-known arguments Chomsky presents is that young children can understand grammatical concepts about the language they speak without having been taught it directly. (Cook and Newson, 2007, p. 26)

At its base, UG-theory suggests there is some kind of “computation system” that converts the external signals (sounds, symbols, sign-language, etc.) into internal ideas. (Cook and Newson, 2007, p. 5) Most of what Chomsky worked on after the theory was put into place, was creating a formal system to analyse syntax of varying languages to compare which elements could be universal. The ideas and structures used to analyse language and form ideas about how such an internal system might be structure has been discussed and evolved over the past nearly half century:

“The UG Theory claims to be a scientific theory based on solid evidence about language. As such, it is always progressing towards better explanations for language knowledge....”

(Cook and Newson, 2007, p. 27)

The theory split into two main branches, each focusing on one end of the computational system; they were the “E-Language” and “I-Language” branches. E-Language is primarily concerned with the actual physical manifestation of language by gathering large samples and analysing them. The I-Linguists focus on mapping out how these ideas are stored in the brain, with the details of how they are expressed mostly irrelevant. To summarise: E-Language “is concerned with what people have done”, while I-Language “is concerned with what they could do” (Cook and Newson, 2007, p. 14)

One of the first things one would think to analyse when speaking about a “universal” grammar are so-called linguistic universals; features that have the same structure throughout all human languages. Greenbergian universals, linguistic features like syntax structure or movement rules that appear in all natural languages (Greenberg, 1969), differ from Chomskyan universals in that Chomskyan universals needn’t manifest in every language; “No language violates a universal principle (the language simply may not use the principle in a particular context)” (Cook and Newson, 2007, p. 23)

# 2 Generative Grammar

A generative grammar is a description of a language that uses a very explicit syntactic syntax. Chomsky himself defined it thusly:

“When we speak of the linguist’s grammar as a ‘generative grammar’ we mean only that it is sufficiently explicit to determine how sentences of the language are in fact characterised by the grammar”

Chomsky (1980, p. 220)

It is based on the idea of building up sentence syntax the same way one can with a mathematical grammar, like a programming language, possible syntax trees are written as recursive rewrite rules such as:

$$S \rightarrow NP VP$$

$$VP \rightarrow V NP$$

$$NP \rightarrow Det N$$

In the above example a sentence (S) is defined as a noun-phrase (NP) plus a verb-phrase (VP), a verb-phrase consists of a verb (V) and a noun-phrase, and a noun-phrase is a determiner (Det) plus a noun (N). With these rules you can construct some of the many possible grammatically valid sentences for English. (Cook and Newson, 2007, p. 32)

Though this was just the beginning of a new way of analysing the syntactic structures of sentences which lead to many further developments.

### 3 Government/Binding Model

In the new government/binding model, the simple building blocks of language which were still being defined were stuck together modularly to create a model of how the computational system could be structured. At its base, the structure has two layers: the D-structure (deep structure) and the S-structure (surface structure). The D-structure reflects the base grammatical structure of the sentence, influenced by the lexicon and phrase structure rules explained above, while the S-structure is what is actually said after being adjusted by movement rules. (Cook and Newson, 2007, p. 61) For example, in the following sentence, the “whom” would be the object of the sentence — coming after the verb as usual — in the D-Structure, but because it’s a question, the object is moved to the front of the sentence:

\* You did see whom.  $\rightarrow$  Whom did you see?

This was the basis of the GB theory which would continue to be developed with new additions to help handle all cases seen in human languages that didn’t already meet the basic model. One of the first iterations of the model, as described above, is illustrated in the following figure from Cook and Newson (2007, p. 62)

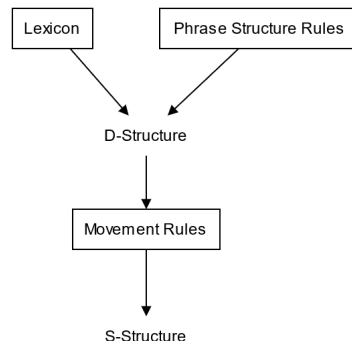


Fig. 1: One of the simplest forms of the GB-Model

## 4 X-Bar Theory

In the earlier example we stated that a verb-phrase was defined as a verb and a noun-phrase, but some verbs are intransitive and don't take an object. While we could simply define two possible verb-phrase trees — one with a object and one without — this information is based on the word itself and this causes an unnecessary redundancy. Chomsky's rewrite rules were then expanded upon with the introduction of X-bar notation to remove this redundancy; a phrase could be defined using only following rewrite rules:

$$X' \rightarrow X (YP)^1$$

$$X'' \rightarrow (YP)^2 X'$$

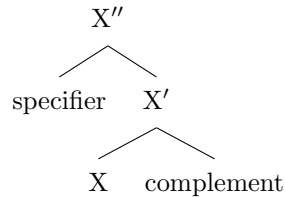


Fig. 2: The X-Bar rules displayed in a tree

Substitute X and Y with any of the four lexical categories in the theory — Noun (N), Verb (V), Adjective (A), Preposition (P) — and you have the structure of that phrase. This system can represent any phrase possible by recursively adding more elements to the tree. (Cook and Newson, 2007, p. 66)

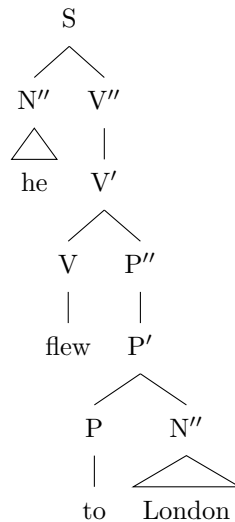


Fig. 3: An example of recursive phrases from Cook and Newson (2007, p. 68)

<sup>1</sup>The complement is optional, it is determined by the head

<sup>2</sup>The specifier is also optional, but isn't selected by the head

## 5 Principles & Parameters Theory

Principles and Parameters (P&P Theory) is a continuation of the GB-model which more accurately represents the more general nature of GB theory.

“These modules of language stand alongside many others ... Determination of the nature of these and other systems is a common project, not specific to this particular conception of the nature of language and its use”

Chomsky (2014)

Principles replaced the idea of fixed grammatical rules with a more generic set of constraints that apply to all constructions in a language as opposed to very specific ones, as with ordinary rules. (Cook and Newson, 2007, p. 35) An example of a Principle as provided by is the principle of locality:

**“Locality:** this principle is a property of linguistic processes which restricts their application to a limited part of the sentence. This then forces movements in all languages to be local: *they must be short*.

Cook and Newson (2007, p. 41)

Parameters are what account for the wide variation we see between languages; if the only thing governing languages were a set list of principles, they would be far more similar than they are. Cook and Newson (2007, p. 44) use the head parameter to illustrate how parameters differ from principles: The head is the most important word in a phrase; it selects what kind of complements may be used with it. Depending on the language, this word may come before or after its complement (or either side such as in French). While it is a principle that a phrase must have a head, where it goes is decided by the head parameter and differs from language to language.

With P&P theory and X-bar notation, the GB-model was expanded to include far more modules over the course of many years of study, leading to the following version of the model:

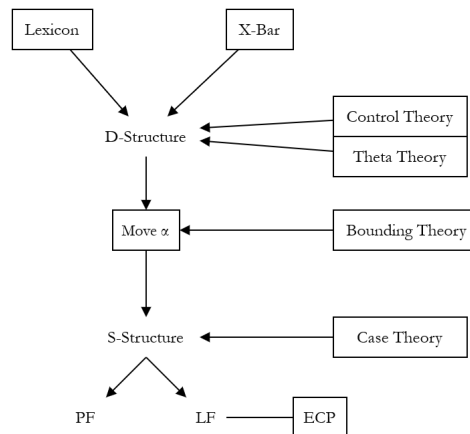


Fig. 4: The structure of the current GB-model (Cook and Newson, 2007, p. 181)

## 6 Minimalist Program

The minimalist program is the name for the latest (since 2000) development out of the GB and P&P Theories. it espouses any claims at definitiveness by its name; it's a program at the moment, not a developed theory; it's the approach being taken to explore the most recent and least-well understood linguistic concepts. (Cook and Newson, 2007, p. 242) So far, the minimalist program has had very little impact on language acquisition research specifically: "Most L1 researchers seem quite happy to continue using a version of the P&P model that involves little of the MP" (Cook and Newson, 2007, p. 219)

The minimalist program had three main phases of its development: in the beginning, it focused on finding the most foundational principles of the worlds languages and the principles which made up for the discrepancies between them. After that, the linguists began examining how perfect the interface between the phonetic form (PF) and the computational system. a large portion of the GB-model was demolished in order to reconstruct the syntax tailored to the most minimal ideas. (Cook and Newson, 2007, p. 3) After that, The phases model has been the latest production of the minimalist program. One can read about the phases model from *The Architecture of Language* Carr (2005)

