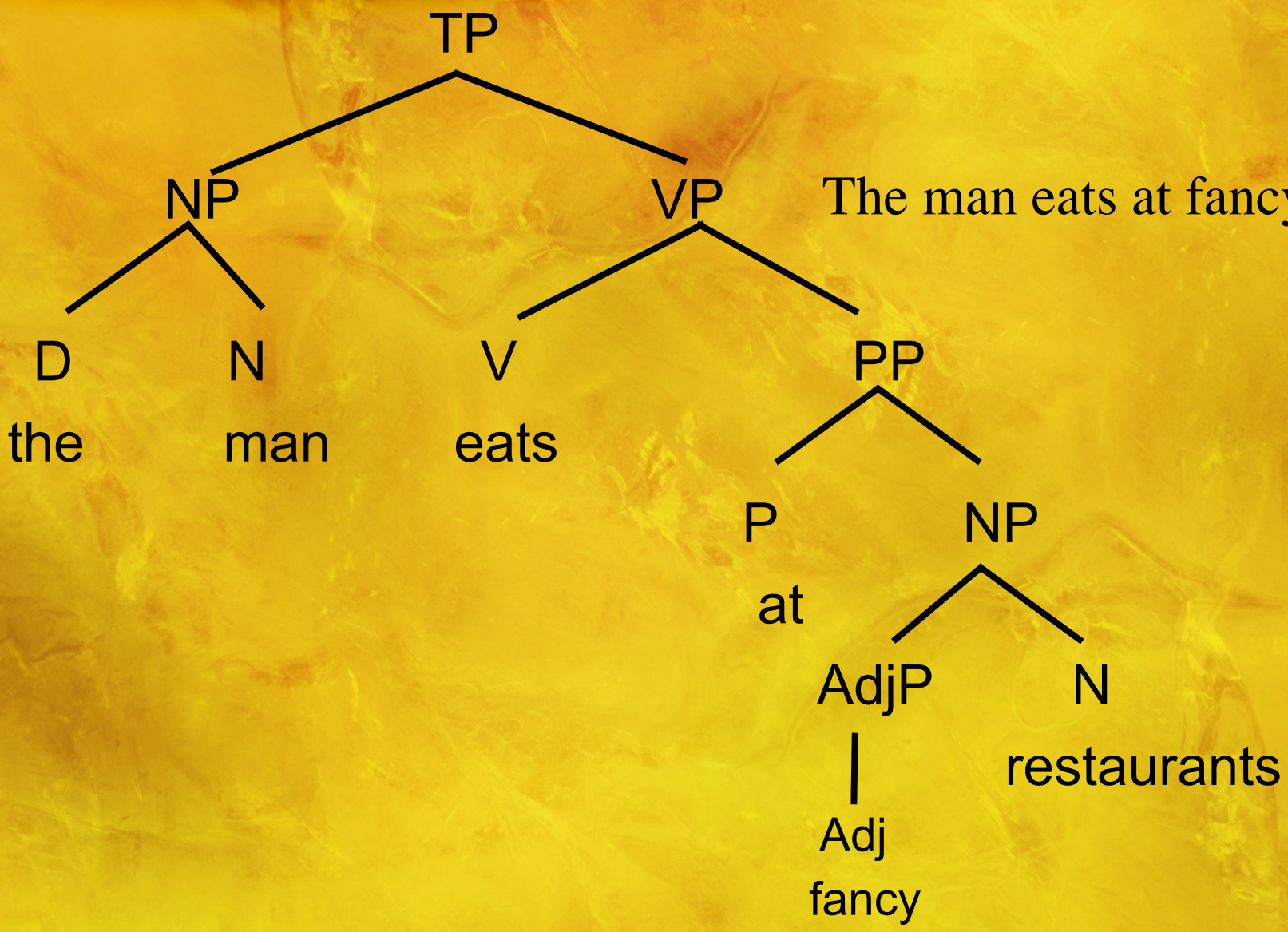
Phrase Structure

A formal hypothesis for representing constituency

Constituents are hierarchically organized



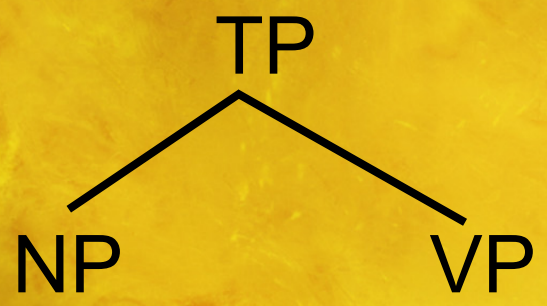
The man eats at fancy restaurants.

[$_{TP}$ [$_{NP}$[$_{D}$the] [$_{N}$man]] [$_{VP}$ [$_{V}$eats] [$_{PP}$ [$_{P}$at] [$_{NP}$ [$_{AdjP}$ [$_{Adj}$ fancy]][$_{N}$restaurants]]]]]

Phrase Structure Rules

- Rules to represent hierarchical structure

eg. TP → NP VP



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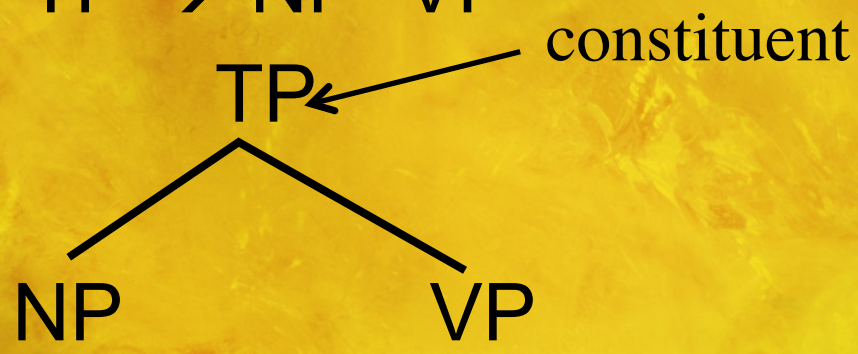

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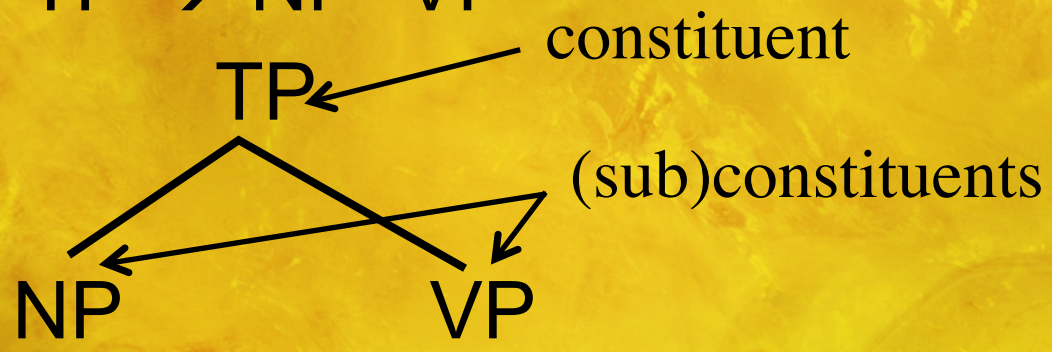

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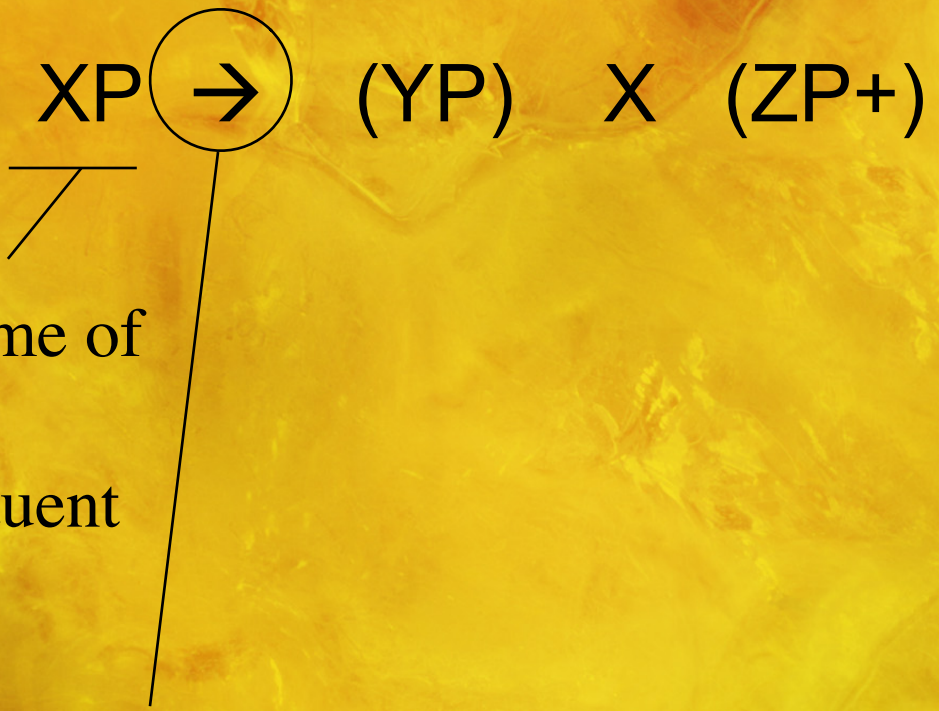

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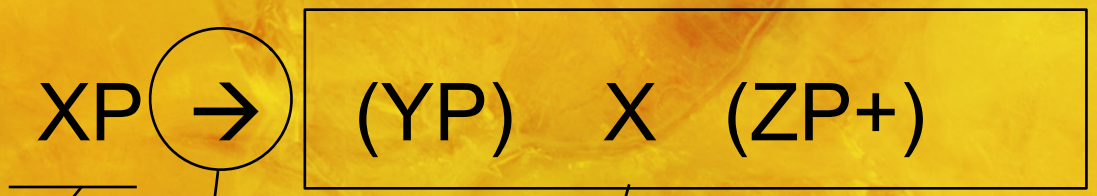

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elements inside of constituent IN ORDER from Left to Right

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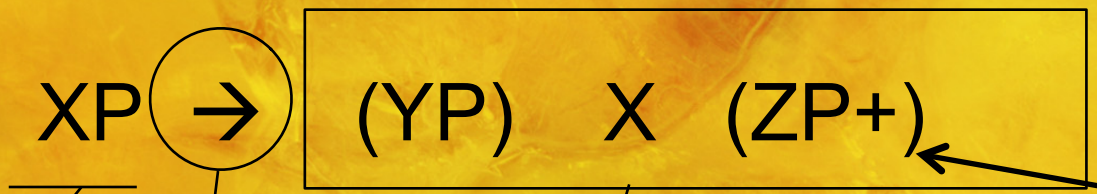

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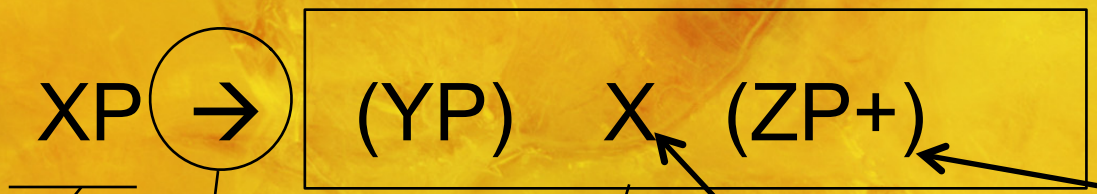

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Phrase Structure Rules

+ means you can have as many as you need

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An Example: The Phrase Structure rule for NPs

- This will be our first case study:
  - We will propose a rule,
  - Test it against evidence, and repeatedly revise it until we get a more adequate picture of what the rule is.
  - Along the way, we'll be practicing tree structure diagrams, both creating them and reading them.
  - We'll then extend the analysis of NPs to other phrases.

