SYNTAX AND TAG

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THE GOALS OF SYNTACTIC THEORY
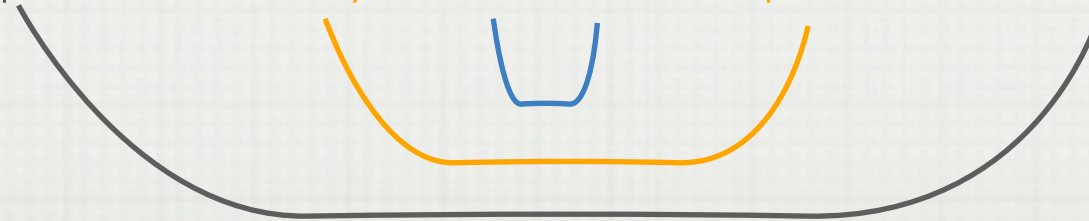
☐ Descriptive Adequacy

How can we capturing the patterns and generalizations underlying a speaker's linguistic knowledge?

1. Barack said it yesterday.

2. Barack l'ha detto ieri.

3. Barack hat es gestern gesagt,

ACHIEVING DESCRIPTIVE ADEQUACY

☐ What formal system should be used to represent grammatical patterns?

☐ Finite state/Regular grammars

the politician   admitted defeat

the politician everyone   despises admitted defeat

the politician everyone I know despises admitted defeat

CENTER EMBEDDING

ACHIEVING DESCRIPTIVE ADEQUACY

☐ What formal system should be used to represent grammatical knowledge?
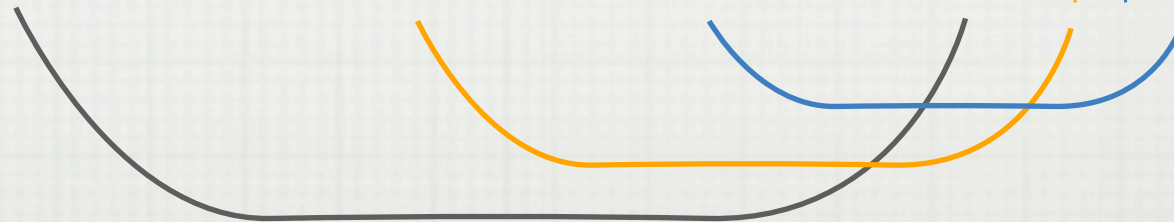
   ☐ Context free grammars

We the children-ACC   let

We the children-ACC Hans-DAT   let help

We the children-ACC Hans-DAT house-ACC let help paint

CROSS-SERIAL EMBEDDING

ACHIEVING DESCRIPTIVE ADEQUACY

☐ What formal system should be used to represent grammatical knowledge?

  ☐ Context-Sensitive Grammars

  ☐ Indexed Grammars

  ☐ Lexical Functional Grammar

  ☐ Head-driven Phrase Structure Grammar

A MORE DEMANDING GOAL: EXPLANATORY ADEQUACY

☐ What are the range and limits of grammatical variation?

1. Did Hilary admit defeat yesterday?

2. Est-ce que Hilary a admis sa defaite hier?

3. *Was the candidate [who behind] admitted defeat yesterday?

☐ There is a tension beween the ability of a theory to describe the facts and to explain the gaps that exist.

EXPLANATORY ADEQUACY

☐ Explanations of limits on variation typically stem from stipulated universal constraints on grammatical structures and derivations.

☐ Can we do better?

"The most interesting contribution a generative grammar can make to the search for universals of language is specify formal systems that have putative universals as consequences, as opposed to merely providing a technical vocabulary in terms of which autonomously stipulated universals can be expressed."

(Gazdar, Klein, Pullum, and Sag, 1985)

FORMAL RESTRICTIVENESS AND EXPLANATORY ADEQUACY

The remainder of this talk will attempt to make good on GKPS's desideratum via the following hypotheses:

Hypothesis 1:

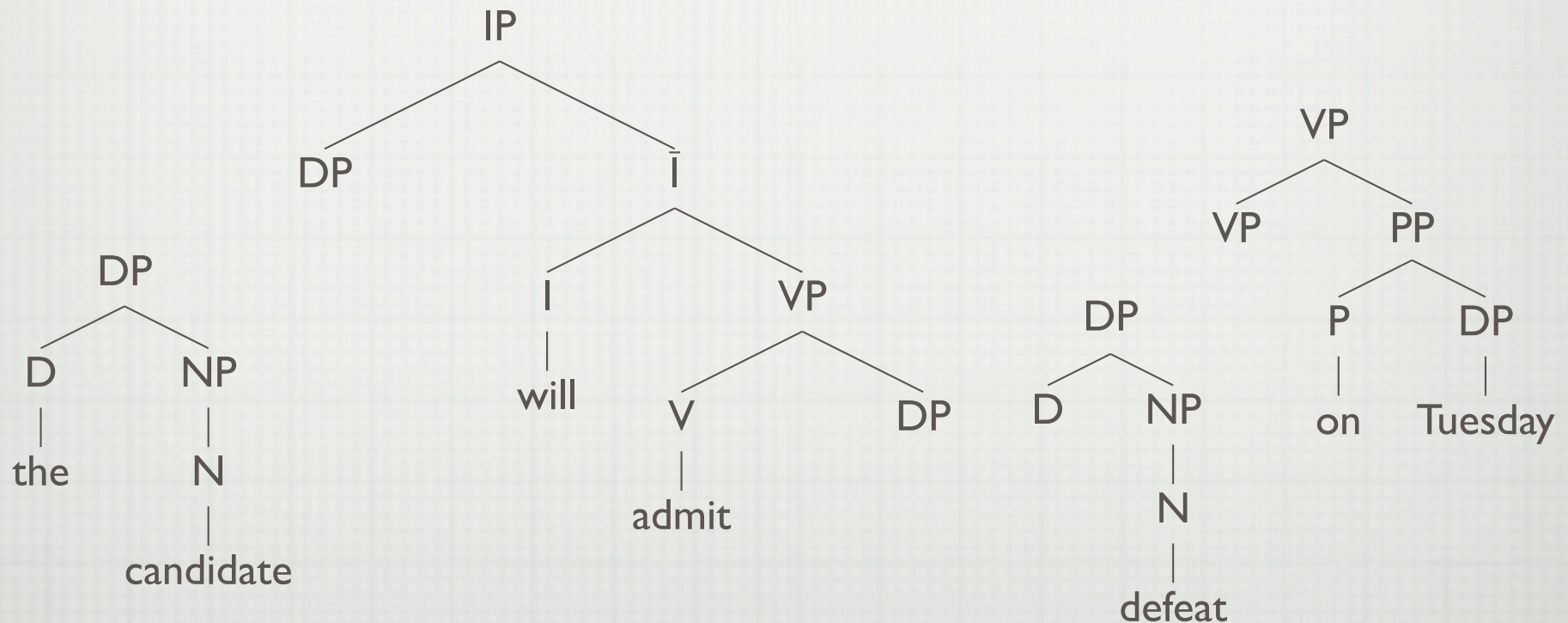Natural language syntax is mildly context-sensitive (Joshi 1985).

