

Lecture Elements 9

Syntax

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Introduction

In the preceding chapter, we moved from the general categories and concepts of traditional grammar to more specific methods of describing the structure of phrases and sentences. When we concentrate on the structure and ordering of components within a sentence, we are studying the syntax of a language.

Generative grammar

Inspired by the original work of Noam Chomsky, linguists have attempted to produce a particular type of grammar that has a very explicit system of rules specifying what combinations of basic elements would result in well-formed sentences. This very explicit system of rules, it was proposed, would have a lot in common with the types of rules found in mathematics.

If we consider the following operation $1 + 1 = 2$

The result of this operation is definite (cannot be changed)

But if we consider the following equation

$$3x + 2y = z$$

The result 'z' is infinite because each time we change the value of 'x' and/or 'y', the value of 'z' will change.

Starting from this comparison with mathematic rules, linguists tried to create grammatical rules by which we can produce an infinite set of sentences. Such a set of explicit rules is a **generative grammar**.

Syntactic structures

A generative grammar defines the syntactic structures of a language. The grammar will generate all the well-formed syntactic structures (e.g. sentences) of the language and will not generate any ill-formed structures. This has been called the '*all and only*' criterion, that is, *all* the grammatical sentences and *only* the grammatical sentences will be produced. The grammar will have a finite (i.e. limited) number of rules, but will be capable of generating an infinite number of well-formed structures.

Deep and surface structure

Surface structure: the structure of individual sentences after the application of movement rules to deep structure (form).

Deep structure: the underlying structure of sentences as represented by phrase structure rules (meaning).

If we consider the following pair of sentences:

Charlie broke the window.

The window was broken by Charlie.

Deep and surface structure

In traditional grammar, the first is called an active sentence, focusing on what *Charlie* did, and the second is a passive sentence, focusing on *The window* and what happened to it. The distinction between them is a difference in their **surface structure**, that is, the different syntactic forms they have as individual English sentences. This other 'underlying' level, where the basic components (noun phrase + verb + noun phrase) shared by the two sentences can be represented, is called their **deep structure**.

Structural ambiguity

Structural ambiguity: a situation in which a single phrase or sentence has two (or more) different underlying structures and interpretations.

Let's say we had two distinct deep structures. One expresses the idea that 'Annie had an umbrella and she whacked a man with it.' The other expresses the idea that 'Annie whacked a man and the man happened to be carrying an umbrella.' Now, these two different versions of events can actually be expressed in the same surface structure form:

Structural ambiguity

Annie whacked a man with an umbrella. This sentence provides an example of **structural ambiguity**.

Phrases can also be structurally ambiguous, as in expressions like *small boys and girls*. *The underlying interpretation can be either 'small boys and (small) girls' or 'small boys and (all) girls'.* The grammar will have to be capable of showing the structural distinction between these underlying representations.

Recursion

Recursion: the repeated application of a rule in generating structures. Recursive ('repeatable any number of times') rules have the capacity to be applied more than once in generating a structure.

E.g. *The gun was **on** the table **near** the window **in** the bedroom.*

The rule that creates a prepositional phrase can be repeated over and over again.

The same procedure can be used on sentence level.

Symbols used in syntactic description •

Symbol	Means	Symbol	Means
S	<i>sentence</i>	N	<i>noun</i>
PN	<i>proper noun</i>	V	<i>verb</i>
Art	<i>article</i>	Adv	<i>adverb</i>
NP	<i>noun phrase</i>	VP	<i>verb phrase</i>
*	<i>Ungrammatical sequence</i>	Pro	<i>pronoun</i>
→	<i>consists of / rewrites as</i>	Adj	<i>adjective</i>
()	<i>optional constituent</i>	Prep	<i>preposition</i>
{ }	<i>only one of these constituents</i>	PP	<i>prepositional phrase</i>

Symbols used in syntactic description

NP → Art N This is simply a shorthand way of saying that a noun phrase (NP) such as *the dog* consists of or rewrites as (→) an article (Art) *the* and a noun (N) *dog*.

NP → Art (Adj) N: here we understand that the (Adj) is optional.