Questions to Ask:

1. What *must occur* in an NP?
2. What is *optional* in an NP? (Notation: inside parentheses)
3. What can *repeat* in an NP? (Notation: +)
4. What is the *relative order* of these elements?

Noun Phrases (NP)

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Noun Phrases (NP)

Let's make sure that the N is really obligatory:

*The are really valuable
*Very old are really valuable
*Very old from France are really valuable

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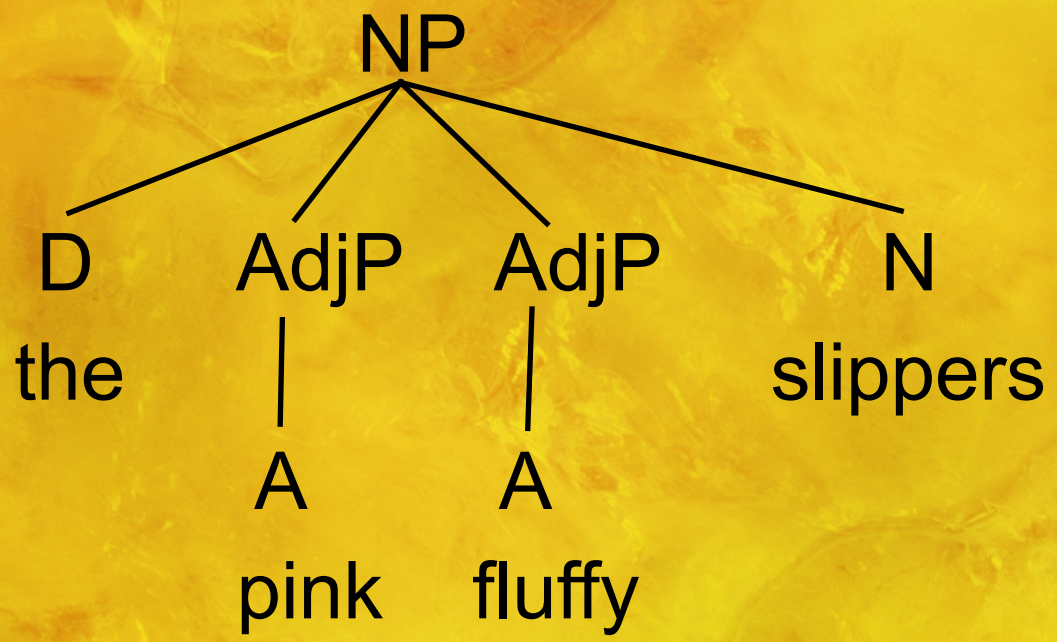

Noun Phrases (NP)

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- NPs also allow as many optional PPs following the N as you like:
  - The book of poems
  - The book of poems with the red cover
  - The book of poems with the red cover from New York

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$$NP \rightarrow (D)\ (AdjP+)\ N\ (PP+)$$

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"NP consist of"

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"NP consist of"

"an optional determiner" (brackets mean optional)

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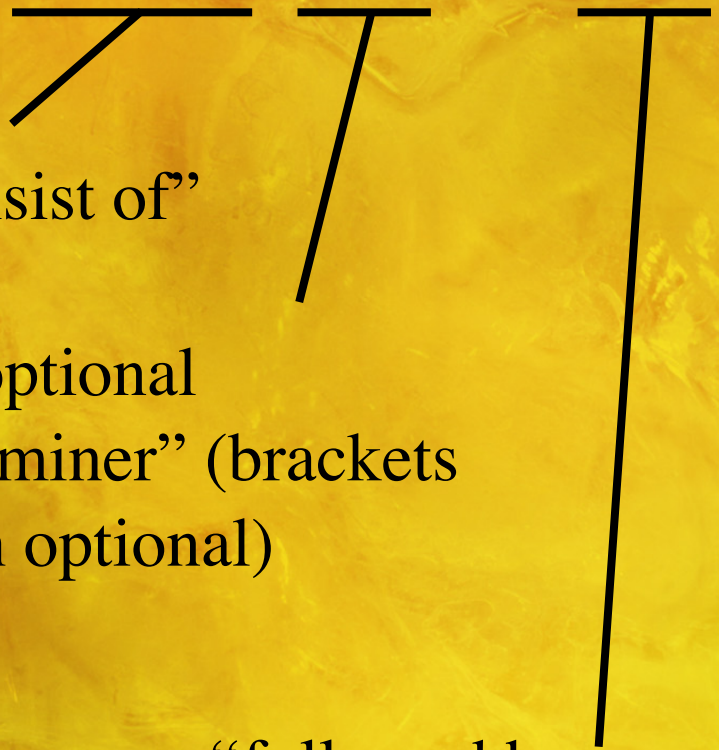

"NP consist of"

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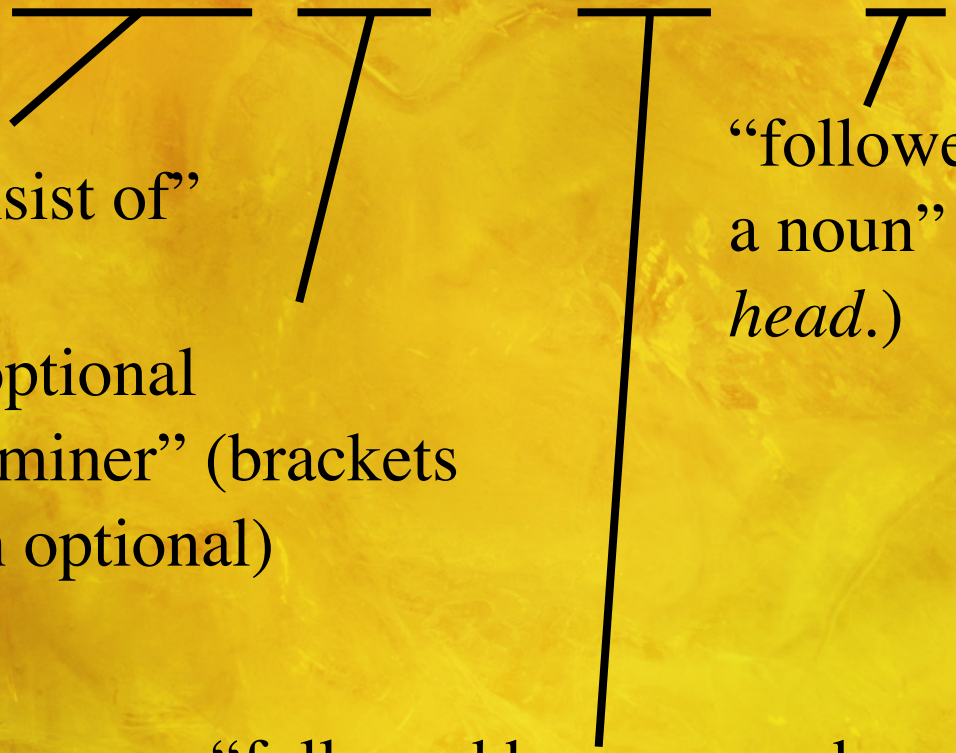

"NP consist of"

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"followed by a noun" (the *head*.)

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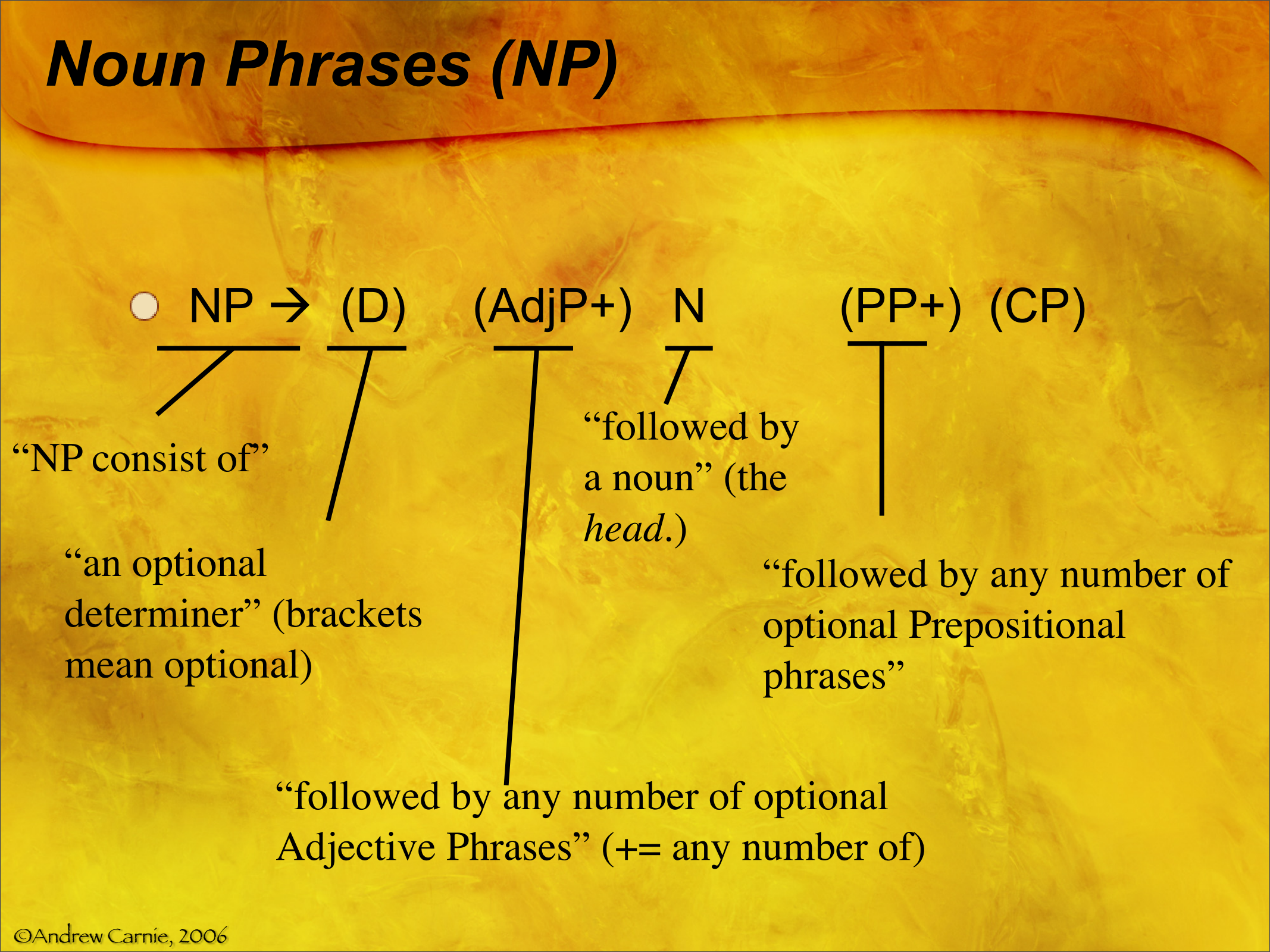

