X-bar Theory

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Outline

Principles and Parameters

X-bar Theory
Principles and Parameters

- An approach to the question of how children acquire language
- Ideas started shaping since the early days of modern generative grammar
- The version that is usually referred to was presented in the 1980s
- Principles and Parameters is an approach, and not (meant to be) a specific theoretical system
**Observations**

- Despite large variations, languages have many common properties on an abstract level.
- Children learn languages easily, despite the fact that language are highly complex.
- Idea: the common properties of languages are innate, so only variations need to be learned.

**Universality**

A theory of grammar should provide us with the tools needed to describe the grammar of any natural language adequately.
Principles and Parameters

Key ideas

- **Universal Grammar** can be defined as:
  - The set of **Principles** that are common to all languages.
  - The initial state of language knowledge for human beings.
- Principles may include **parameters**, which represent settings that may vary from language to language.
- Children *simply* need to learn the values of relevant parameters to acquire the grammar of their native language.

Questions

- What are the principles that are part of UG?
- What parameters are there in UG, and what are their possible values in individual languages?
Government and Binding

- GB refers to a specific approach to linguistic theory
- GB focus on principles rather than rules.
- More modularity: it actually consists of a set of theories that interact.
  - $\bar{X}$ (X-bar) theory
  - $\theta$ theory
  - Case theory
  - Binding theory
  - Bounding theory
  - Control theory
  - Government theory
X-bar theory

- X-bar theory was developed in the 1970s to design phrase structures in a more theoretically sound way.
  - First presented by Chomsky (1970).
- X-bar theory forms the basis of syntactic structure in the transformational tradition.
- X-bar theory seeks to be general.

Key concerns

- Can we define phrase structure rules in a way that captures cross-linguistic properties of syntactic structures?
- Can we define phrase structure rules in a way that allows to capture commonalities in structure within a language? (cross-categorial)
- Can we define phrase structure rules in a way that distinguishes complements from adjuncts?
**X-bar theory**

Syntactic headship was defined and phrases viewed in terms of heads, complements and specifiers.

**Phrase Structure Rules**

<table>
<thead>
<tr>
<th>Rule</th>
<th>Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X'' \rightarrow \text{Specifier } X' \mid X' \text{ Specifier}$</td>
<td></td>
</tr>
<tr>
<td>$X' \rightarrow \text{Adjunct } X' \mid X' \text{ Adjunct}$</td>
<td></td>
</tr>
<tr>
<td>$X' \rightarrow X \text{ Complement(s) } \mid \text{Complement(s) } X$</td>
<td></td>
</tr>
</tbody>
</table>

- $X$: an arbitrary lexical category
- $XP$: $X$ phrase
- $X$-bar, $X'$, $\bar{X}$: intermediate level
- Endocentric structures only
An example (N)

Flat

NP

D AdjP N PP PP

the big book of poems with the blue cover

Highten

NP

D AdjP N PP

the big book of poems with the blue cover

NP → D N’

N’ → AdjP N’

N’ → N’ PP

N’ → N PP
An example (V)

**Flat**

```
VP
  V  NP  PP
    |    |    
  eat beans with a fork
```

**Highten**

```
VP
  V'  PP
    |    
  VP  with a fork
    |    
  V  NP
    |    
  eat beans
```

- VP $\rightarrow$ V' 
- V' $\rightarrow$ N' PP 
- V' $\rightarrow$ V NP
An example (Adj)

- AdjP → Adj'
- Adj' → AdvP Adj'
- Adj' → Adj
An example (P)

PP

PP

P′

AdvP

right

P′

Conj

P′

P

NP

off

the table

and

P

NP

into

the trash

▶ PP→P′

▶ P′→AdvP P′

▶ P′→P
The XP is called the maximal projection.
The X′ is called the intermediate projection.
## Complements and Adjuncts