## 7 Criticism

Chomsky's theory of Universal Grammar has been the subject of relentless criticism since it first came about in the 1960s. One of the most common argument that targets the foundation of the concept as a whole criticises the assumption that psychological theories can be evaluated in the same way physical ones can; some, such as Quine (1960) claimed they are not the same. Chomsky rebutted this by explaining his view that there is no proof that one cannot distinguish between two psychological theories. (Cipriani, p. 13)

Another point often brought up is that the principles in P&P theory must limit the scope of human language, no matter how extensive the parameters alter their representations. Though, this can be fairly easily dismissed as it is an inherent property of the theory; if you want to make a list of things which are common to all languages, it must have a fixed boundary to have any meaningful value. (Cipriani, p. 13)

A very strong criticism levied against UG is that it has no limit to how many exceptions it can have while still being considered correct. In other fields such as mathematics, you would have to abandon a theory once it exceeded the ideal limit of exceptions, but UG is always correct. The consequence of this is that UG theory is not falsifiable, and therefore — according to some — unscientific. (Cipriani, p. 14)

## 8 My Impression

Personally, I find the last of the example criticism very compelling; as I read through Cook and Newson (2007), I found myself often lamenting the rapid loss of elegance in any new concept introduced. At the time, I couldn't put into words the feeling that this *couldn't* be universal; there were far too many exceptions and specific rules that it seemed to only apply to a handful of very well-known

languages like English, German, Japanese, etc. Likely this is due to the very brief introduction I have been given, but I still feel it's unproductive to analyse something that, it seems, we will never be able to prove. I'm very appreciative of the many positive impacts UG's study has had on the entire field of linguistics and computer-science, I can't help feel it's unscientific to make claims about the extremely subjective qualia of human language. It makes a fantastic *model* of human languages in, probably, the most elegant manner, but — at least for now — it can only ever be a model.

Another concept troubling me while studying this is that it seems to miss a question that interests me greatly: are human languages representative of the full extent of human language faculty (assuming it is a biological faculty)? How can we tell where the border of this in-built faculty is? It's possible that we could learn more complex languages, or simply completely different languages from what seems possible given all current knowledge of human language, but this is taken up by other parts of the brain and could seem indistinguishable from regular language faculty. Does this simply also count as part of UG, or is this the brain simply adapting to a new language by using it's other logical faculties?

These questions were prompted by my interest in constructed languages (conlangs) such as Toki Pona (Lang, 2014) and Ithkuil (Quijada, 2011) which test the extreme limits of our language faculty. I would be interested to know how these fit into UG theory, if they do at all, because their ability to test what we can interpret as “language” seems to suggest to me that while we are probably equipped to develop, speak and understand language by evolution, it might be far more open-ended than we previously thought. Personally, I think the negative stigma still attached to conlangs and the prevailing opinion that they aren't “real languages” might be hindering linguistic progress. I think that, until we can fully accept conlangs as valid and powerful avenues of linguistic exploration, making any significant progress towards understanding language and human nature as a whole will be stunted.



## References

- Philip Carr. Noam chomsky, the architecture of language. *Journal of Linguistics*, 41(2):445—452, 2005. doi: 10.1017/S002222670523339X.
- Noam Chomsky. Rules and representations. *Behavioral and Brain Sciences*, 3(1), 1980. doi: 10.1017/S0140525X00001515.
- Noam Chomsky. *The Minimalist Program*. 01 2014. ISBN 9780262327282. doi: 10.7551/mitpress/9780262527347.001.0001.
- Enrico Cipriani. The generative grammar between philosophy and science. *European Journal of Literature and Linguistics*, pages 12–16.
- V. J. Cook and Mark Newson. *Chomsky’s Universal Grammar: An Introduction*. Blackwell Publishing, 3 edition, 2007.
- Joseph H. Greenberg. Language universals: A research frontier. *Science*, 166(3904):473–478, 1969. ISSN 0036-8075. doi: 10.1126/science.166.3904.473. URL <https://science.sciencemag.org/content/166/3904/473>.
- S. Lang. *Toki Pona: The Language of Good*. Great Britain, 2014. ISBN 9780978292300. URL <https://books.google.ch/books?id=5P0ZjwEACAAJ>.
- J. Quijada. *A Grammar of the Ithkuil Language*. 2011. URL <https://books.google.ch/books?id=HkNTMwEACAAJ>.
- Willard Van Orman Quine. *Word and object: An inquiry into the linguistic mechanisms of objective reference*. 1960. ISBN 0262670011.