- ☐ generates (some) cross-serial dependencies
- ☐ constant growth property
- ☐ polynomial time parsing

Hypothesis 2:

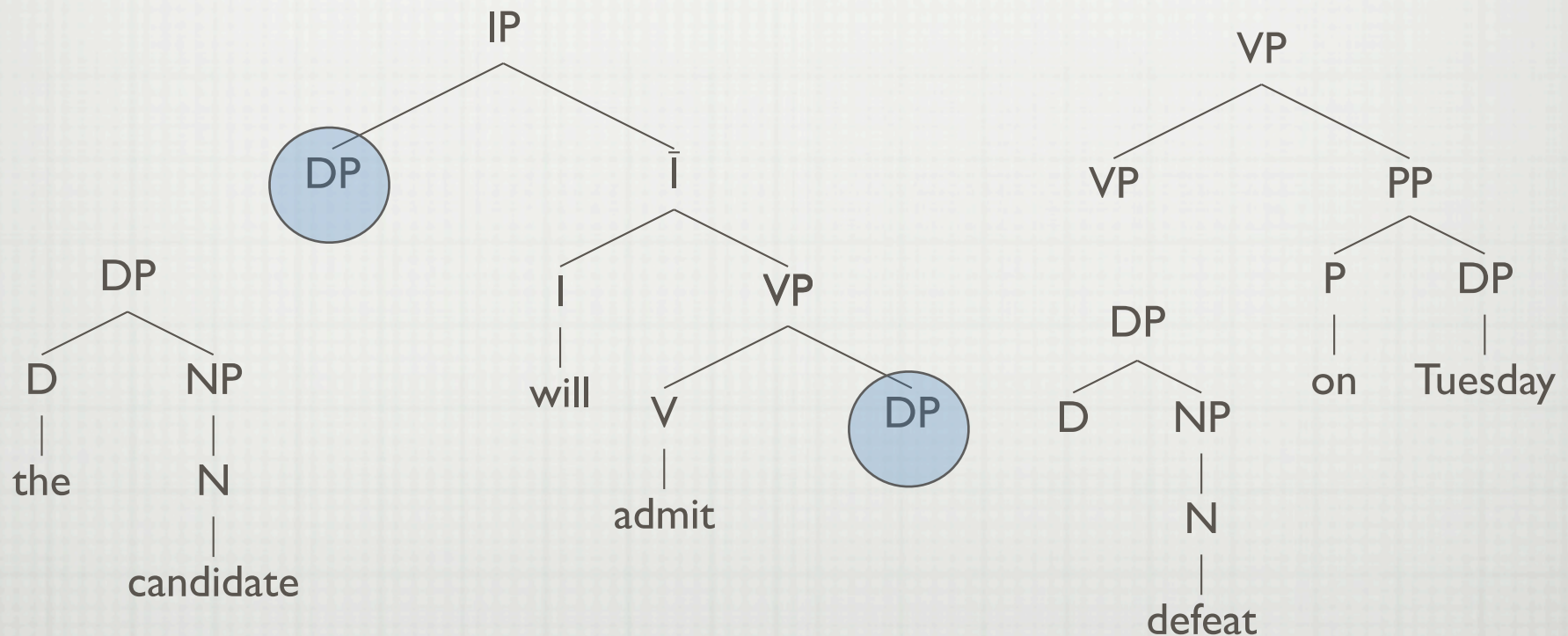Natural language syntax is mentally represented as a Tree Adjoining Grammar.

TREE ADJOINING GRAMMAR

☐ Unlike many familiar formalisms, TAG is tree rewriting system.

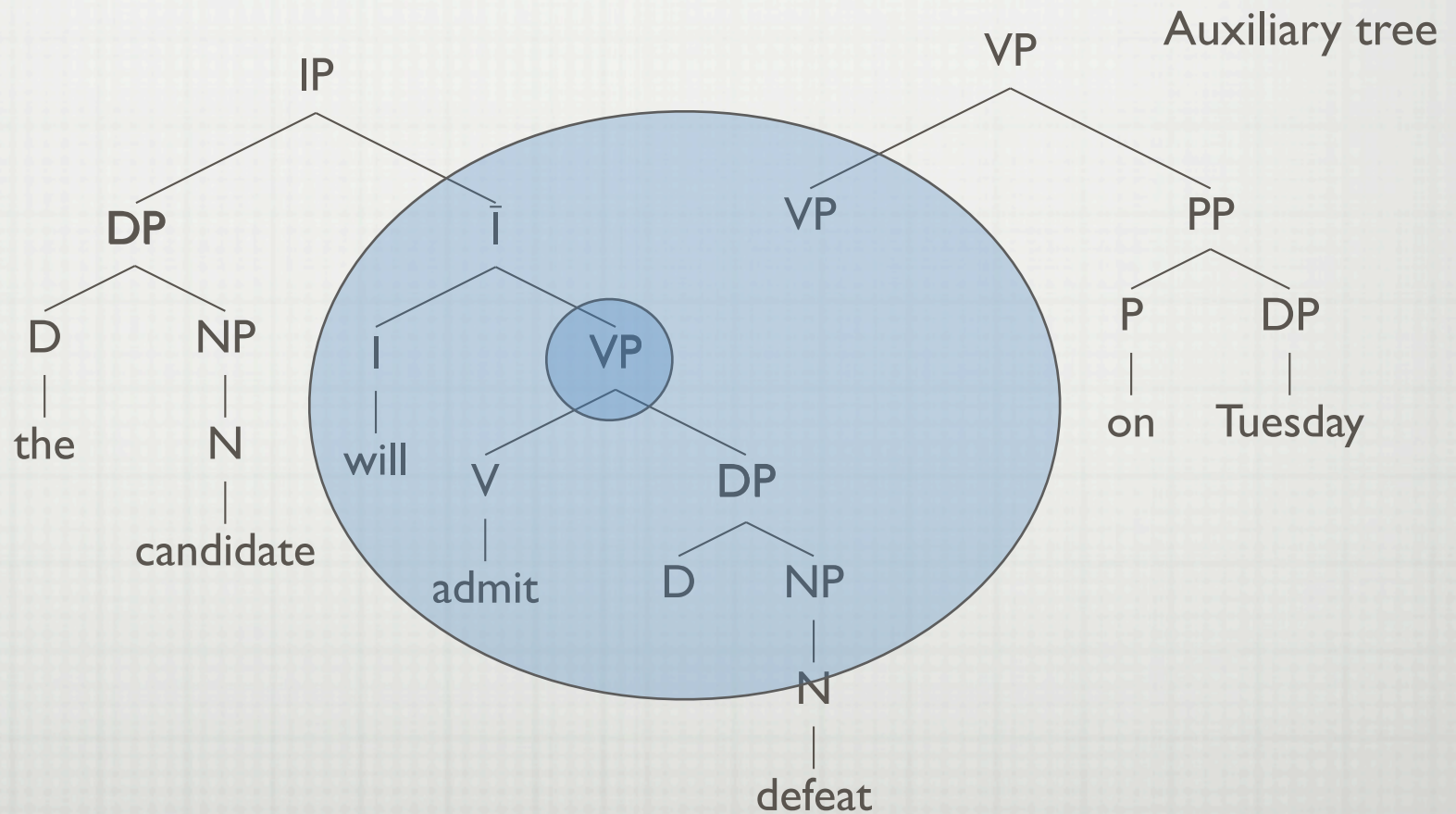☐ Elementary trees: express local co-occurrence restrictions

