

A brief historic overview of Syntax & Early stages in Transformational Syntax

Syntactic Theory
Winter Semester 2009/2010

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20 October 2009

Outline

- 1 A brief historic overview
 - Grammar in the early days
 - Towards Modern Linguistics

- 2 Generative Grammar
 - Syntax and limits of Phrase Structures
 - Transformational Grammar

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Early work on Grammar

- There is a long tradition of describing language's structure:
- In most cases, language was analyzed so that classical texts could be read
- Grammar described archaic forms of language

Examples of early grammarians and linguistic work

- India: Pāṇini (estimated 4th century B.C.)
- China: Erya (author unknown) (3rd century B.C.)
- Greece: Dionysius Thrax (2nd century B.C.), Apollonius Dyscolus (2nd century A.D.)
- Rome: Donatus (4th century A.D.), Priscian (6th century A.D.)
- France: Lancelot et al (1660) *Grammaire générale et raisonnée* (Port Royal)

Pāṇini's grammar

- Sanskrit grammar, said to be short and complete
- Includes topics as syntax, morphology, phonology and pragmatics
- Especially known for the *Aṣṭādhyāyī*:
 - describes algorithms that can be applied to lexical items to form words
 - systematic and highly technical
 - focus on brevity: difficult to read
- Pāṇini is said to have influenced the foundations of many aspects of modern linguistics:
 - Structuralism (Ferdinand de Saussure and Leonard Bloomfield)
 - Generative grammar (Noam Chomsky)
 - Optimality theory

Diachronic Linguistics

- Discovery of Sanskrit and its obvious resemblance to Latin and Greek lead to development of comparative linguistics
- Originally mostly guided towards languages with historic records
- Interest in other languages stimulated researchers to describe language
- Gradual shift of interest: from prescriptive to descriptive grammars

Ferdinand de Saussure (1857 - 1913)

- Sanskrit scholar
- His course notes were published posthumously by his students in *cours de linguistique générale* (1916)
 - Turned the attention from *diachronic* linguistics to *synchronic* linguistics
 - Formulated the arbitrariness of sign
 - Introduces the terms “langage”, “langue” and “parole”

Ferdinand de Saussure (cont)

- *Langage, Langue and parole*
 - **Langage** is the faculty of speech: it is heterogeneous consisting of physic, physiological and psychological facts
 - A **Langue** is a homogeneous system of symbols that may be mapped to meaning, it is a social product , exterior of individuals
 - **Parole** is the act of using language, it is also here where psychology comes into play
- Saussure's work is seen as the starting point of 'structuralism', introducing "syntagmatic analysis": what elements can occur in which context: what does it contribute to the meaning?

Towards modern syntax

- Structuralism (20-30ies, Bloomfield), distributionalism (50ies Hockett, Harris)
- Categorical Grammar (30ies, Ajdukiewicz)
- Dependency Grammar (30ies, Tesnière)

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Chomsky's Syntactic Structures

- Main task for linguist: separate grammatical strings from ungrammatical strings
- Two issues:
 - How to define grammatical strings?
 - Corpus or statistical methods: fail because of creative character of language
 - Grammaticality cannot be determined by 'meaningfulness'
 - Proposed method: native speaker judgments
 - What kind of system can describe all grammatical strings of a natural language? It must
 - 1 consist of a finite set of rules
 - 2 be descriptively adequate
 - 3 be explanatory

Level of formal grammar

- Easy to show: English is not a finite state grammar
Compare (after Chomsky (1957)):
 - (i) If S_1 , then S_2 .
 - (ii) Either S_3 , or S_4 .
 - (iii) If either S_3 , or S_4 , then S_2 .
 - (iv) *If S_1 , or S_2 .
- Phrase Structure Grammar?

Phrase Structure Grammar (PSG)

Chomsky on Phrase Structure Grammar:

- Not flawed in the same way a finite state grammar is
- There are probably languages that cannot be described by a PSG
 - Later shown to be (most likely) true for Dutch, and definitely for Swiss German
- If English can be described by a PSG, remains to be seen
- There are, however, other grounds to consider PSGs inadequate to describe natural language...

Adequacy of linguistic theory

How to test whether a linguistic theory is adequate?

- 1 Can it account for the data?
- 2 Can it account for data in a straight-forward way, or will it lead to extreme (implausible) complexity?
- 3 Can the same system be used to construct grammars for all natural languages?