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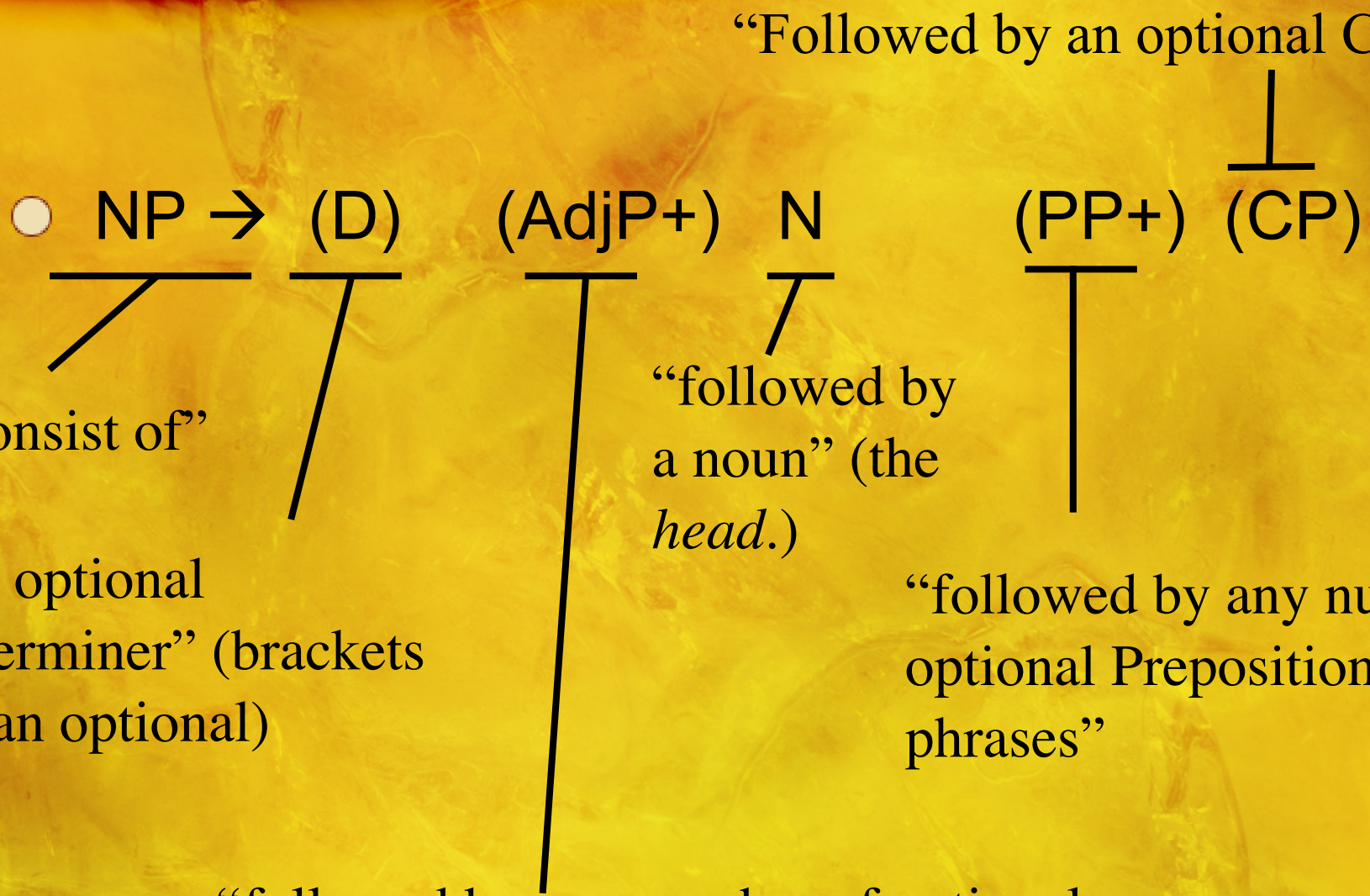

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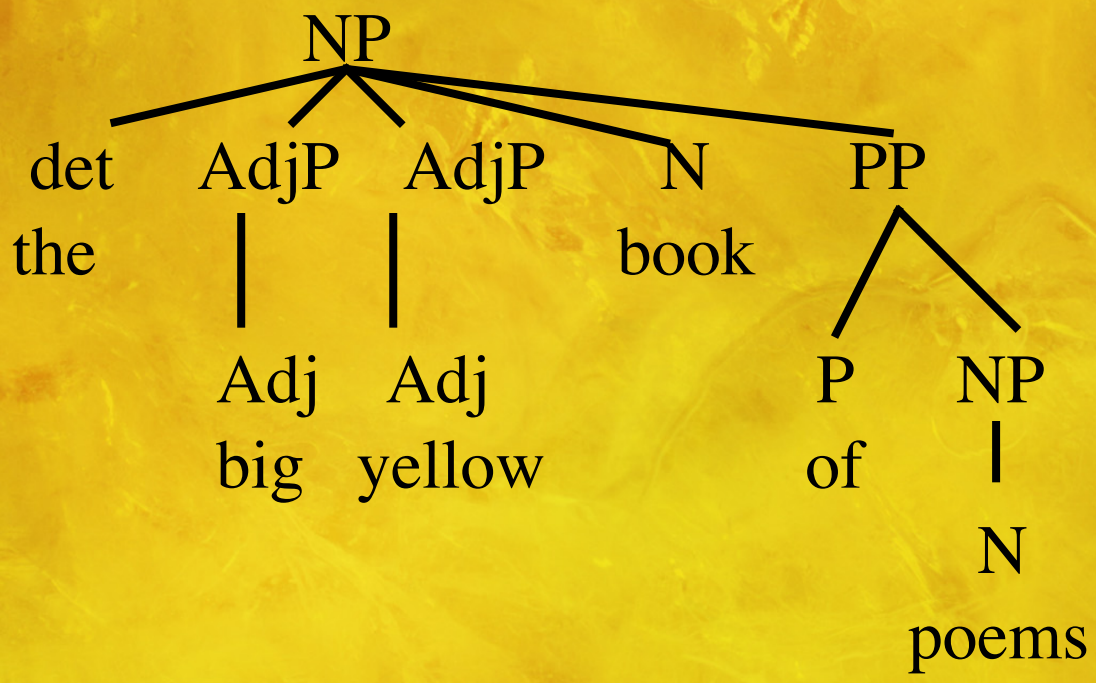

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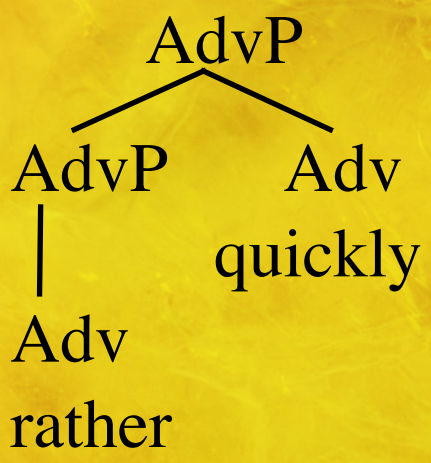

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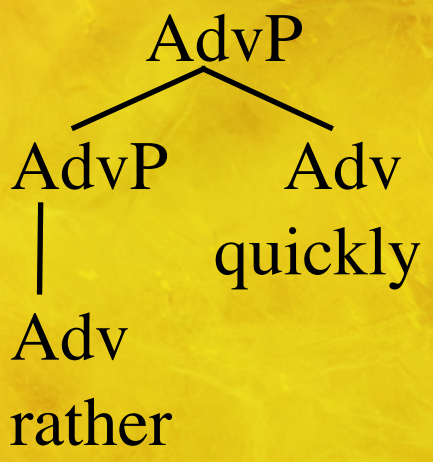

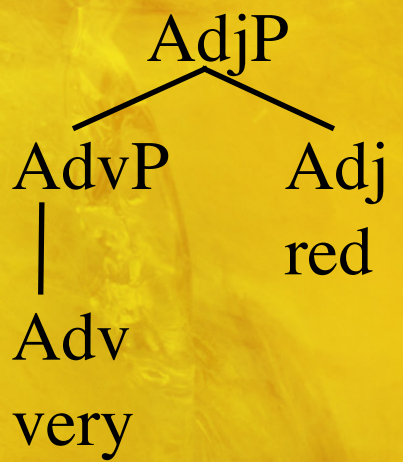

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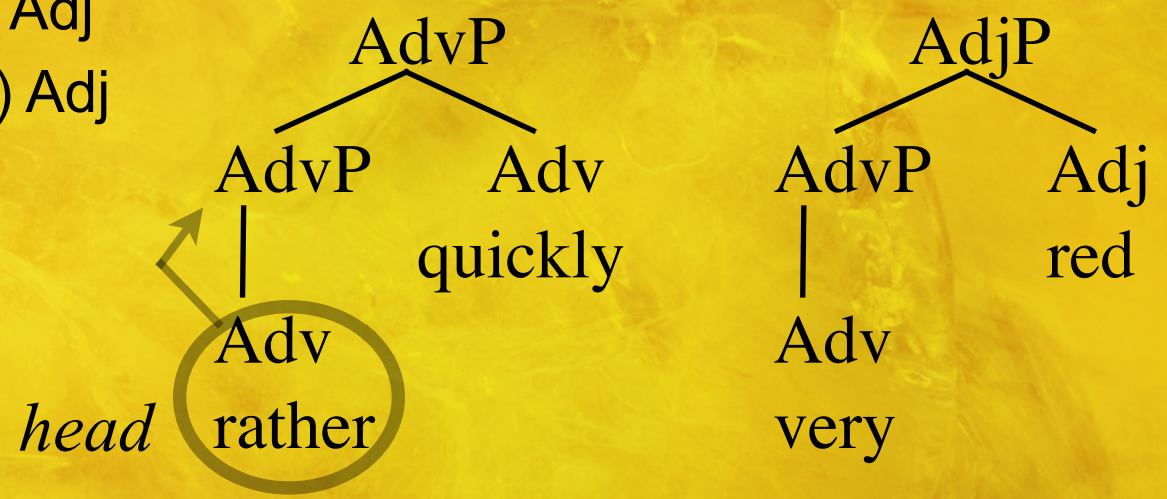