☐ Unlike many familiar formalisms, TAG is tree rewriting system.
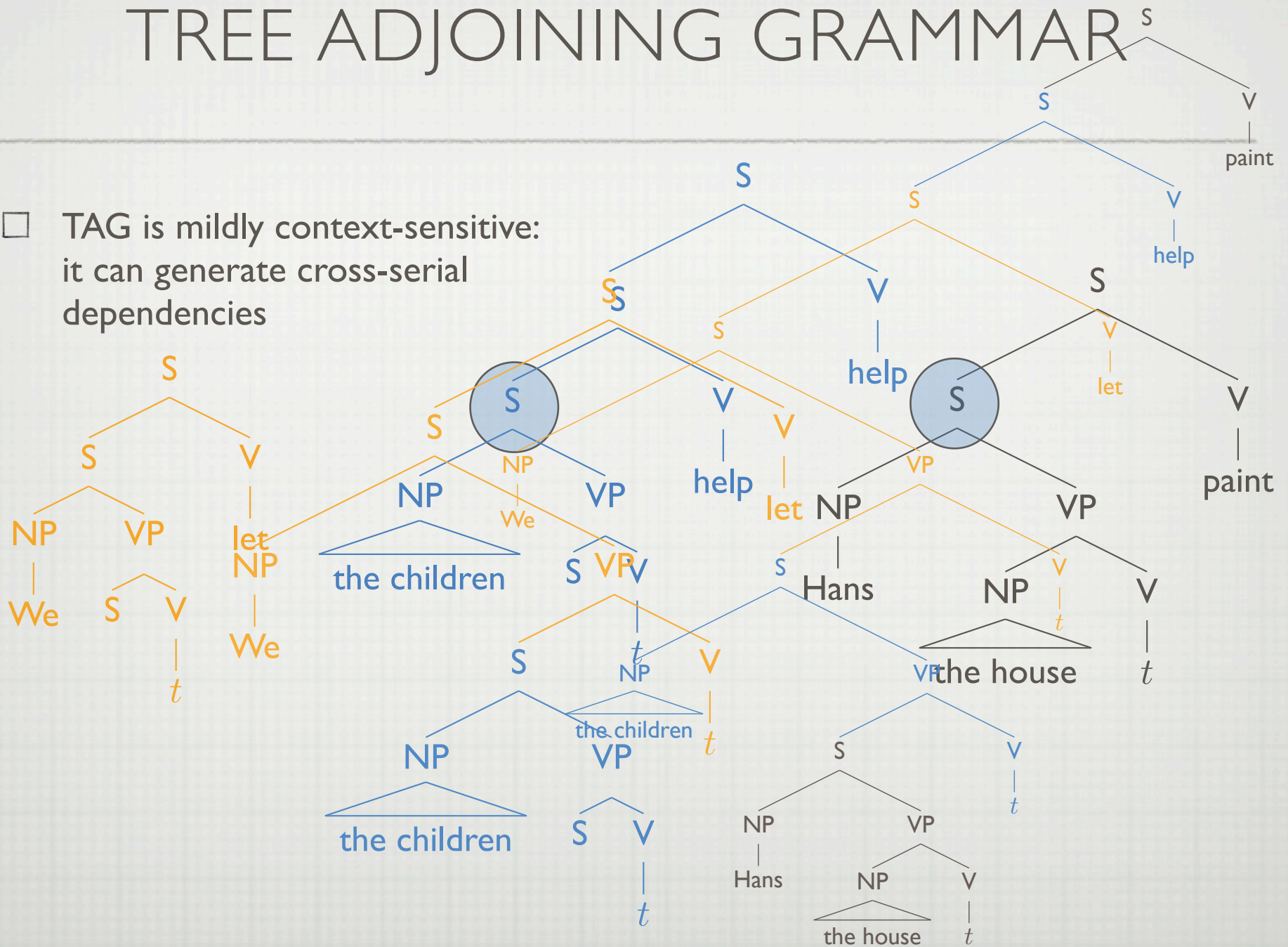
    ☐ Combinatory operation 1: substitution

☐ Combinatory operation II: adjoining

TREE ADJOINING GRAMMAR

- TAG is mildly context-sensitive: it can generate cross-serial dependencies

THE ROLE OF TAG IN SYNTAX

☐ Fundamental TAG Hypothesis: Every syntactic dependency is expressed locally within an elementary tree.

☐ Non-local dependency corollary: Non-local dependencies always reduce to local ones once recursion is factored away.

☐ Questions:

   ☐ What constitutes the domain of an elementary tree?

   ☐ What are the relevant syntactic dependencies?

   ☐ Is this true?

THE NATURE OF ELEMENTARY TREES

- [ ] Since the earliest work in TAG (which itself built on Harris and Chomsky's notion of kernel sentences), it has been assumed that Elementary Trees are some kind of clausal structures that are centered around a single lexical item (LTAG). We can put some linguistically meat on this claim as follows:

  - [ ] Condition on Extended Tree Minimality (CETM): The syntactic heads in an elementary tree and their projections must form the extended projection of a single lexical head.
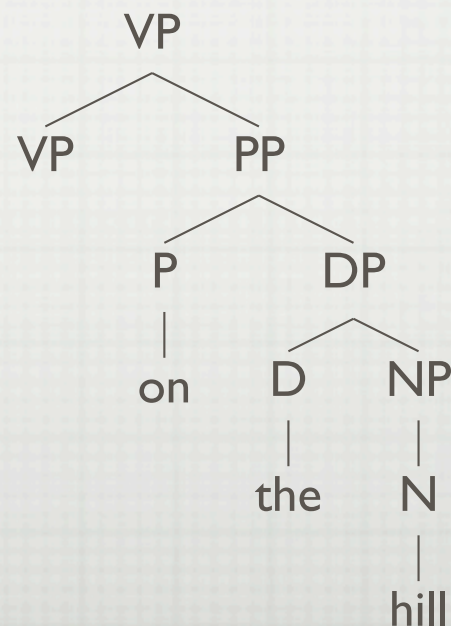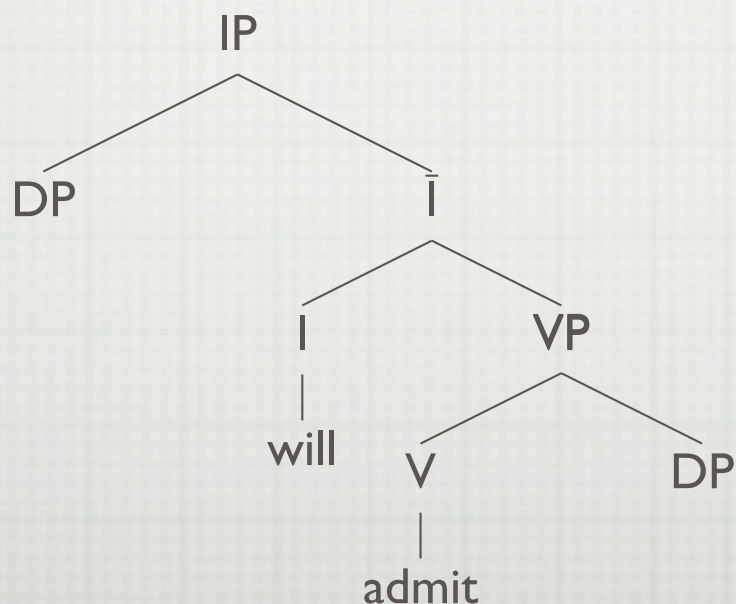
THE NATURE OF ELEMENTARY TREES

☐ Theta Criterion:

    ☐ If H is the lexical head of an elementary tree T, H assigns all of its roles in T

    ☐ If A is a frontier non-terminal of elementary tree T, A must be assigned a role in T.
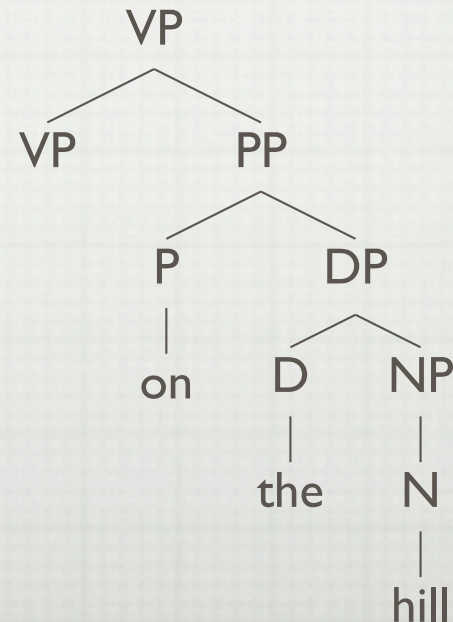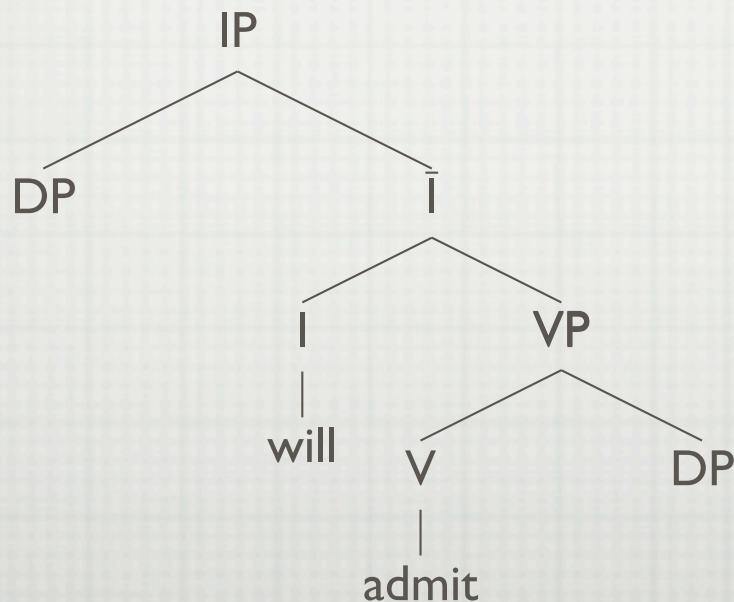
CASE STUDY 1:
RAISING TO SUBJECT

- 2 types of infinitival complements:

1. John tries to bother me.

2. John appears to bother me.

DISTRIBUTIONAL DIFFERENCES

☐ Idiom chunks:

    ☐ Tabs were kept on the anarchists.