<table>
<thead>
<tr>
<th>PP is a complement</th>
<th>PP is an adjunct</th>
</tr>
</thead>
<tbody>
<tr>
<td>PP</td>
<td>PP</td>
</tr>
<tr>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>NP</td>
<td>NP</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>the</td>
<td>the</td>
</tr>
<tr>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>book of poems</td>
<td>N′ with a red cover</td>
</tr>
<tr>
<td></td>
<td>book</td>
</tr>
<tr>
<td>The PP seems to complete the meaning of the noun.</td>
<td>The PP seems more optional and more loosely related to the head.</td>
</tr>
</tbody>
</table>

\[(1) \quad a. \quad \text{the book of poems with a red cover} \]
\[b. \quad *\text{the book with a red cover of poems} \]
Complements and Adjuncts (cont)

(2)  

a. the book [of poems] [with a red cover] [from Blackwell] [by Robert Burns]

b. *the book [of poems] [of fiction] [with a red cover]
Complements and adjuncts (cont)

(3)  

a. the book of poems with a red cover from Blackwell by Robert Burns  
b. the book of poems from Blackwell with a red cover by Robert Burns  
c. the book of poems from Blackwell by Robert Burns with a red cover  
d. *the book with a red cover of poems from Blackwell by Robert Burns

(4)  

a. the book of poems with a red cover and with a blue spine  
b. the book of poems and of fiction from Blackwell  
c. *the book of poems and from Blackwell
Complements and adjuncts (cont)

One-replacement

Replace an N′ node with one.

(5) a. the one
b. the one with a red cover
c. *the one of poems with a red cover
Complements and adjuncts (cont)

Summary

► Adjuncts but not complements can be iterated and reordered and can stand next to one.
► Complements must be located next to the head and can’t be reordered.
► We could conjoin complements with complements and adjuncts with adjuncts, but we couldn’t mix the two.

The complement/adjunct distinction holds for categories other than NP as well.
Complements and adjuncts (V)

(6) I [\(V\) loved] [direct object \(\text{the policeman}\)] [adjunct intensely] [adjunct with all my heart].

(7) a. *I loved intensely the policeman with all my heart.
   b. *I loved the policeman the baker intensely with all my heart.
Complements and adjuncts (V)

Did-so (did-too) replacement targets V’. It can only apply before an adjunct and not before a complement.

(8) Mika loved the policemen intensely and
    a. Susan did so half-heartedly.
    b. *Susan did so the baker.

In general, complements of all categories (N, V, A, P, etc.) are the semantic objects of the head.

(9) a. John fears dogs. (verb)
    b. John is afraid of dogs. (adjective)
    c. John has a fear of dogs. (noun)
Determiner phrases (DP)

According to X-bar theory

All non-head material must be phrasal. We don’t like,

```
NP
  \  
D N'
  |   |
the N
  |   |
  book
```
Determiner phrases (DP)

Proposal

- Determiners are heads.
- Determiners are not part of the NP.
- NP is the complement to the determiner head.

<table>
<thead>
<tr>
<th>Old view</th>
<th>DP hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>NP</td>
<td>DP</td>
</tr>
<tr>
<td>D</td>
<td>...</td>
</tr>
<tr>
<td>N′</td>
<td>D′</td>
</tr>
<tr>
<td>...</td>
<td>D</td>
</tr>
<tr>
<td>N</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Genitive NPs

of-genitive

(10) a. the coat of the panther
b. the roof of the building
c. the hat of the man standing over there

s’-genitive

(11) a. the panther’s coat
b. the building’s roof
c. the man standing over there’s hat
d. *the man’s standing over there hat
Genitive NPs

Key observations

- The 's marker appears after the entire possessor NP.
- 's is not a suffix. Instead it seems to be a small word indicating possession.
- 's is in complementary distribution with (i.e., cannot co-occur with) determiners.

(12) a. the man standing over there ’s hat
    b. *the man ’s standing over there hat

(13) a. *the building ’s the roof (cf. the roof of the building)
    b. *the panther ’s the coat (cf. the coat of the panther)
    c. *the man standing over there ’s the hat (cf. the hat of the man standing over there)
Genitive NPs

**Linguistic view**

When two items are in complementary distribution, they are instances of the same thing.