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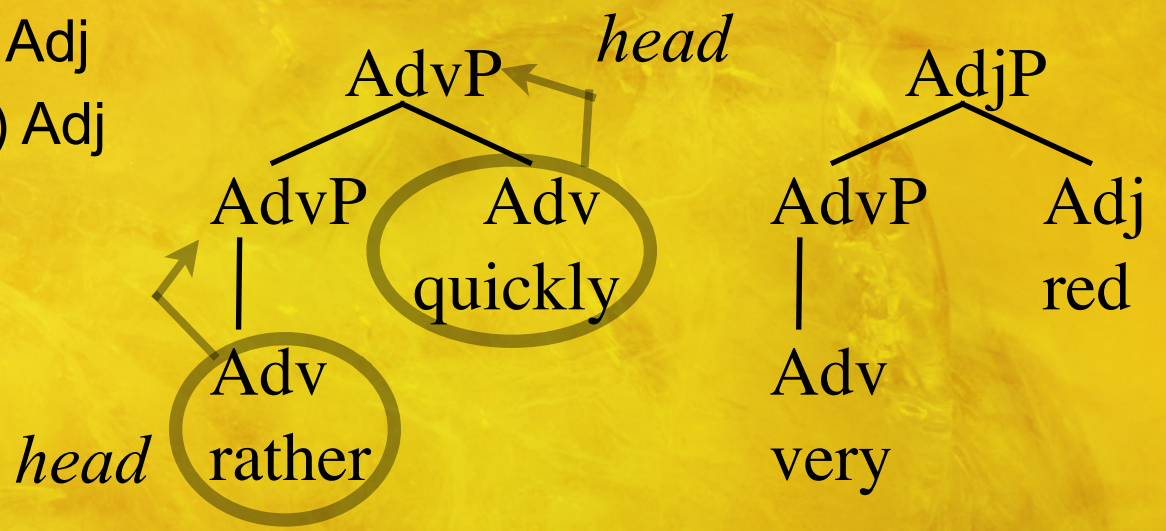

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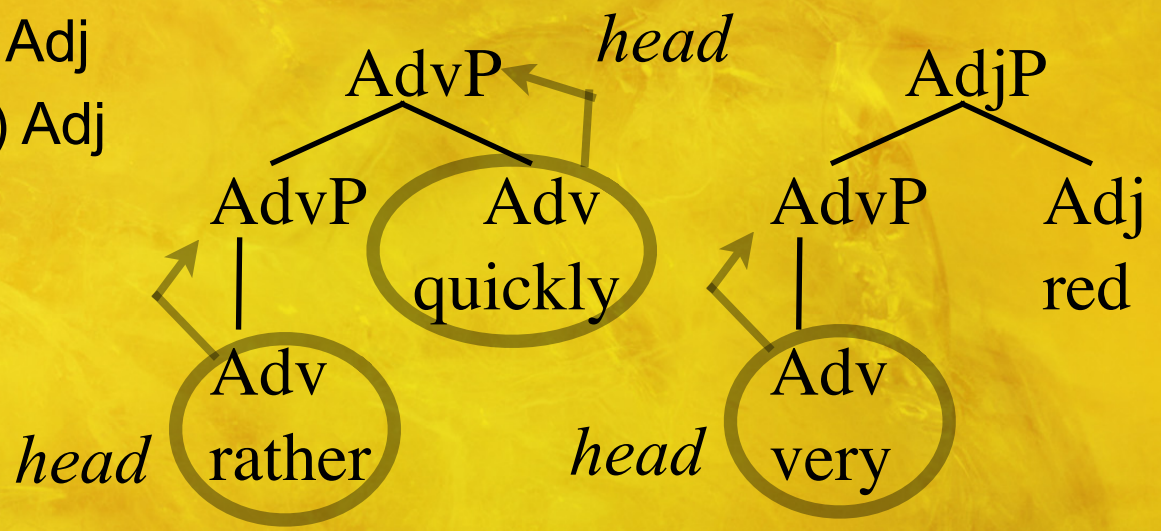

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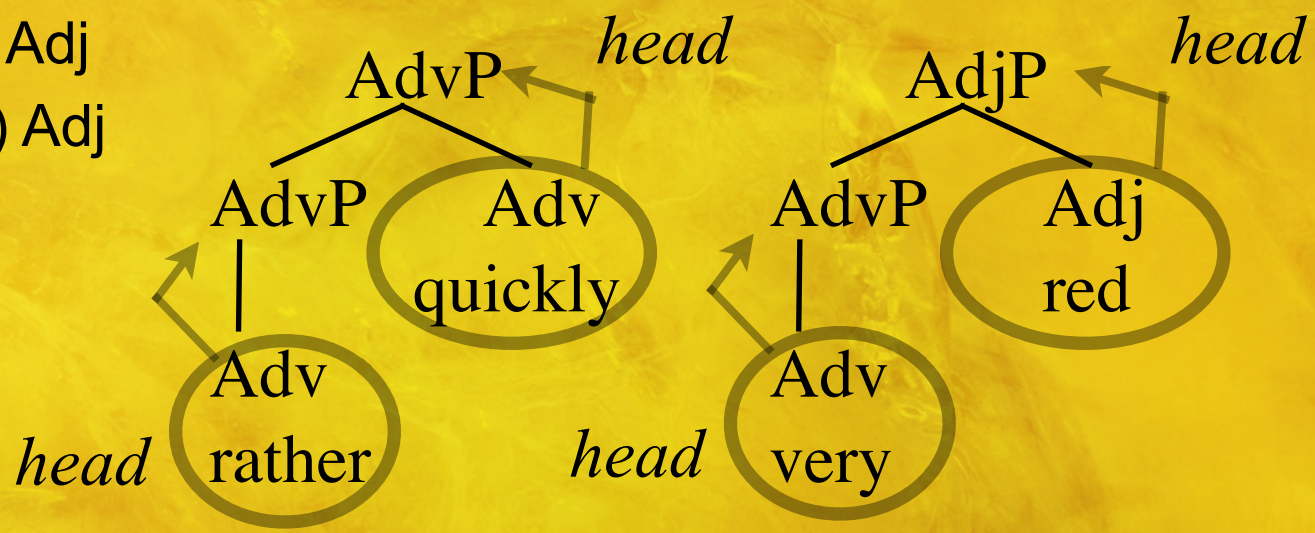

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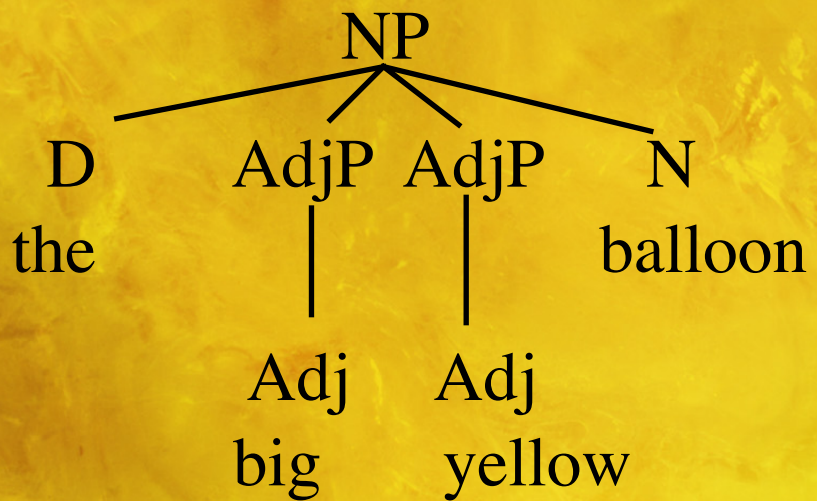

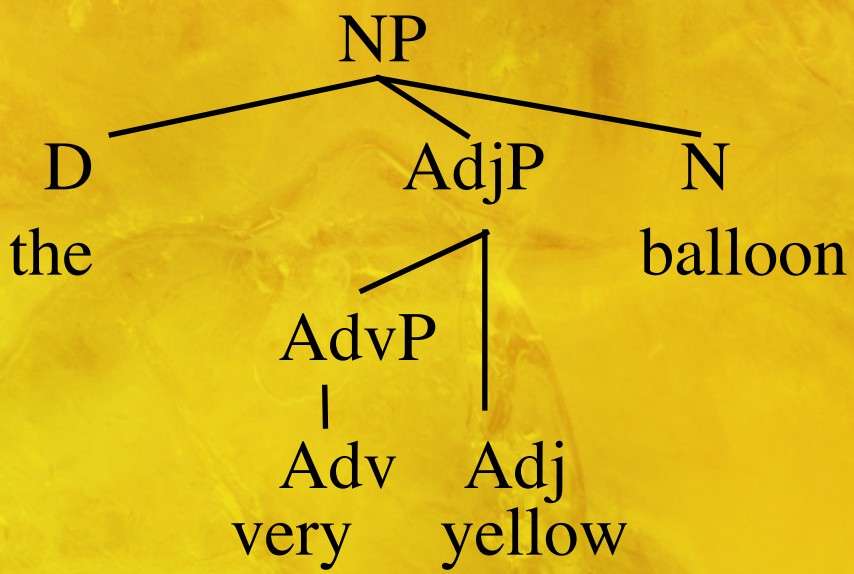

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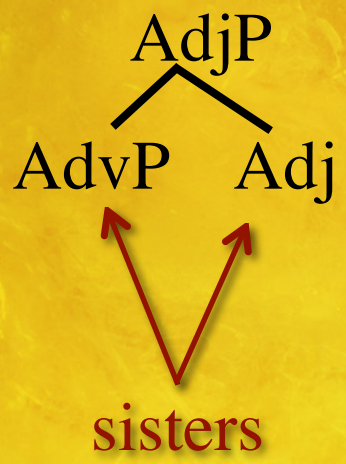

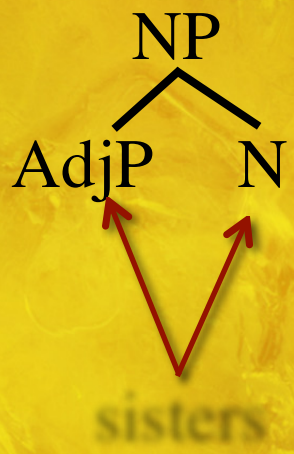

Prepositional Phrases (PPs)

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  - up the road
  - on the video screen
  - under the avocado
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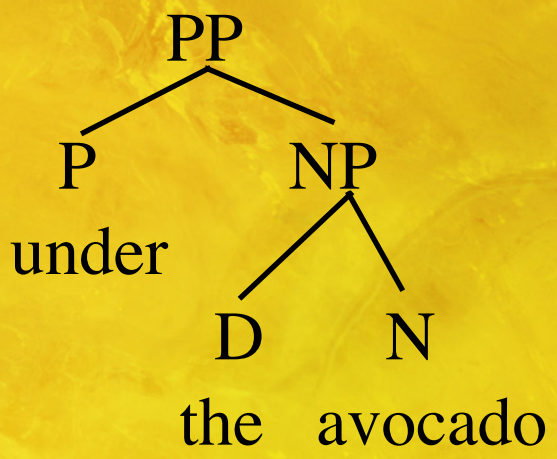

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- This is controversial: not everyone agrees these are prepositions.