    ☐ *Tabs try to be kept on the anarchists.

    ☐ Tabs appear to be kept on the anarchists.

☐ *There*-insertion:

    ☐ There is a problem with the reactor.

    ☐ *There tried to be a problem with the reactor.

    ☐ There appeared to be a problem with the reactor.

☐ Distributivity

    ☐ One translator each was assigned to the visiting diplomats.

    ☐ *One translator each tried to be assigned to the visiting diplomats.

    ☐ One translator each appeared to be assigned to the visiting diplomats.

Conclusion: subject of appear, but not try, is the "same" as the subject of the lower predicate.

CAPTURING THIS INTUITION VIA MOVEMENT
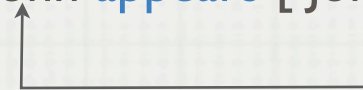
☐ Transformational analysis – Raising

    ☐ Underlying representation:

        ∅ appears [John to bother me]

    ☐ Surface representation
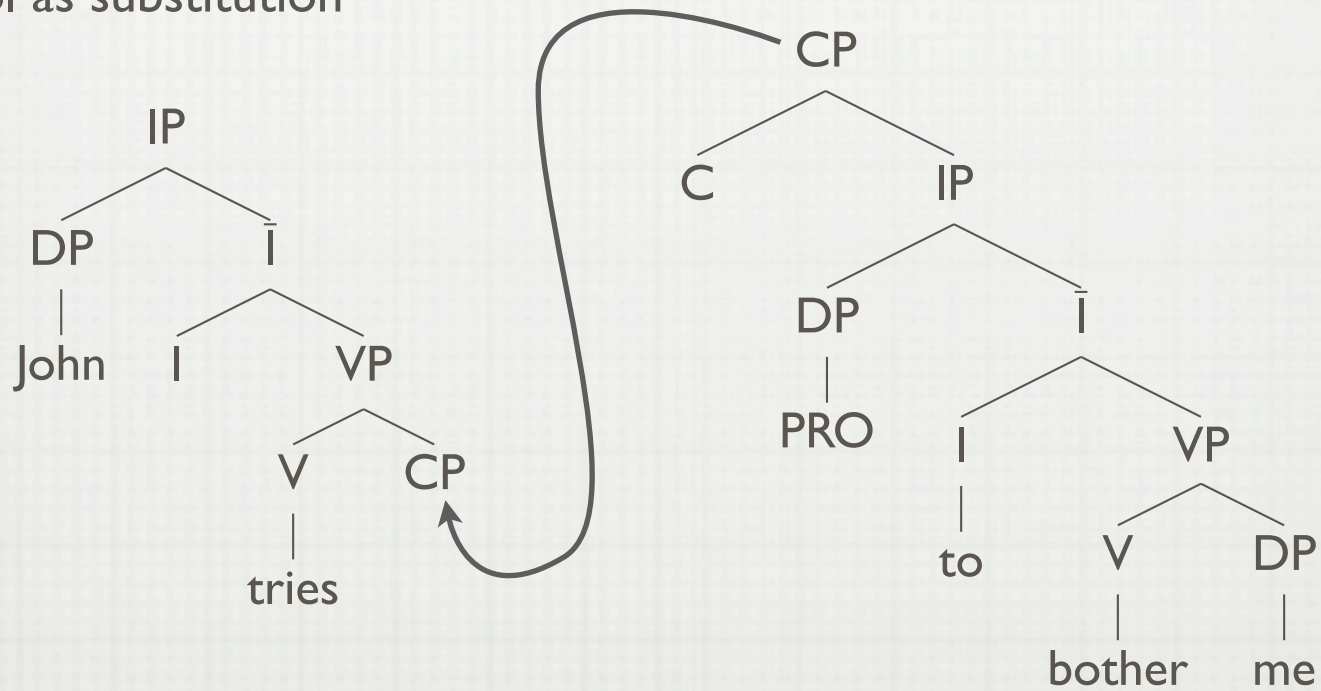
        John appears [~~John~~ to bother me]

☐ Transformational analysis – Control

    ☐ Underlying and surface representations:

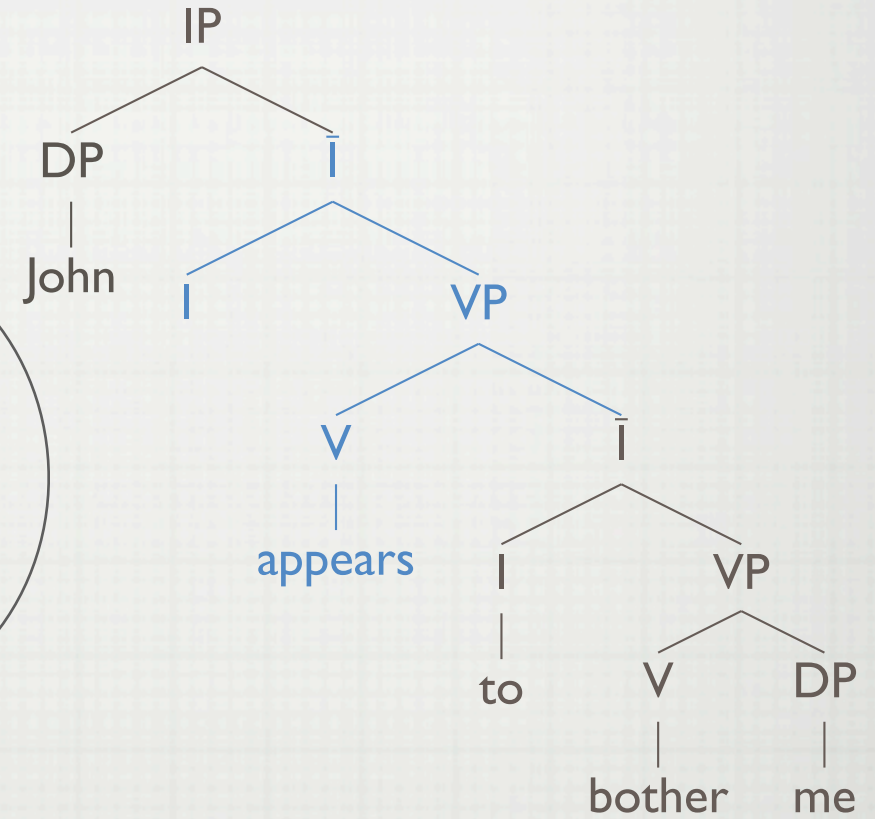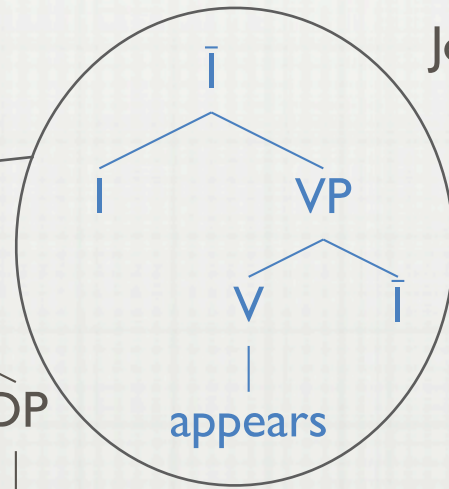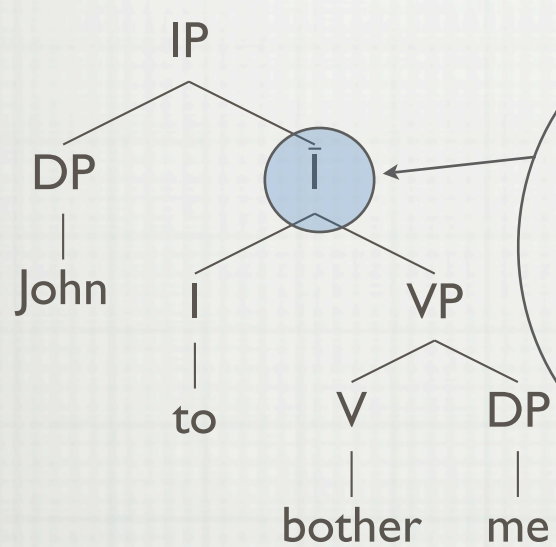   John tries [PRO to bother me]