NP → Art N **Art**

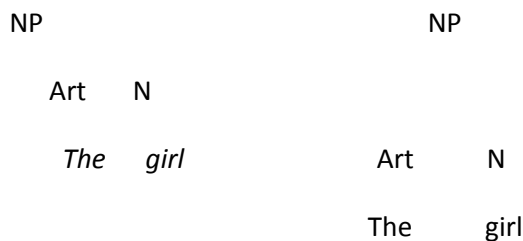
NP → Pro **NP → N** **NP → {Art N, Pro, PN}**

NP → PN **Pro**

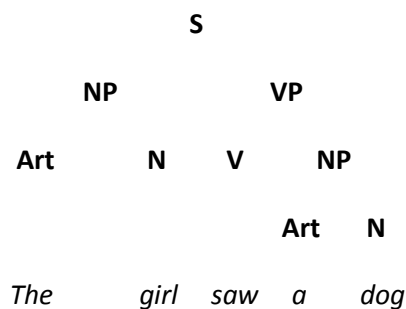
PN

Tree diagrams

In chapter 8, we looked at ways to describe the structure of sentences by first concentrating on the linear sequence of constituents, then noting how our diagrams could capture some aspects of the hierarchical organization of those structures. To create a more explicit representation of the hierarchical organization of one structure, shown in a labeled and bracketed format on the left below, we can use a **tree diagram**, shown on the right below.



Although this kind of ‘tree’, with its ‘branches’, shown on the right, seems to grow down rather than up, it functions rather well as a diagram representing all the grammatical information found in the other analysis on the left. It also shows very explicitly that there are different levels in the analysis.



Phrase structure rules

Phrase structure rules: rules stating that the structure of a phrase of a specific type consists of one or more constituents in a particular order.

S → **NP VP** “a sentence rewrites as a noun phrase and a verb phrase”.

NP → {**Art (Adj) N, Pro, PN**} “a noun phrase rewrites as either an article, an optional adjective and a noun or a pronoun or a proper noun”.

$VP \rightarrow V NP (PP) (Adv)$

$PP \rightarrow Prep NP$

Lexical rules

Lexical rules: rules stating which words can be used for constituents generated by phrase structure rules.

$PN \rightarrow \{Mary, George\}$

$V \rightarrow \{followed, helped, saw\}$

$N \rightarrow \{girl, dog, boy\}$

$Adj \rightarrow \{small, crazy\}$

$Art \rightarrow \{a, the\}$

$Prep \rightarrow \{near, with\}$

$Pro \rightarrow \{it, you\}$

$Adv \rightarrow \{recently, yesterday\}$

Back to recursion

As we did earlier with the repetition of the prepositional phrase, e.g. *The gun was **on** the table **near** the window **in** the bedroom*, we can do the same with sentences.

Mary helped George.

Cathy knew that Mary helped George.

John believed that Cathy knew that Mary helped George.

After verbs such as *believe* and *know*, as in these examples, the word *that* introduces a ‘complement phrase’.

Complement phrases

Complement phrase (CP): a structure such as *that Mary helped George* used to complete a construction beginning with a structure such as *Cathy knew*.

The word *that*, as used in these examples, is called a **complementizer (C)**. The role of that as a complementizer is to introduce a **complement phrase (CP)**.

So, we are now in a position to define a **CP** in the following way: “a complement phrase rewrites as a complementizer and a sentence”, or $CP \rightarrow C S$.

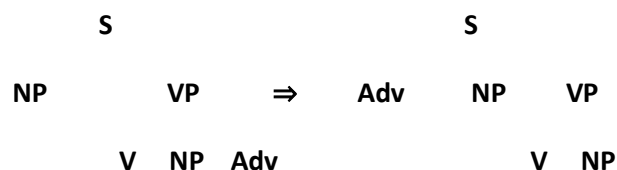
Complement phrases

We can also see from the same sentence that the complement phrase (CP) comes after a verb (V) *knew*. This means that we are using the CP as part of a verb phrase (VP), as in *knew that Mary helped George*. So, there must be another rule that says: “a verb phrase rewrites as a verb and complement phrase”, or $VP \rightarrow V CP$.

If we now look at these two new rules in conjunction with an earlier rule, we can see how recursion is built into the grammar. $S \rightarrow NP VP$ $VP \rightarrow V CP$ $CP \rightarrow C S$

Transformational rules

Transformational rules: rules that are used to change or move constituents in structures derived from phrase structure rules. Let’s consider the following examples: *Mary saw George recently.* / *Recently Mary saw George.*



Transformational rules

As shown in the earlier slide, we use the symbol \Rightarrow to indicate that a transformational rule is being used to derive a new structure from the basic structure.

There are many more rules and concepts involved in the analysis of syntax. (We’ve barely scratched the surface structures.) However, having explored some of the basic issues and methods of syntactic analysis in order to talk about ‘structure’ in language, we must move on to consider how we might incorporate the analysis of ‘meaning’ in the study of language.