Limits of Phrase Structure Grammar

Phrase Structure Grammar may be able to generate all grammatical strings, but it cannot capture regularities in relations between expressions

■ Coordination:

- 1 The topic of the lecture is syntax
- 2 The topic of the book is syntax
- 3 The topic of the lecture and of the book is syntax

■ Passivization:

- 1 Noam Chomsky wrote *Syntactic Structures*
- 2 *Syntactic Structures* was written (by Noam Chomsky)

Three levels of morpho-syntactic representation

Phrase Structure Grammar: D-structure

Transformations: S-structure

Morpho-phonemics: Final output

Transformations

How to capture grammatical phenomena such as agreement, coordination, passivization?

- Main idea: split syntactic structures in a deep structure (d-structure) and surface structure (s-structure)
- Phrase Structures create deep-structures
- Transformations apply to deep-structures deriving a surface structure
 - sentences and their passives have the same d-structure

Information in Syntactic Structures

- In addition to how the sentence can be composed in smaller parts, we want to know how these parts relate to each other
- In syntactic structures such information comes from:
 - 1 Definitions of grammatical functions
 - 2 The lexicon
 - 3 Features on categories

Grammatical functions and Grammatical Categories

- Grammatical functions (subject, object, predicate) are defined in relation to the deep structure (Standard Theory):
 - Subject-of-S [NP, S]
 - Object-of-V [NP, VP]
 - Predicate-of-S [VP, S]
- Syntactic properties are generally represented by (boolean) features, e.g.

N: [+N, -V]

V: [-N,+V]

A: [+N,+V]

Subcategorization and lexical insertion

- Lexical items come with a subcategorization frame.
- E.g.:
 - love: [V; -NP]
 - smile: [V; -]
 - rely: [V; -PP]
 - think: [V; -S']
- Here, the subject is inserted structurally, i.e. the subcategorization frame only defines the VP
- **Lexical Insertion Rule** (Ouhalla (1994): p.50):
Insert lexical item X under terminal node Y, where Y corresponds to the categorial features of X, and YP corresponds to the subcategorisation properties X.

Based on Ouhalla (1994) p.45–50

Transformations: Passivization

Passivization: optional

Structural analysis:

$NP - Aux - V - NP$
the dog - past - chase - the cat

Structural change:

$X_1 - X_2 - X_3 - X_4$
the dog - past - chase - the cat
↓
 $X_4 - X_2 + be + en - X_3 - by + X_1$
the cat - was - chased - by the dog

(Chomsky (1957: p112))

PSG and Transformation: tense

- Starting with PS-rule: $S \rightarrow NP \text{ Aux VP}$
- Consider the following examples:
 - The boy watched the movie
 - The boy will watch the movie
 - The boy doesn't watch the movie
 - The boy didn't watch the movie, but his friend did
 - Watch the movie, she wondered whether the boy will.
- Tense seems to be part of 'Aux' rather than VP:
 $S \rightarrow NP \text{ Aux VP}$
Aux \rightarrow Tense (Modal) (Neg)

based on Ouhalla (1994)

PSG and Transformation: tense (cont)

- The structure of *the boy watched the movie* is:
NP – tense – V – NP
- The tense marker thus precedes the verb *watch* in the d-structure.
- How can we make sure that tense will be marked on the main verb in spell-out?

- 1 Apply a transformation moving V to Aux?

S-Structure: $[[_{NP} \text{The boy}] [_{Aux} \text{watch}_i \text{-ed}] [_{VP} \text{ } _i \text{ the movie}]]$

- 2 Apply a transformation moving tense to V?

S-Structure: $[[_{NP} \text{The boy}] [_{Aux} \text{ } _i] [_{VP} \text{watch -ed}_i \text{ the movie}]]$

based on Ouhalla (1994)

Evidence for moving tense

- Adverbs can precede or follow a VP in English:
 - (i) The boy cleverly avoided Bill.
 - (ii) The boy avoided Bill cleverly.
 - (iii) The boy will cleverly avoid Bill.
- If V moves to Aux, the verb precedes the VP on the surface
- Adverbs should be able to follow the verb, but
 - (iv) *The boy avoided cleverly Bill.
- The conjugated verb thus remains in situ, and tense must move to the VP, if there is no modal: 'affix hopping'

based on Ouhalla (1994)