A TAG ANALYSIS

☐ Control as substitution

A TAG ANALYSIS

Raising as adjoining:
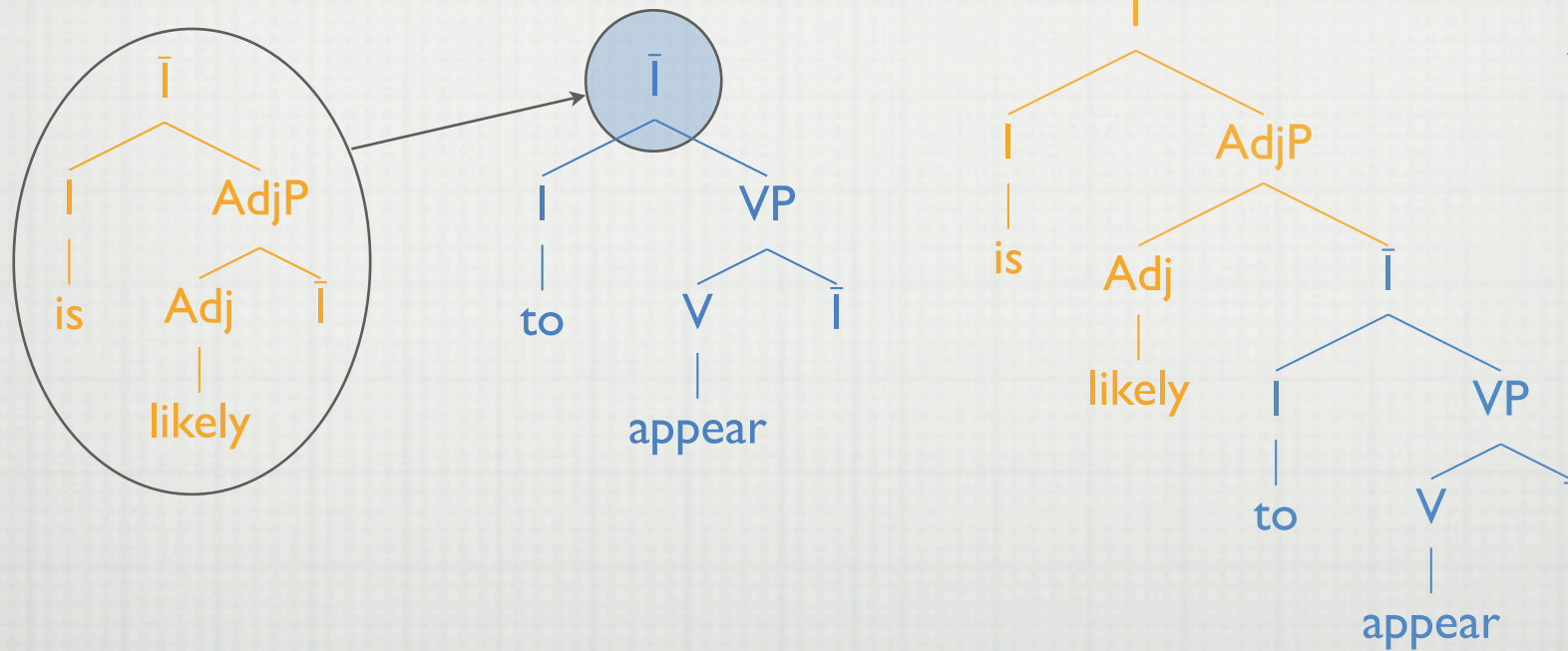
ITERATING RAISING

☐ Raising can also take place successive cyclically:

John is likely [~~John~~ to appear [~~John~~ to bother me]
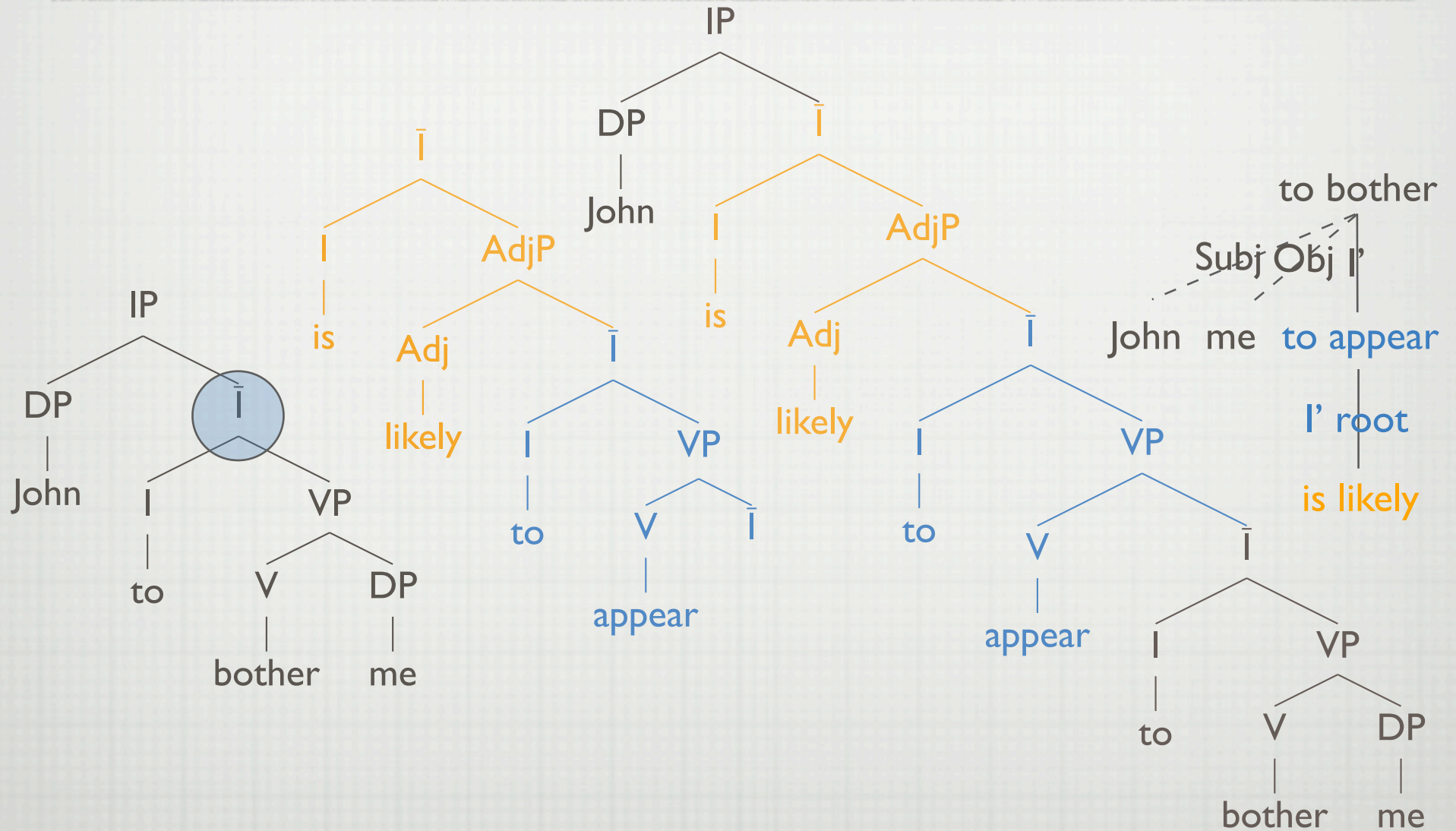
☐ We can accomplish the same effects with iterated adjoining

