Tree Adjoining Grammars

Syntax: The inner structure of NPs

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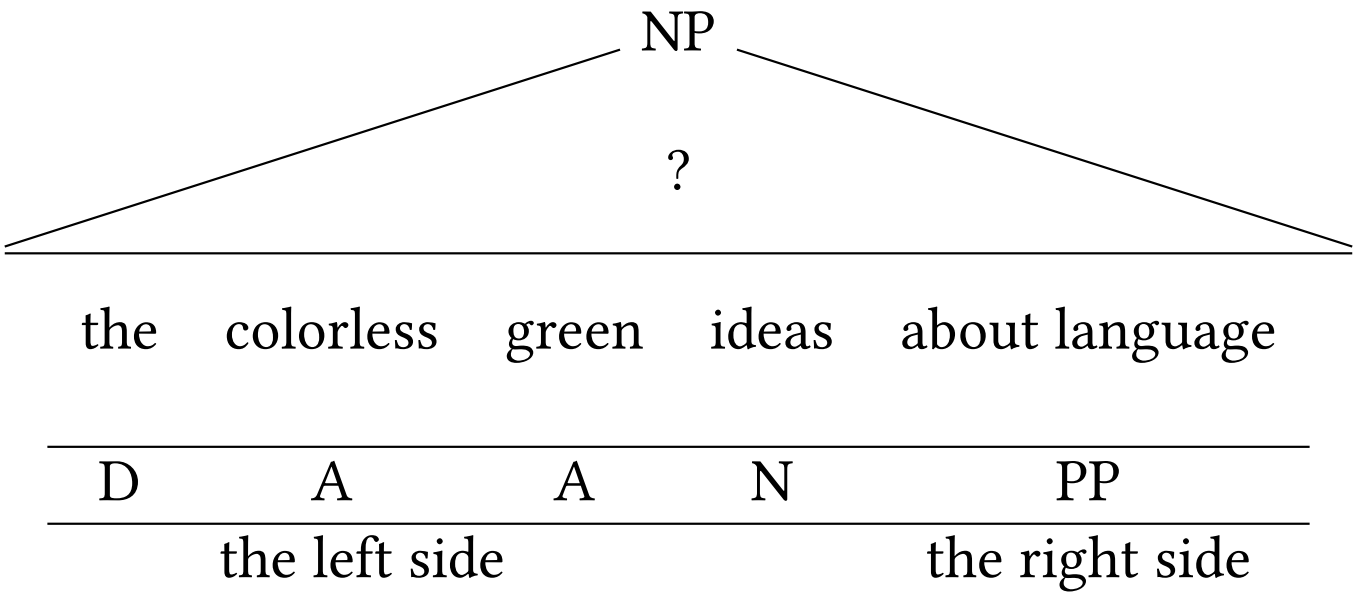
Outline

The inner structure of NPs



1. The left side of nouns
   - Determiners
   - Adjectives
2. The right side of nouns
   - PP-complements/-adjuncts of nouns
   - Relative clauses

The left side of nouns - Determiners

'Determiners' labels a rather heterogenous set of items:

- articles (*the*, *a*)
- demonstratives (*this*, *that*)
- genitives (*my*, *Bill's*, *that man's*)
- quantifiers (*all*, *some*, *every*, *most*, *many*)

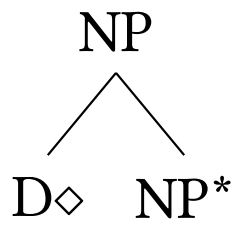
Determiners can be stacked:

(1) all these many ideas

⇒ The pattern of determiner stacking is very complex!

The left side of nouns - Determiners - XTAG-analysis

XTAG (XTAG Research Group, 2001) uses β**Dnx** for all determiners:

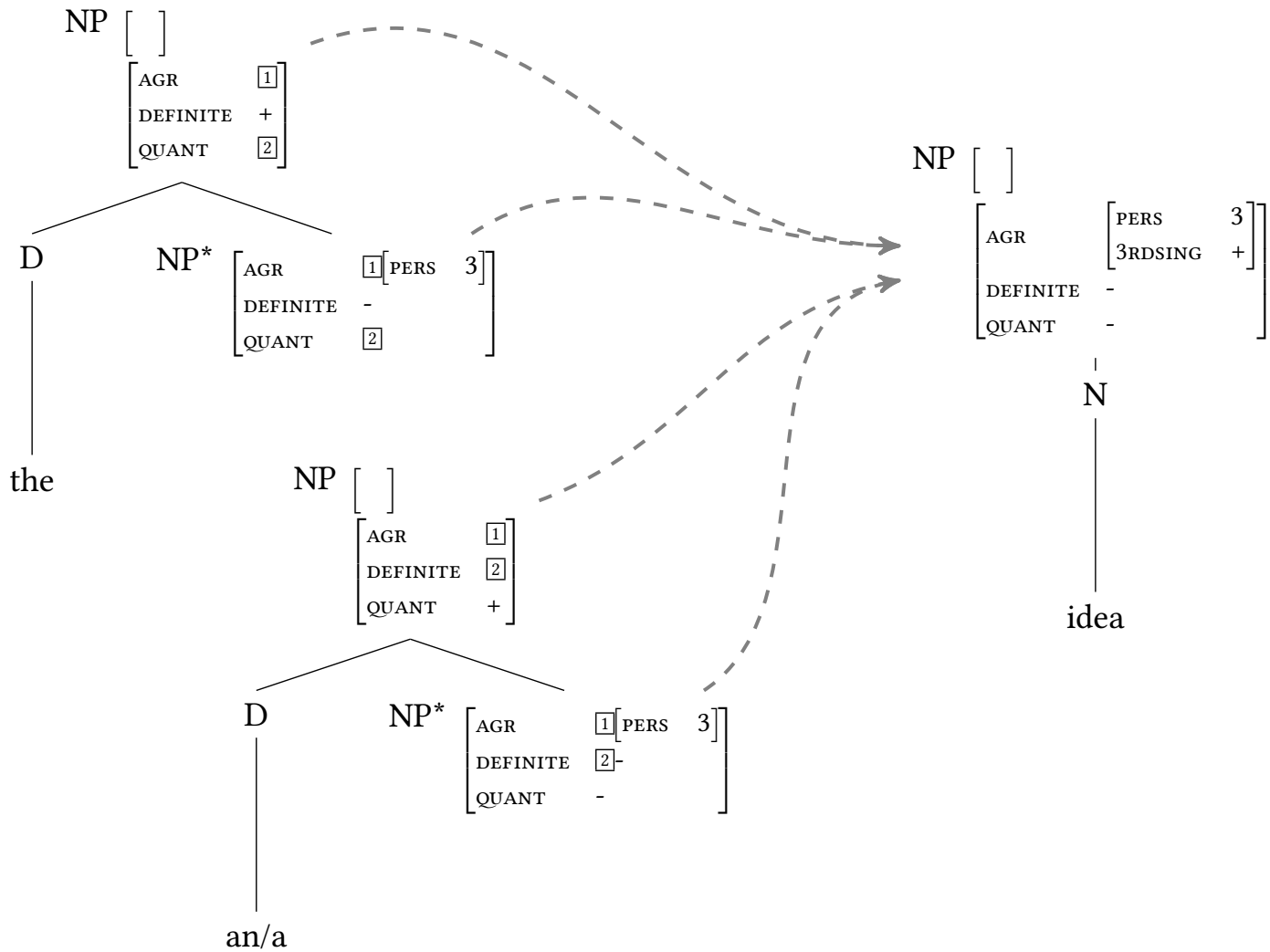


XTAG uses a set of **9 features** to handle determiner stacking:

- DEFINITE:= $\{+, -\}$ marks definite determiners (*the*, *this*, *that*, ...)
- QUANT:= $\{+, -\}$ marks quantifiers and non-definite articles (*a*, *all*, *some*, *every*, ...)
- plus: CARD(INALITY), GEN(ITIVE), WH, DECREAS(ING), CONST(ANCY), COMPL(EMENT), and ARG

$\Rightarrow$ We only consider DEFINITE and QUANT in what follows.

The left side of nouns - Determiners - XTAG-example



(2) a. *the an idea (mismatch feature QUANT)

b. *a the idea (mismatch feature DEFINITE)

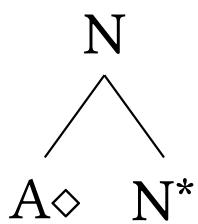
The left side of nouns - Adjectives

XTAG assumes that adjectives can appear in any order:

(3) a. the colorless green ideas
    b. the green colorless ideas

In XTAG, adjective trees adjoin to N, where no special feature is required:

βAn:



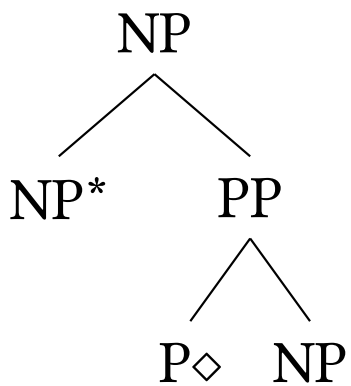
The right side of nouns - PP-complements/adjuncts

XTAG assumes that PP-complements/adjuncts can appear in any order.