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  - VP→ V
- Verbs can be modified by adverbs:
  - Marko [often sang]
  - Susan [sang beautifully]
  - Luis [often sang beautifully]
  - VP →(AdvP+) V (AdvP+)

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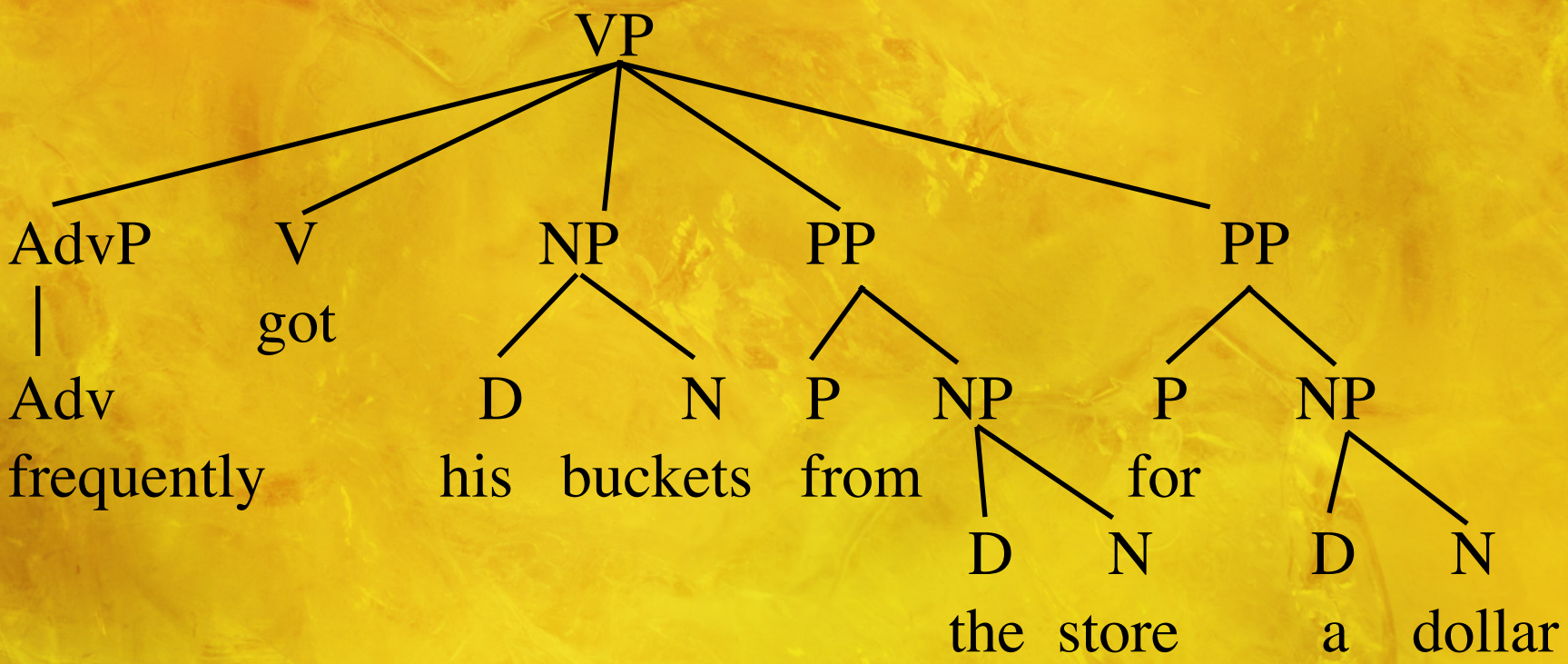
- Verbs with a Sentence (CP) Object:
  - Fred said [Marko sang a song] with some derision yesterday
  - Fred asked Bill [if his T-shirt was inappropriate]
  - VP →(AdvP+) V (NP) ({NP/CP}) (PP+) (AdvP+)

Verb Phrases (VP)

VP →(AdvP+) V (NP)({NP/CP})(AdvP) (PP+) (AdvP+)



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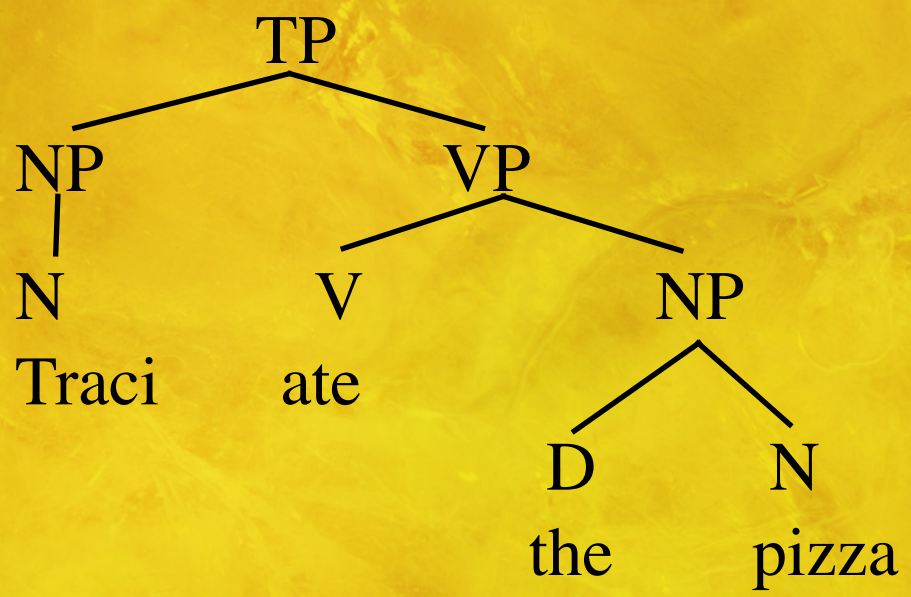

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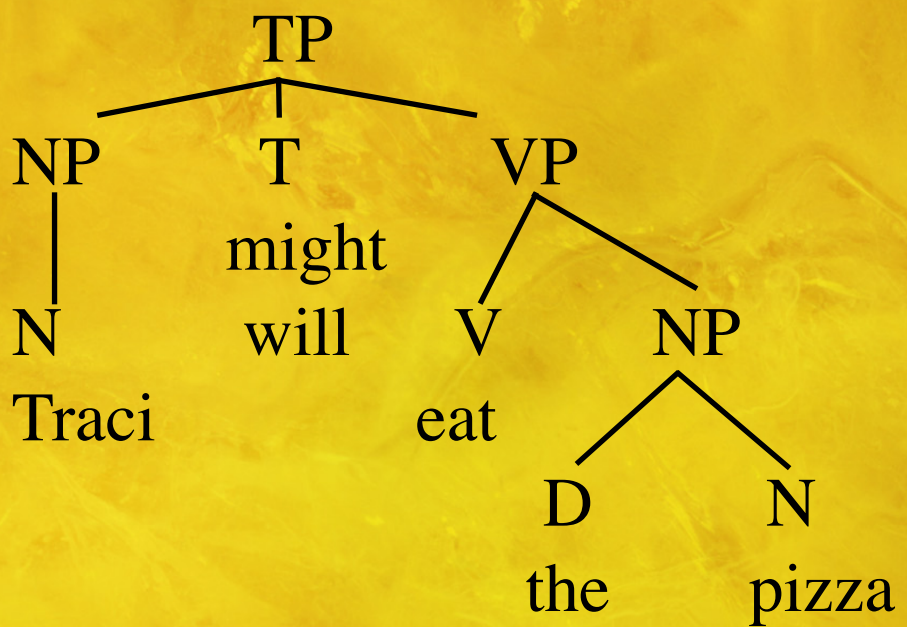

Embedded Clauses

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- Sometimes clauses can function as the subject or object of other clauses.
  - I asked [if Maria would eat the spaghetti]
  - I think [that Maria decked the Janitor]
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  - I asked [if Maria would eat the spaghetti]
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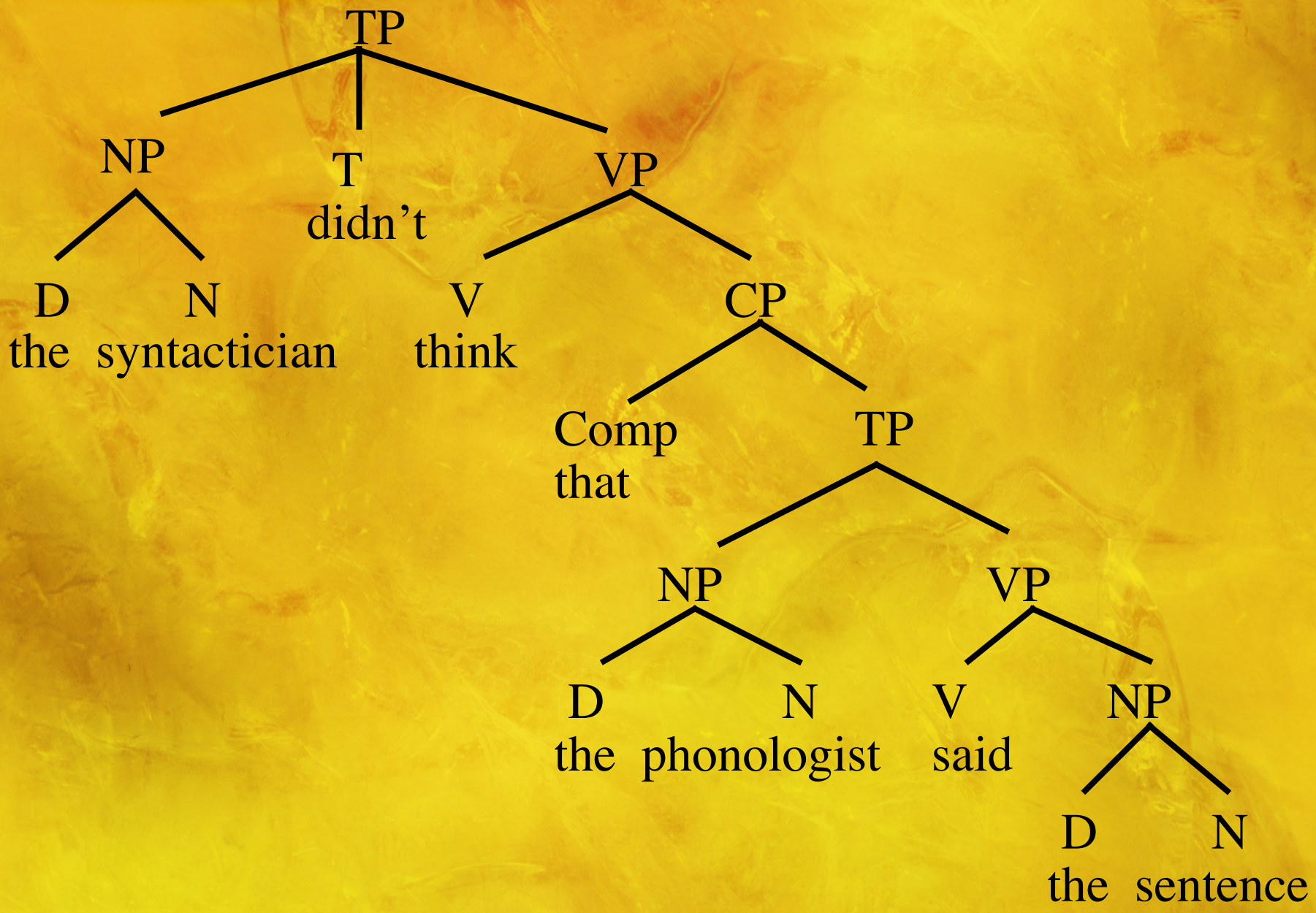
  - [That Maria decked the Janitor] is obvious
- Words like “that” and “if” are called complementizers.
  - CP→(Comp) TP