Derivation tree

ITERATING RAISING

LOCALITY OF RAISING

☐ Raising must be local: it can't skip over an intervening subject
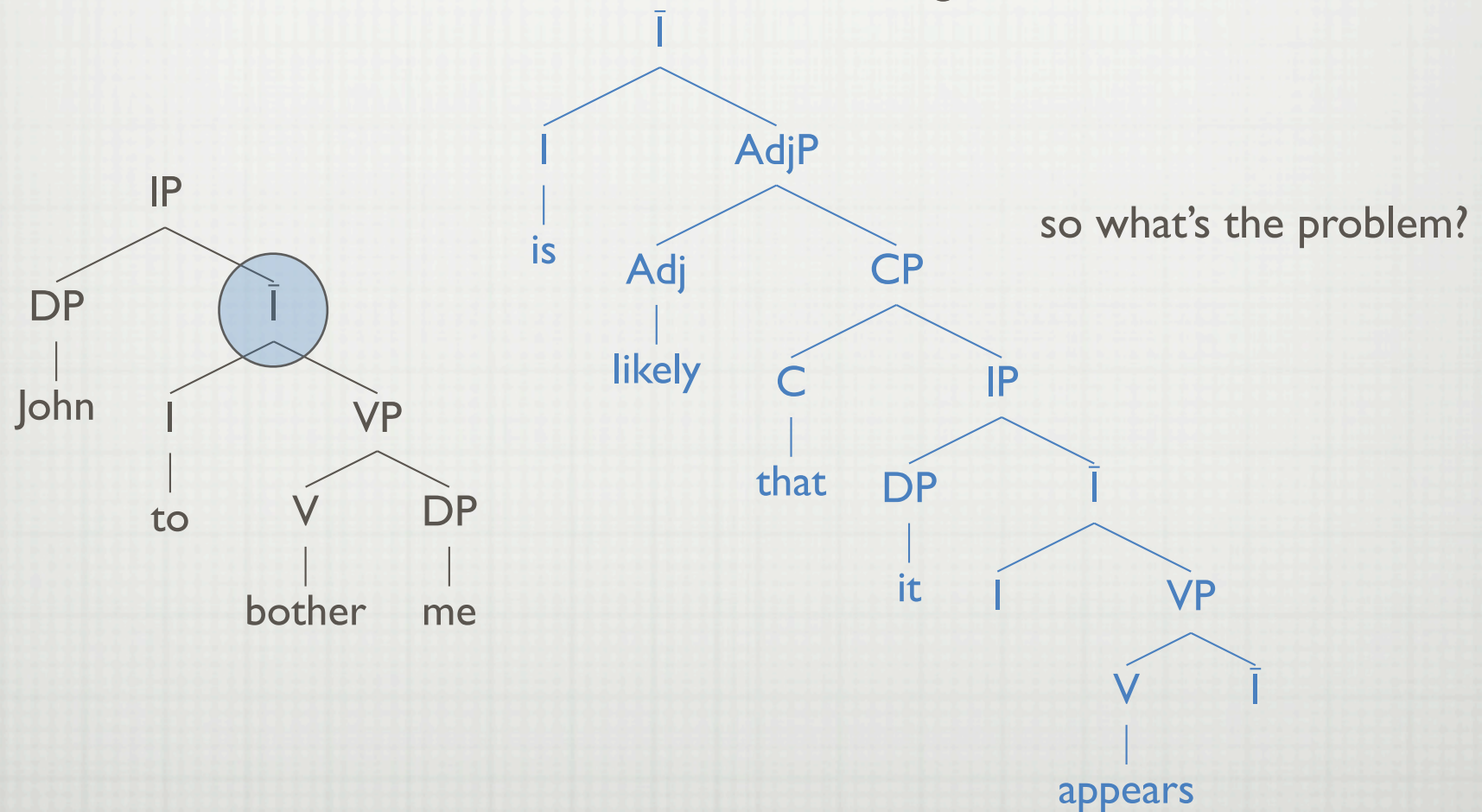
*John is likely [that it appears [~~John~~ to bother me]

☐ In transformational analyses, this is stipulated as a condition on movement (shortest move) or as a condition on traces (NP-trace must be locally A-bound).
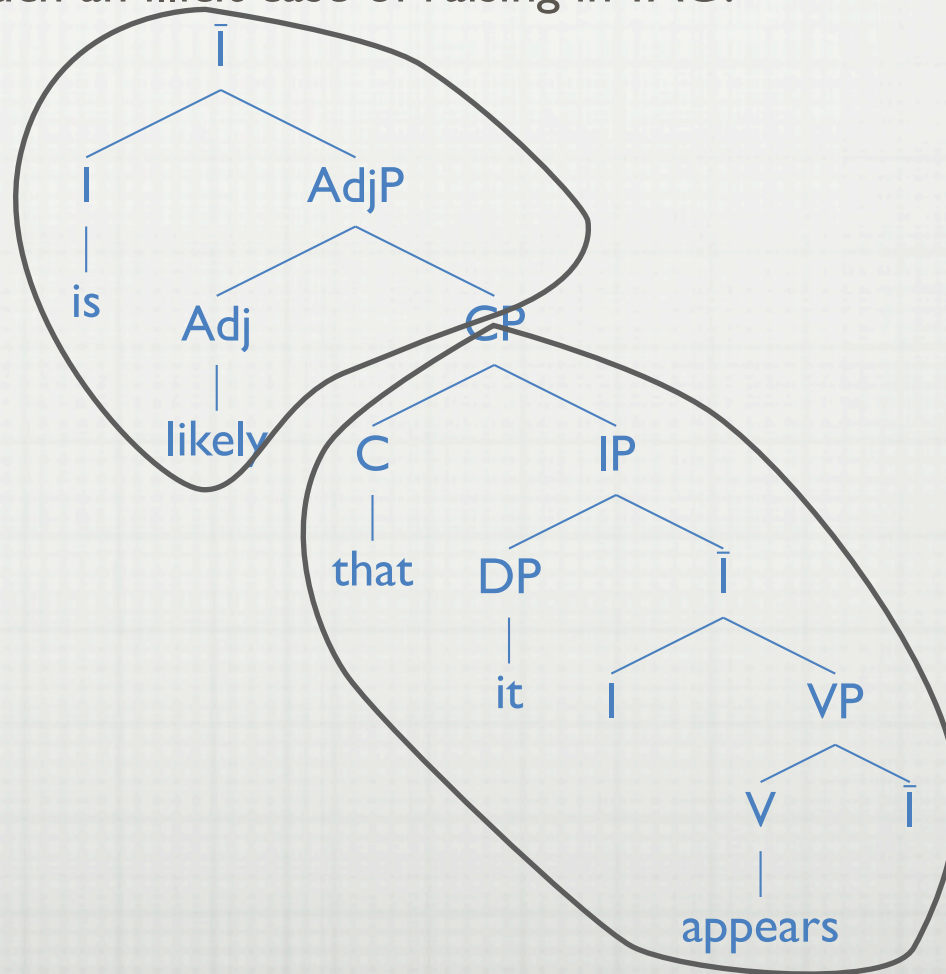
How would we derive such an illicit case of raising in TAG?

so what's the problem?

□ How would we derive such an illicit case of raising in TAG?