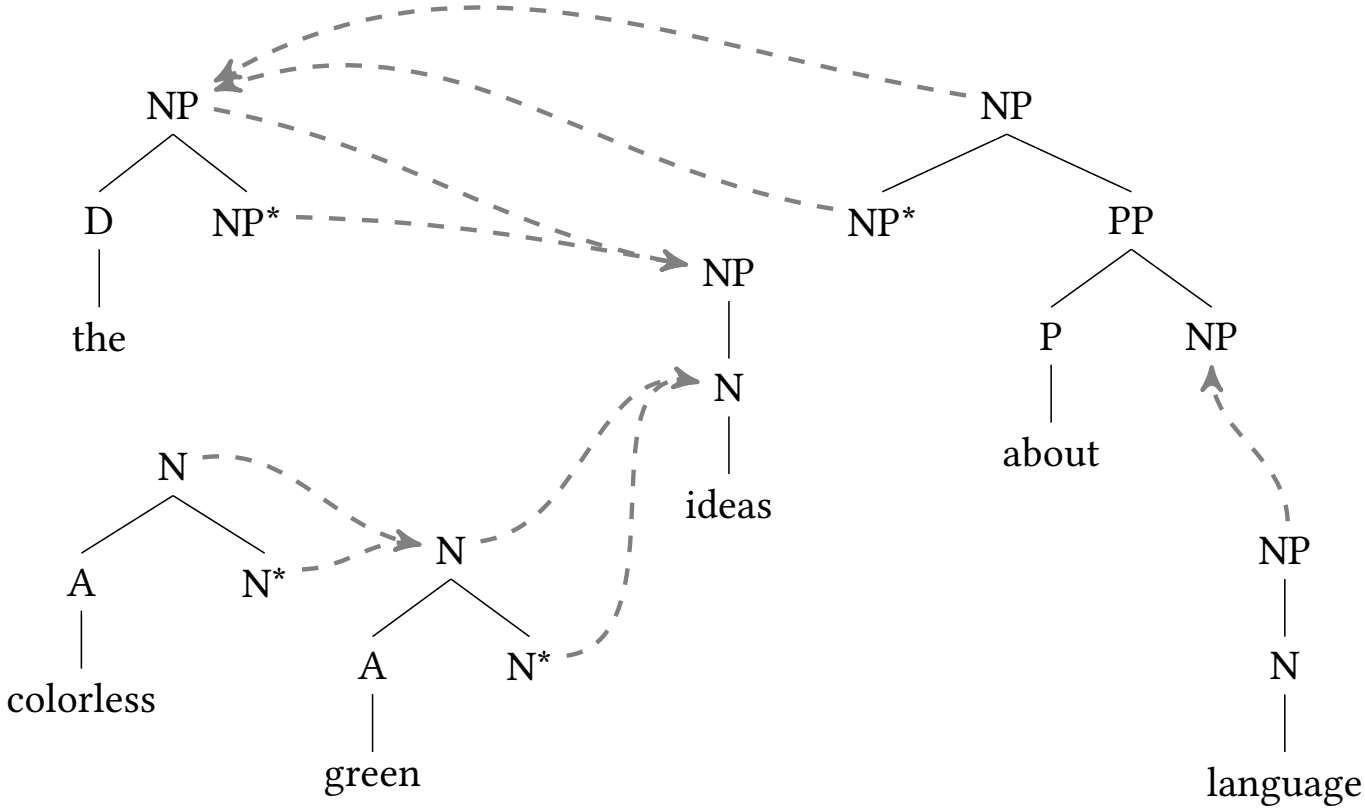
(4) a. the ideas about language from Germany
    b. the ideas from Germany about language

In XTAG, PP-complements/adjuncts adjoin to NP, and no special feature is required:

βnxPnx:



The inner structure of NPs - Putting the pieces together



⇒ The order of adjunction of determiners and PPs is not fixed!

Gerund NPs

NPs made from gerunds basically fall into two groups:

1. The gerund verb is treated like a regular noun.
2. The gerund verb and its complements/adjuncts preserve a sentential structure, but are treated as regular NP.

Determiner gerunds (aka derived nominalizations):

(5) a. [The proving of the theorem] succeeds.
b. *[The proving the theorem] succeeds.

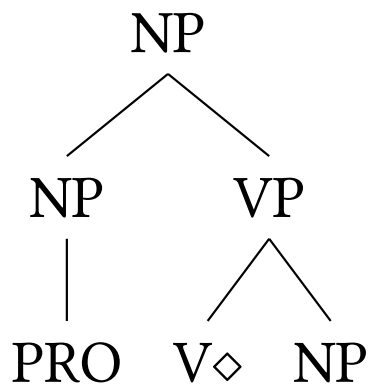
NP gerunds (aka sentential gerunds):

(6) a. [Proving the theorem] succeeds.
b. [John proving the theorem] succeeds.
c. *[The Proving the theorem] succeeds.

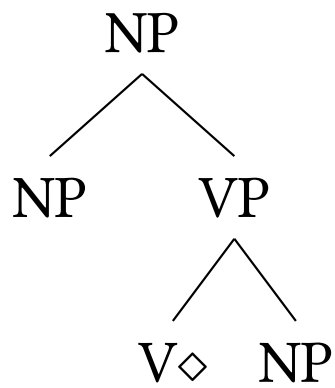
Gerund NPs - XTAG-analysis of NP gerunds

(7) a. [Proving the theorem] succeeds.
b. [John proving the theorem] succeeds.

αGnx0Vnx1-PRO:



αGnx0Vnx1:



XTAG Research Group (2001). A Lexicalized Tree Adjoining Grammar for English. Technical report, Institute for Research in Cognitive Science, University of Pennsylvania, Philadelphia, PA.