**Proposal**

```
DP
  /\  \
DP  D'
  |  /
possessor D 's
  |  /
    possessed
```
**An example (DP)**

```
DP
    D
    | DP
    |   D'
    |     NP
    |       N
    |         N'
    |           VP
    |            standing over there
    |                N
    |                 man
    |                     D
    |                      N'
    |                         's
    |                          N
    |                           hat
        D
        | DP
        |   D'
        |     NP
        |       N
        |         N'
```

The example shows a DP structure with a noun phrase (NP) consisting of a determiner (D), a noun (N), and a verb phrase (VP). The noun phrase is part of a larger DP structure, which includes a determiner phrase (DP) with a determiner (D) and a noun phrase (NP). The whole structure represents a phrase standing over there.
An example (DP)

Old view

```
?                  NP
<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NP</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>the man standing over there</td>
</tr>
</tbody>
</table>
```

```
NP
  |   |
  |   |
  D  N'
    |   |  
    |   |   |  
    |   |   |  |
    |   |   |  's
    |   |   |   N
    |   |   |   |
    |   |   |   hat
```
Tense phrases (TP)

Example

```
TP
  └── DP
      └── The student

TP
  └── VP
      └── V′
          └── V
              └── DP
                  └── his syntax assignments

TP
  └── DP
      └── VP
          └── V
              └── DP
                  └── his syntax assignments
```

Context-free rule

- Other courses: $S \rightarrow NP \ VP$
- This course so far: $TP \rightarrow DP \ VP$
In order to reanalyze the $TP \rightarrow DP \ VP$ in X-bar terms, we need to determine TP’s head, complement, and specifier.

**Proposal**

- T is a functional head.
- The subject DP sits in the specifier of TP.
- The VP is the complement to T.

**Problem**

T is optional in this view.
Tense phrases (TP)

Key observations

- Tense inflection on a verb is in complementary distribution with auxiliaries.
- We can conjoin a T′ that has an auxiliary with a T′ that has a tensed verb.

(14)  
  a. The roadrunner walks funny.  
  b. The roadrunner is walking funny.  
  c. *The roadrunner is walks/walkings funny.

(15)  
  I [T′, [T′ kissed the toad] and [T′ must go wash my mouth now]].
Movement

TP
  DP
    The student
  T'
    T
      -ed
      V
        V'
        VP
        DP
    love

his syntax assignments
Complementizer phrases (CP)

Do all clauses have CPs, or do only embedded clauses have CPs?

(16)  a. John thinks that asparagus is yummy.
       b. *That asparagus is yummy. (cf. Asparagus is yummy.)
Complementizer phrases (CP)

Proposal: null complementizer

Asparagus is yummy
Yes/No questions

Proposal

```
CP
   ...
   C'
   ∅ [+Q]
   TP
   DP T' T
   VP
```
Yes/No questions

English does, in fact, have an overt \([+Q]\) complementizer (i.e. if), but it is only found in embedded questions. If occupies the \([+Q]\) complementizer, so no subject-aux inversion is required (or allowed).

(17) a. Fabio asked if Claus had run a marathon.
b. *Fabio asked if had Claus run a marathon.
c. *Fabio asked had if Claus run a marathon.
Yes/No questions

Cross-linguistic concern

In many other languages (e.g. Irish), yes/no questions are formed with a complementizer particle that precedes the verb.

(18) Ar thit Sean?
Q fall John
Did John fall?
Complementizer phrases (CP)

Coordination

(19) You can lead a horse to water but will it drink?
A big picture

\[
\begin{align*}
\text{CP} & \quad \text{C'} \\
\text{C} & \quad \text{TP} \\
\emptyset \text{[-Q]} & \quad \text{DP} \\
\text{D'} & \quad \text{NP} \\
\text{The} & \quad \text{N'} \\
\text{N'} & \quad \text{PP} \\
\text{AdjP} & \quad \text{N'} \\
\text{Adj'} & \quad \text{N} \\
\text{Adj} & \quad \text{P} \\
\text{ugly} & \quad \text{D} \\
\emptyset & \quad \text{NP} \\
\text{N} & \quad \text{Brazil} \\
\text{books} & \\
\text{the} & \quad \text{N'} \\
\text{N} & \quad \text{puddle}
\end{align*}
\]
Homework I

- X-bar analysis for sample Chinese sentences.
- Select ca. 20 sentences from our Test Suite and present coherent X-bar analysis for them.
Reading

- 徐列炯, 沈阳. 1998. 《题元理论与汉语配价问题》