Two extended projections by the CETM means two elementary trees

This derivation step is not locally well-formed

Ī
├ I
│ └ is
└ AdjP
  ├ Adj
  │ └ likely
  └ CP
    ├ C
    │ └ that
    └ IP
      ├ DP
      │ └ it
      └ Ī
        ├ I
        └ VP
          ├ V
          │ └ appears
          └ Ī

John to bother me
|
is likely
:
that it appears

LOCALITY OF RAISING

☐ Context-freeness of TAG derivations: Each link in a derivation tree must be well-formed independently of all others.

☐ Corollary: Auxiliary trees must be born, not made.

☐ This formal property of TAG derivations (coupled with our assumptions about the nature of elementary trees) eliminates the need for a stipulated condition on movement

LOCALITY OF RAISING

☐ Another consequence of recursion failure: no raising nominals

*John's appearance [~~John~~ to bother me]
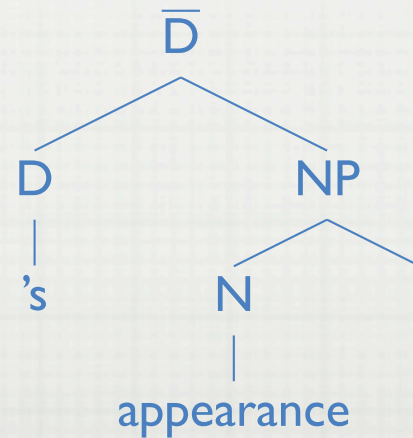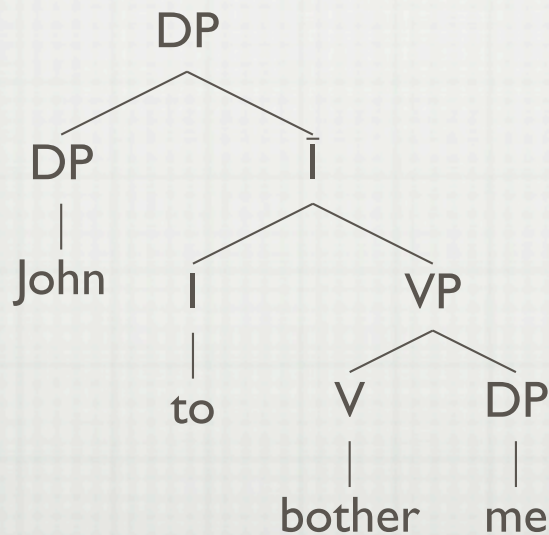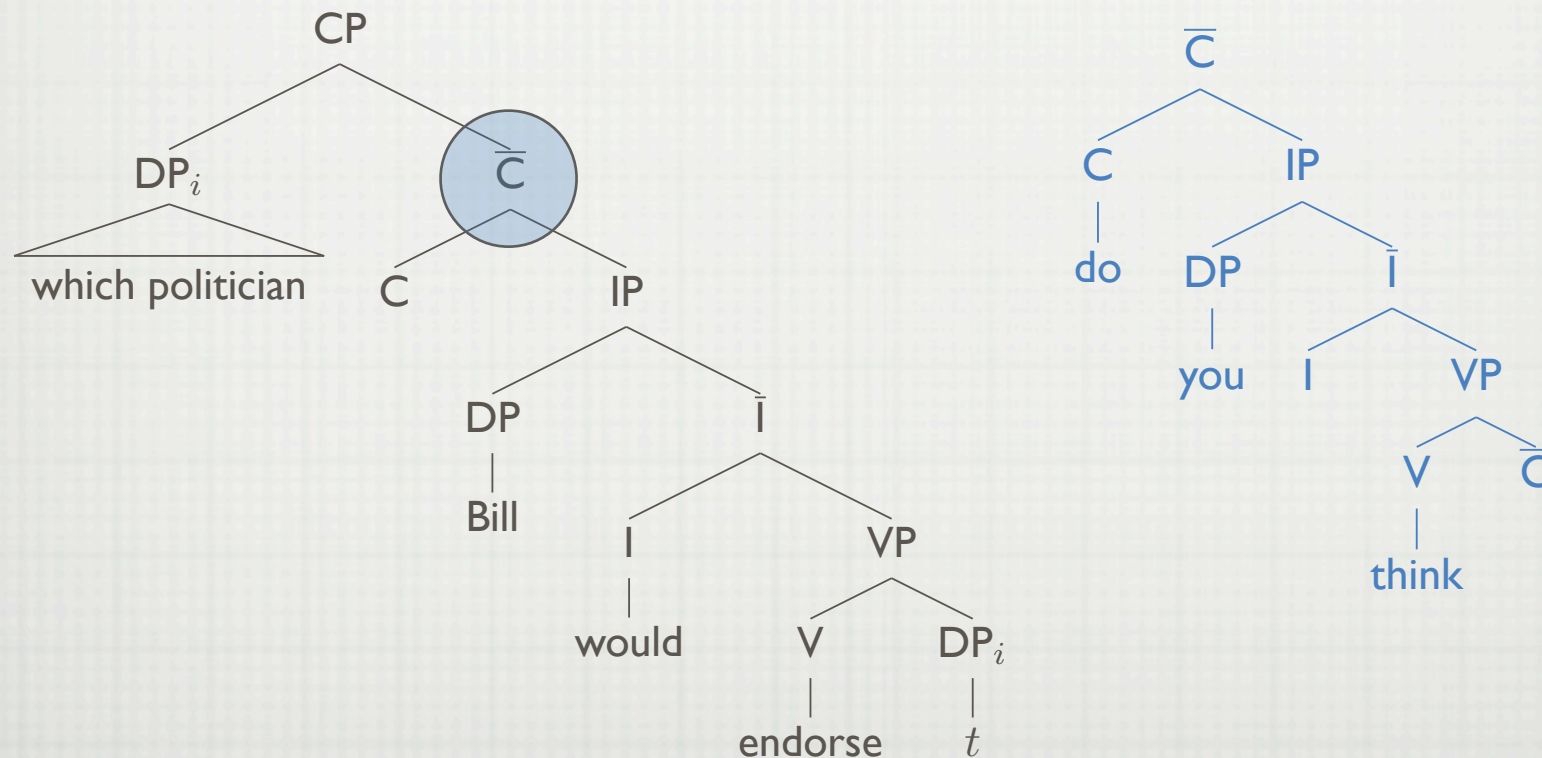
☐ In raising, we were able to eliminate movement in favor of adjoining. In contrast, English wh-movement shows a reordering that cannot be accomplished via adjoining (under current assumptions).