Affix-hopping

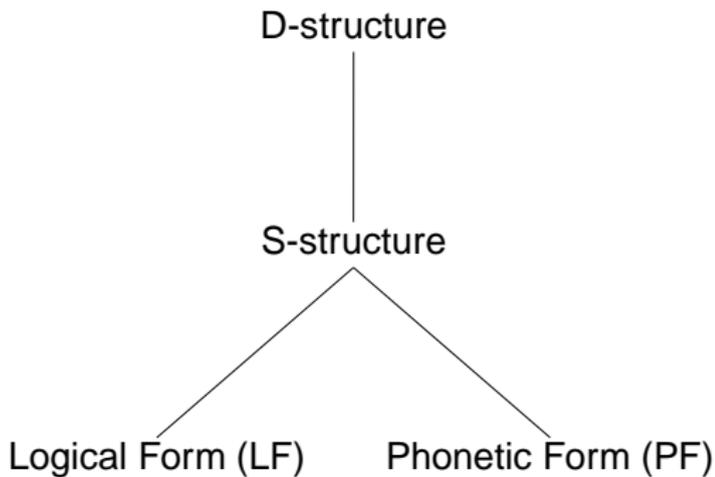
- We also want to account for the following:
 - 1 Auxiliary verbs do move to Aux: *Mary was often happy*
 - 2 Tense does not move to VP when VP dominates an auxiliary: **The boy have watched the movie*
 - 3 Affixes cannot 'hop' over negation: **The boy (do) not watched the movie*
- **Affix hopping:** Move Tense (from Aux) to V, provided
 - i) Aux does not dominate a Modal or Negation
 - ii) V has the feature specification [-AUX] (i.e. is not an auxiliary)
 - iii) VP does not dominate a V with feature specification [+AUX]

based on Ouhalla (1994), definition p. 98 (before subject-aux inversion)

Transformational grammar: initial stages

- Standard Theory: interpretation from d-structure
- Extended Standard Theory: interpretation from d-structure, s-structure and possibly final derived structure
- Trace theory: when transformations move elements around, these elements leave a trace:
→ semantics can be interpreted from s-structure only

Language Model



Assumptions in transformational syntax

- There is a difference in competence and performance, i.e. between what the speaker knows of the language and how (s)he uses it
- Children can learn a complex system such as language so easily, because the basis is innate: we are born already having a *Universal Grammar* (UG) in our mind
- Descriptive adequacy: describe language as known by the speaker (according to competence)
- Explanatory adequacy: plausibility of the analysis depending on whether it is easily learnable given our UG

Contributions to Syntax

- Syntax was placed in the centre of linguistic research
- Aims of syntax go beyond description:
 - Attention for the (more) formal side of syntax
 - Attention for psychological aspect of grammar
- This lead to more systematic research on linguistic data:
native speaker judgments, distinction between grammatical
from ungrammatical

Some remarks

- Transformational syntax states that
 - Grammar (PSG + transformation) must be able to generate all expressions that are part of the language
 - A speaker must have access to s-structure and d-structure (in Standard Theory) to interpret an expression
- Because of such remarks, many take transformational grammar as a language production model: **This is not necessarily the case**
- The first aim of the transformational approach is to study how language works as a system that can easily be learned by children

Some more remarks

- Because a language production/interpretation model is not the aim of transformational grammar, the model is not the most suitable for such approaches
- Despite its efforts towards formal description, the details are often not formal enough for computational approaches
→ how does Lexical Insertion work really?
- This also applies (perhaps in somewhat lesser extends) to \bar{X} Theory, Government and Binding and Minimalism

Concluding remarks

In this lecture, we have seen:

- That diachronic linguistic research lead to descriptive linguistics
- That transformational syntax emerged from a need to improve on structural approaches
- A (somewhat simplified) overview of Standard Theory, including examples of transformations in English
- Fundamental ideas in transformational syntax

What to retain from this lecture?

- Chomsky's ideas on syntactic research:
 - What is the aim of syntactic research? I.e. what are the aims of transformational grammars?
 - Chomsky's assumptions concerning innateness of grammar and grammaticality
- The basic architecture of the language model assumed in the transformational approach (*d-structure*, *s-structure*, PF, LF)

What you do **not** need to know (for this lecture)

- Specific names and dates from the historic overview
- How to formalize transformations, or what they are exactly
- Details of examples presented in this lecture, i.e.
 - Passivization in transformational syntax
 - Affix-hopping
- The exact motivation of particular analyses presented here: most were highly simplified, and would require substantial additional reading

Some presupposed knowledge

Please make sure you are familiar (and comfortable) with the following concepts:

- Constituency
- Phrase Structure Grammar
- Subcategorization

If not the following sources may be of help:

- Judith Köhne's slides on the preparatory course web-page
- Sag, Wasow and Bender (2003) (First two chapters)
- Ouhalla (1994) (Chapter 2)

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