Embedded Clauses

- VP→(AdvP+) V ({NP/CP}) (PP+) (AP+)
- TP →{NP/CP} (T) VP



A common mistake

- Note the structure of the following three simplified rules (I've left out the material that isn't relevant to the point I'm making):
  - VP→ V (CP)
  - TP →NP (T) VP
  - CP → (Comp) TP
- VP is only ever a mother to CP' (never TP), and CP' is only ever a mother to Comp and TP (never NP nor VP)

A common mistake

- So with the following rules, you can draw only certain trees
  - VP→ V (CP)
  - TP →NP (T) VP
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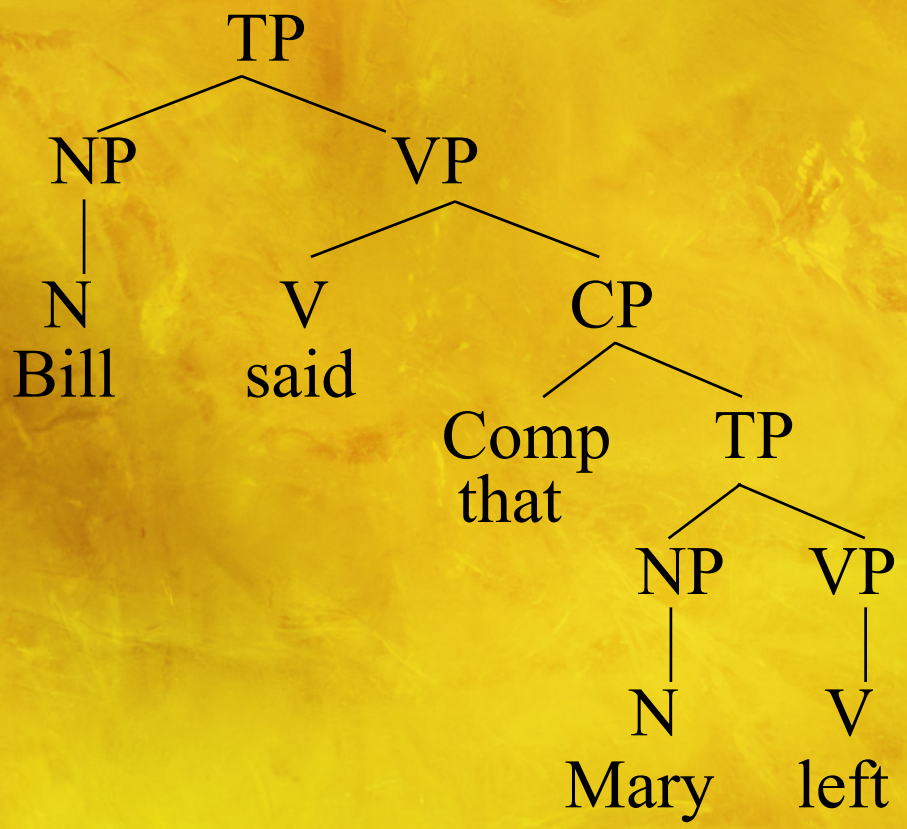

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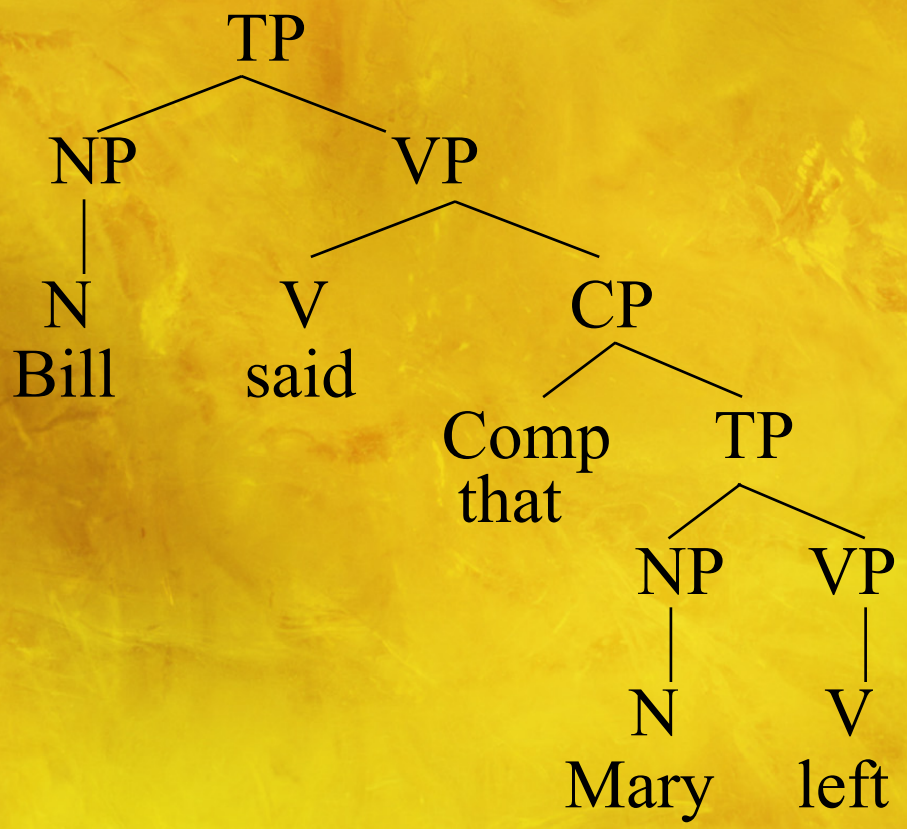

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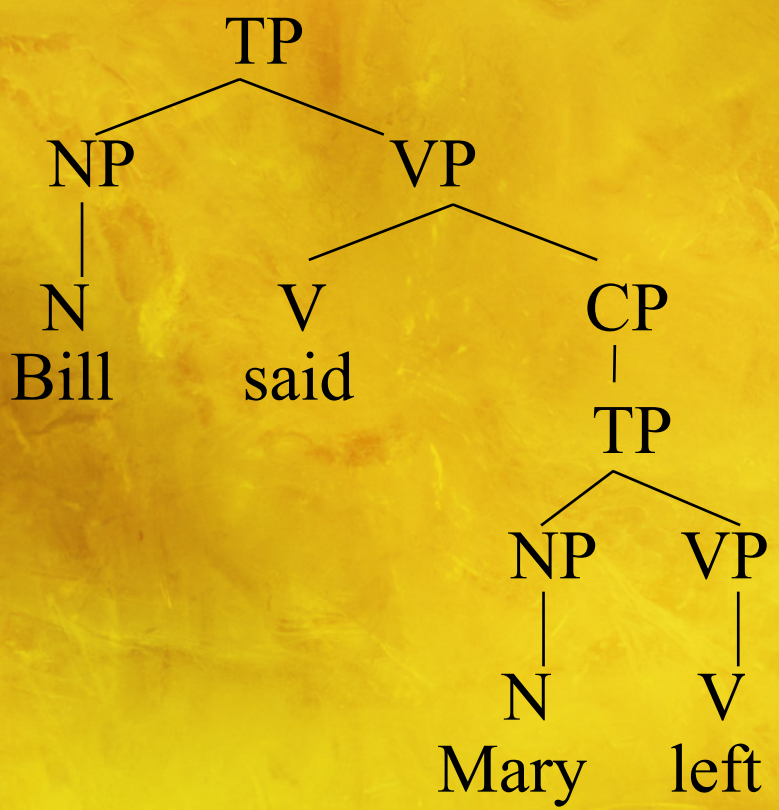

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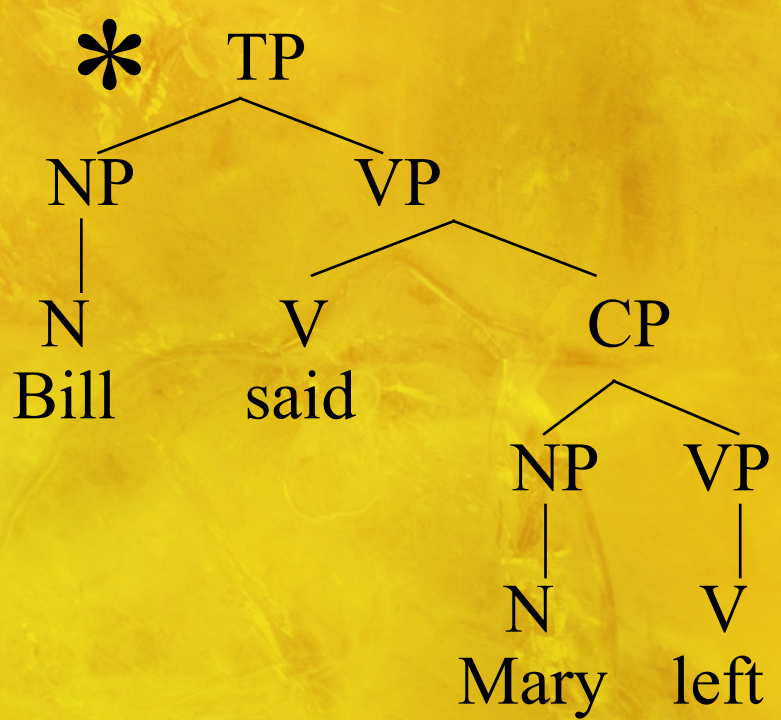

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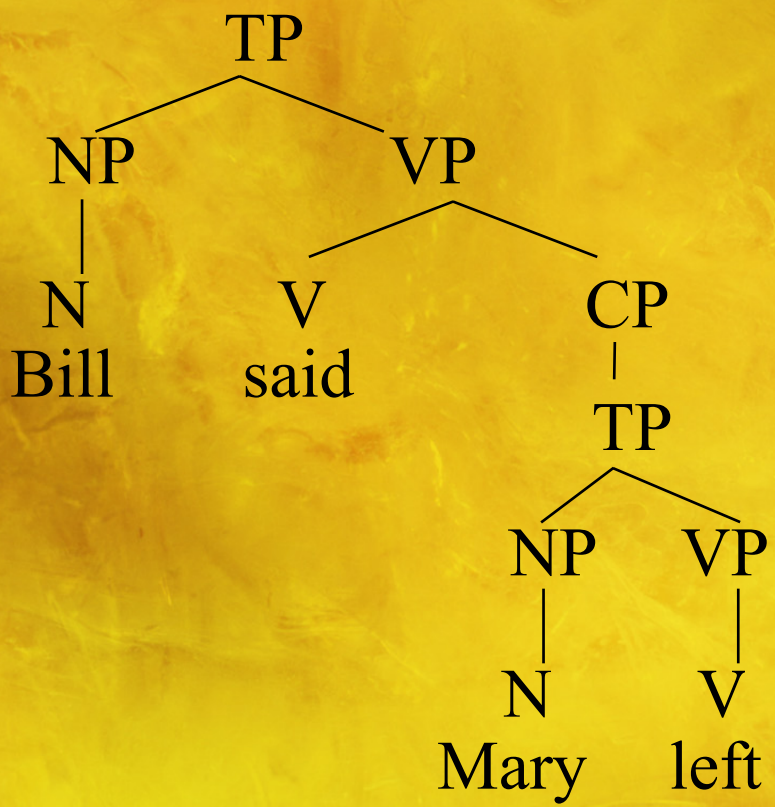

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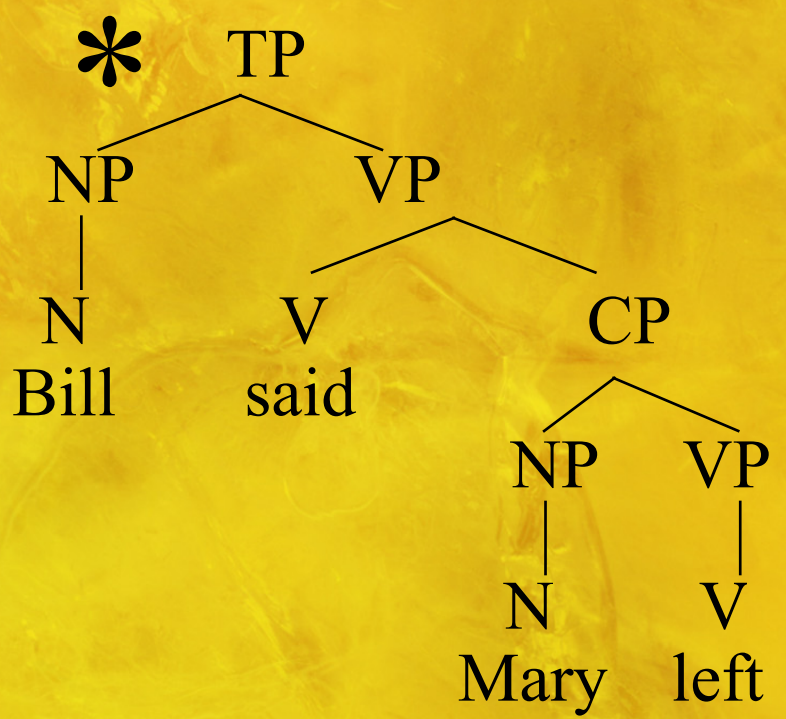

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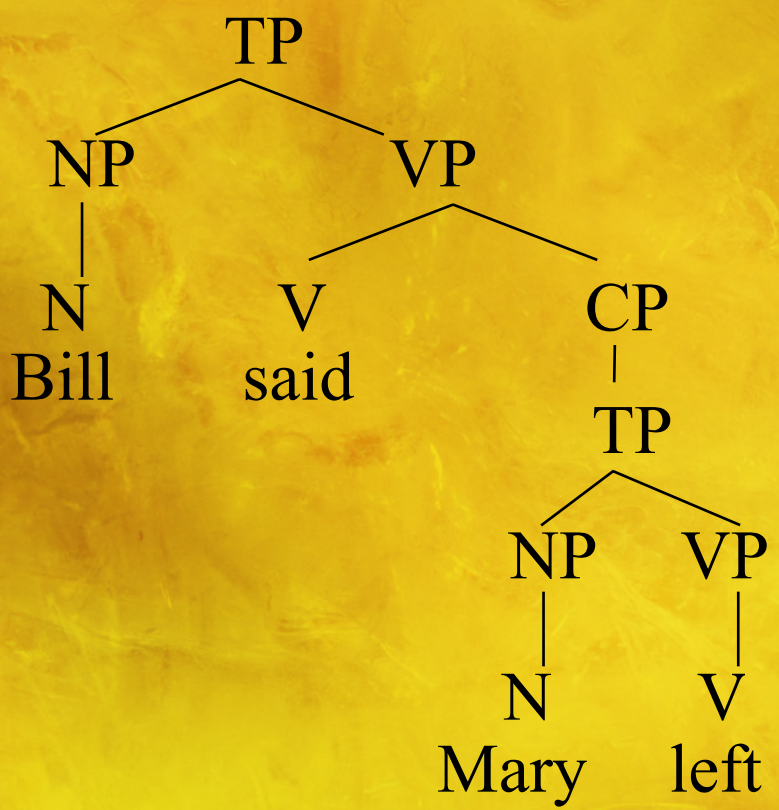

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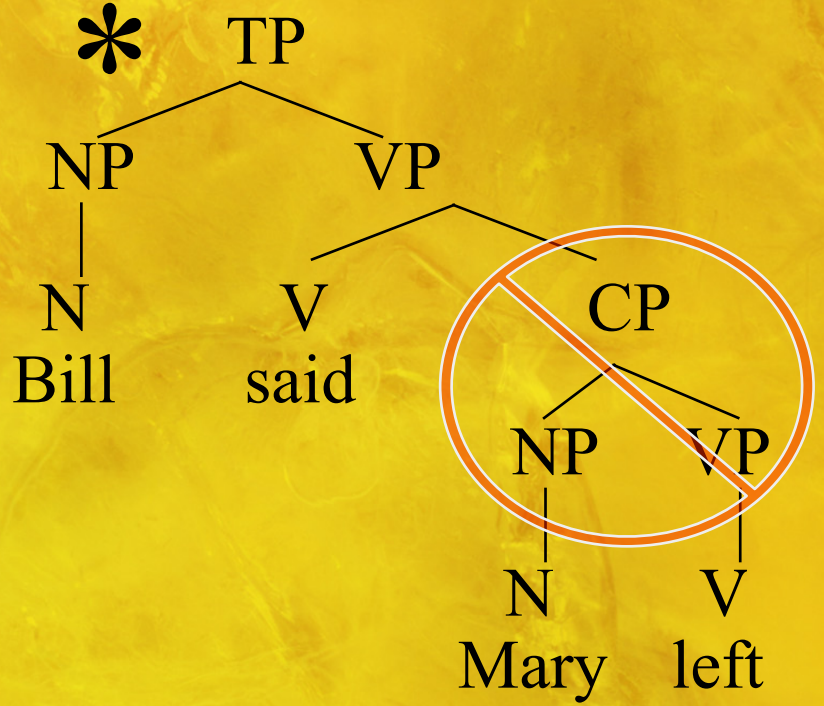

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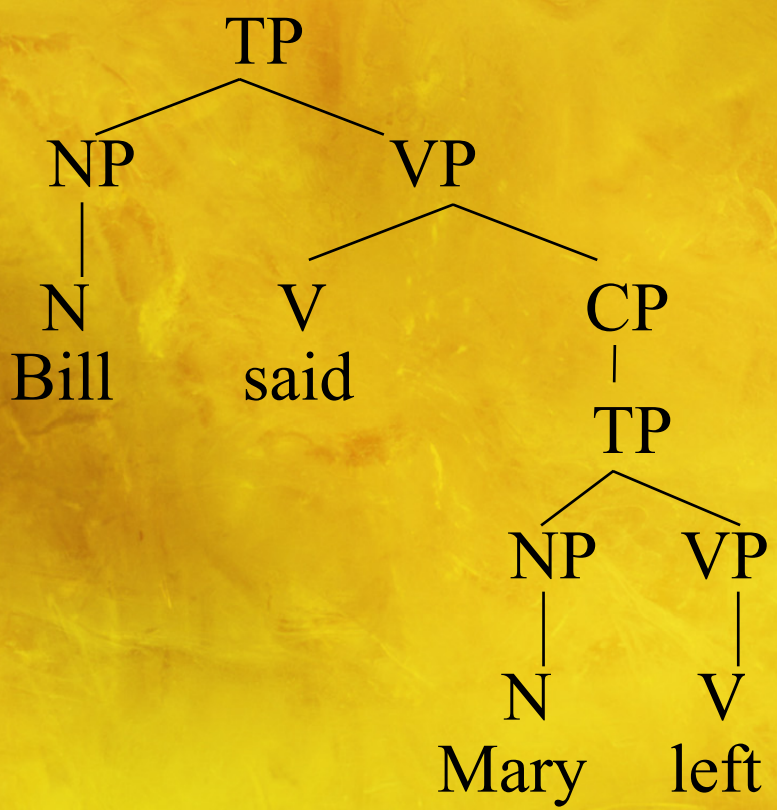

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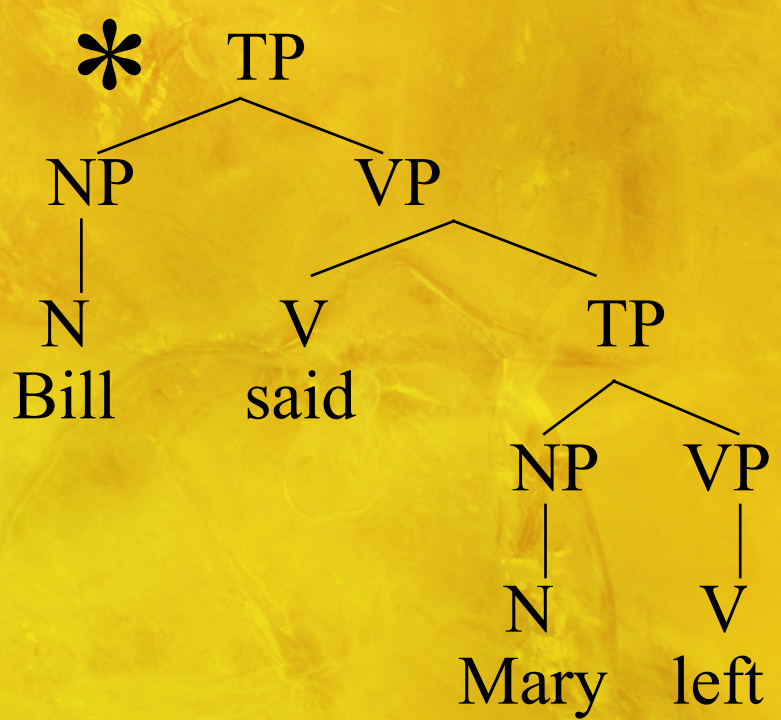

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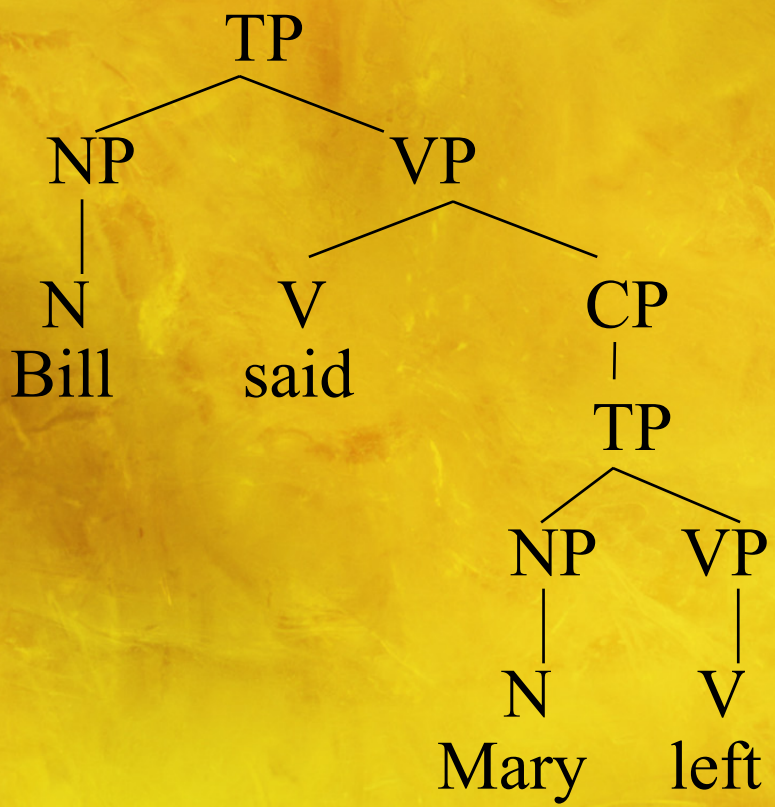

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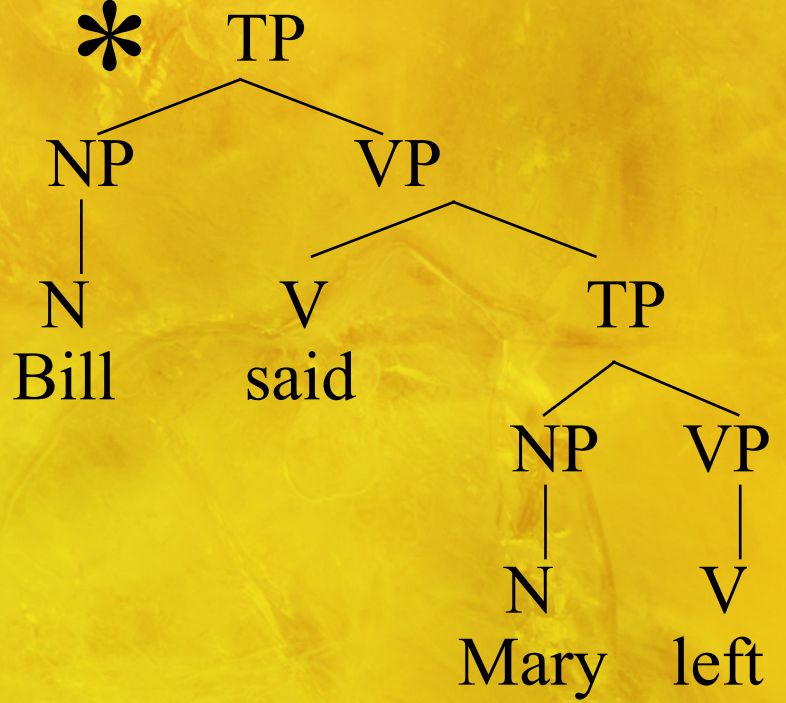

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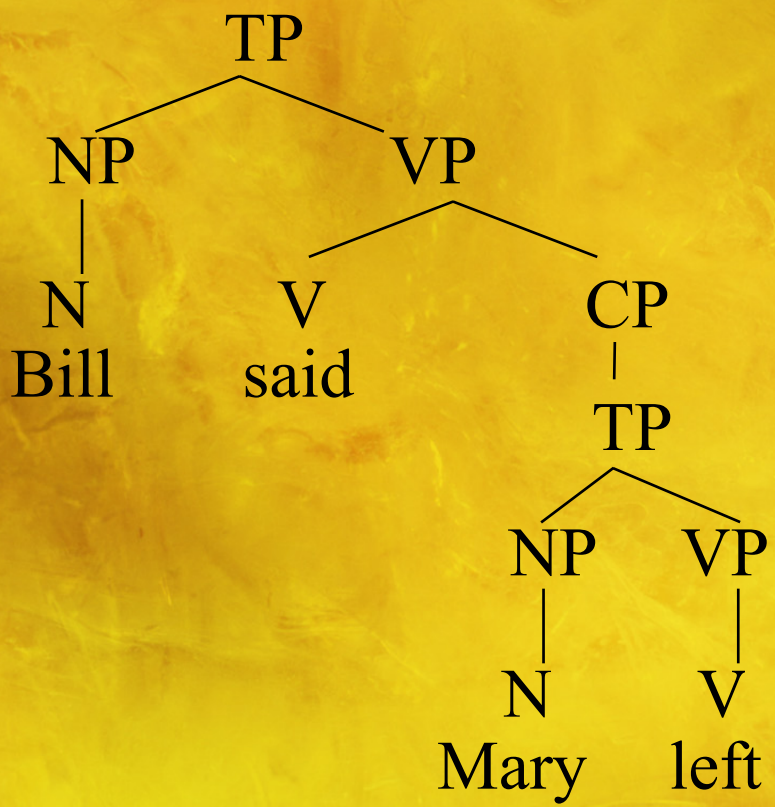

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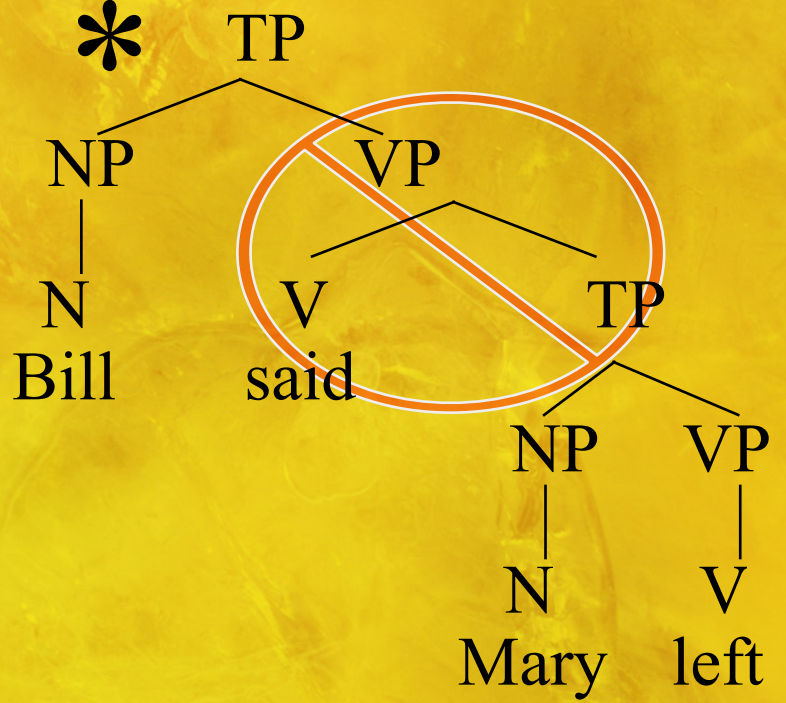

No rule says VP → V (TP)

An obvious but important point

- Your trees and your rules must correspond to one another.

- When you are drawing your trees (we'll do a lot of practice in a week or so) you must make sure that the tree is consistent with the rules.

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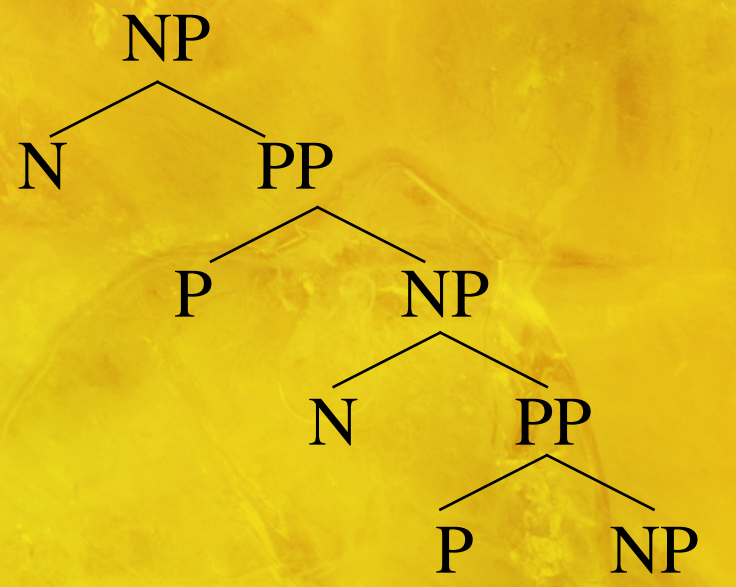

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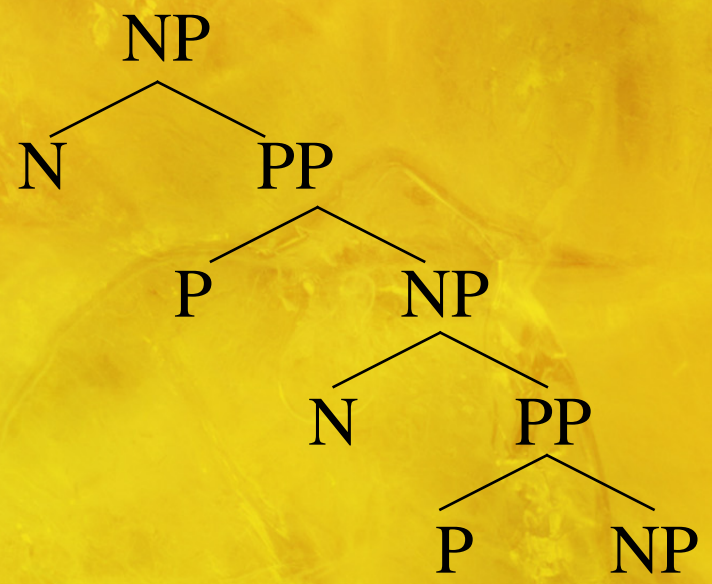

etc!!!!

This property is called

Recursion

Summary

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- These rules also capture the recursive (infinite) property of language.

PSRs of English

- CP → (C) TP
- TP → {NP/CP} (T) VP
- VP →(AdvP+) V (NP)({NP/CP}) (AdvP+) (PP+) (AdvP+)
- NP → (D) (AdjP+) N (PP+) (CP)
- PP → P (NP)
- AdjP → (AdvP) Adj
- AdvP → (AdvP) Adv

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to be significantly revised