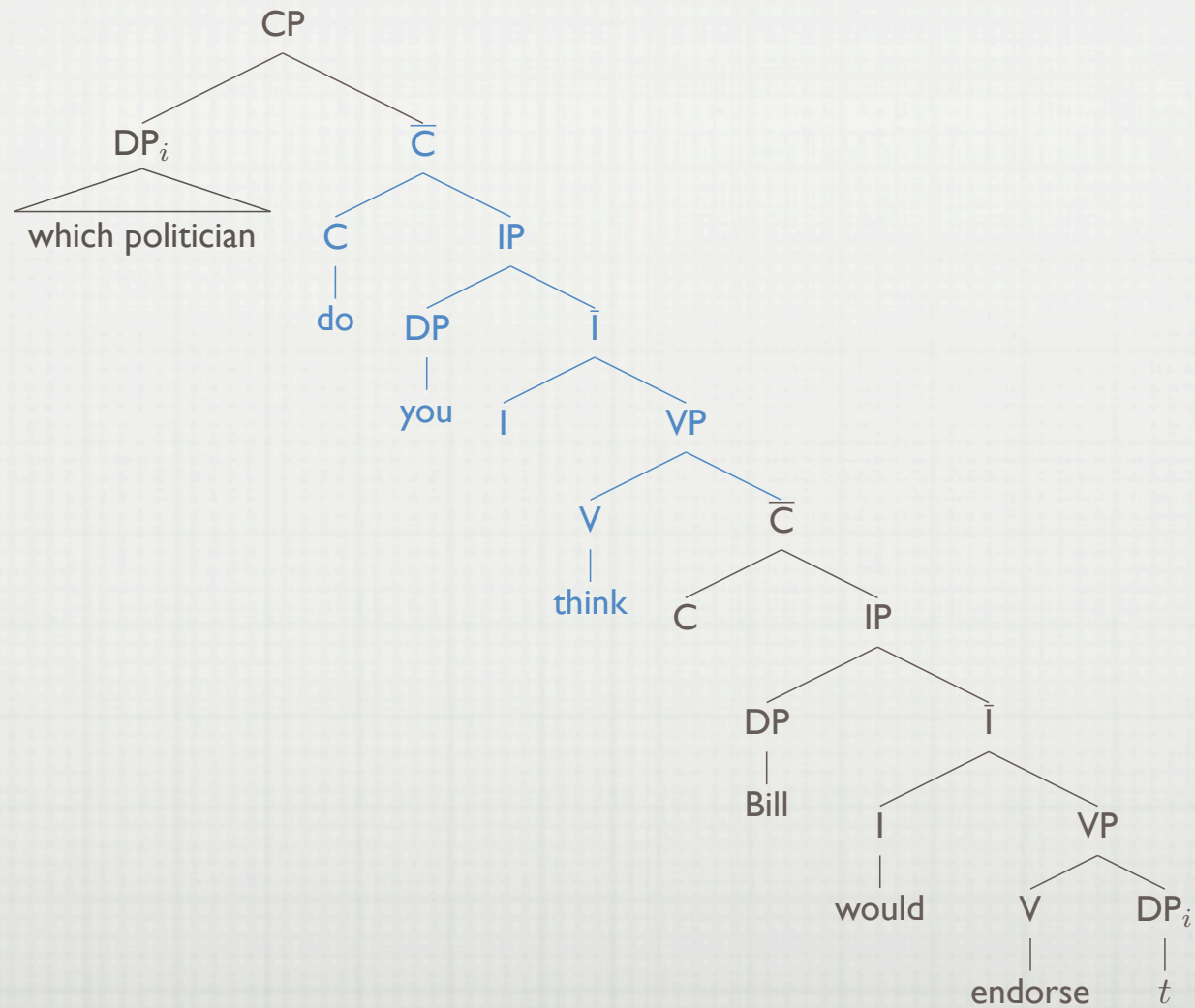☐ Idea: allow displacement/movement, but only within an elementary tree

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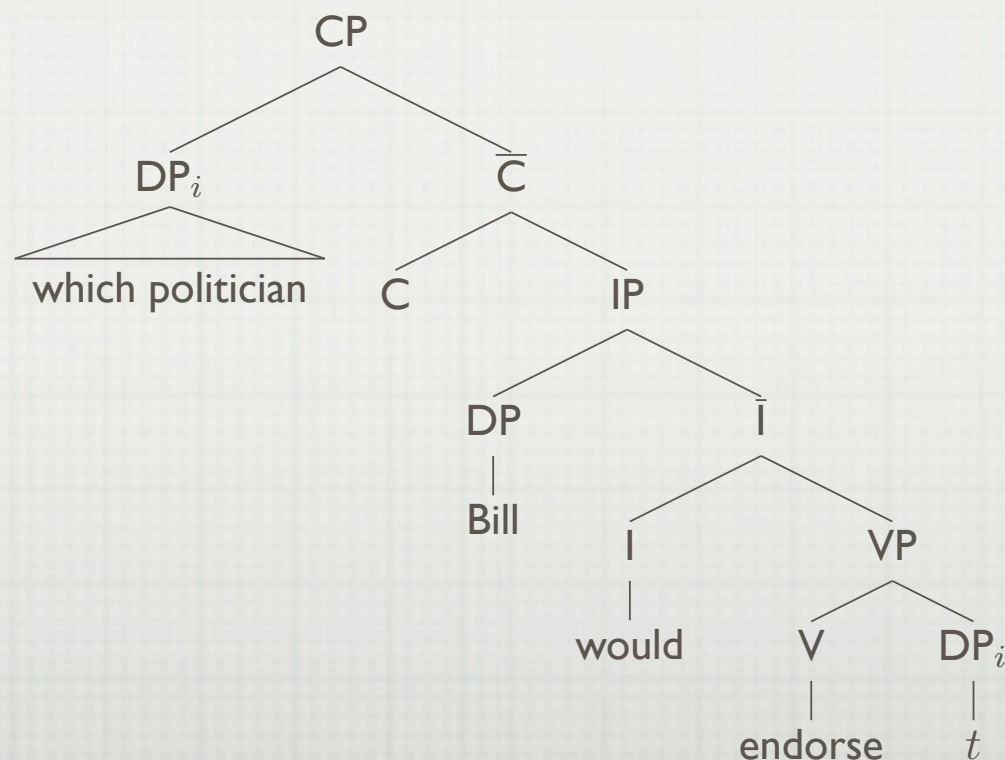
MAKING QUESTIONS

☐ As before, apparent non-locality arises from adjoining

MAKING QUESTIONS

A problem for recursion:
    Which castle did you paint a picture of?

A problem for recursion:

Which castle did you paint a picture of?
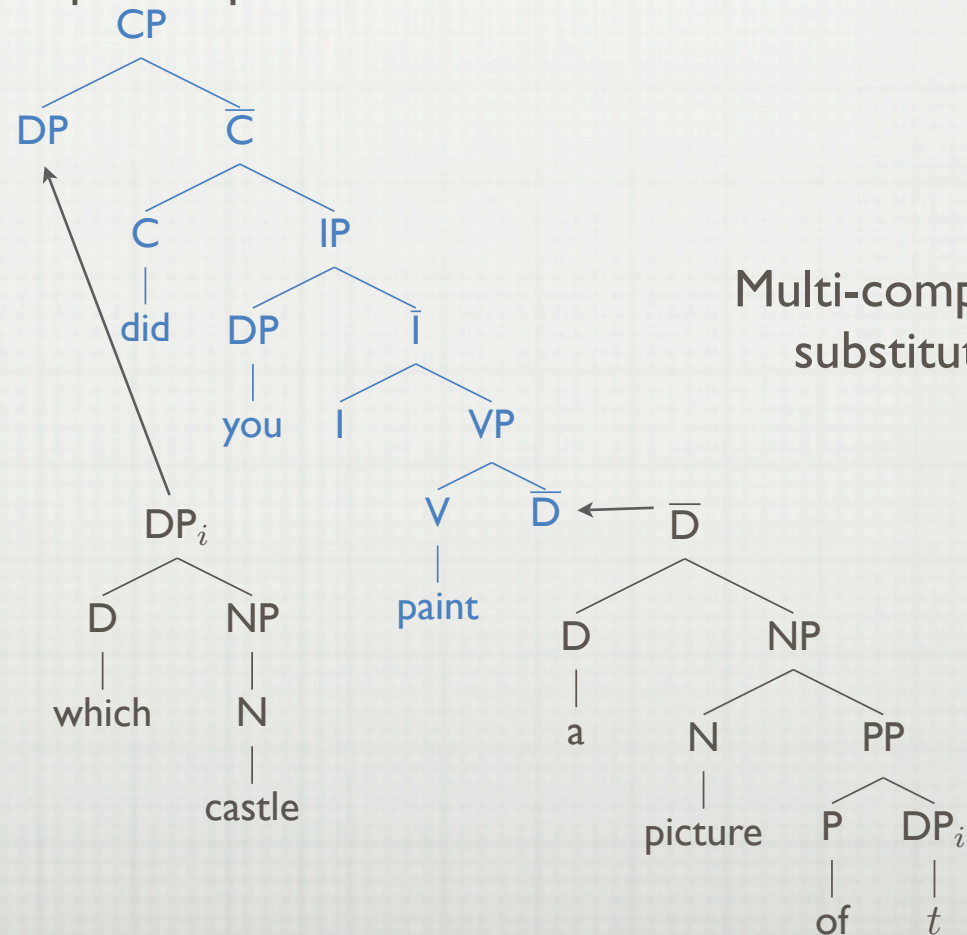
Multi-component substitution

BACK TO LOCALITY

☐ *Which politician did you call Hilary because Bill endorsed?
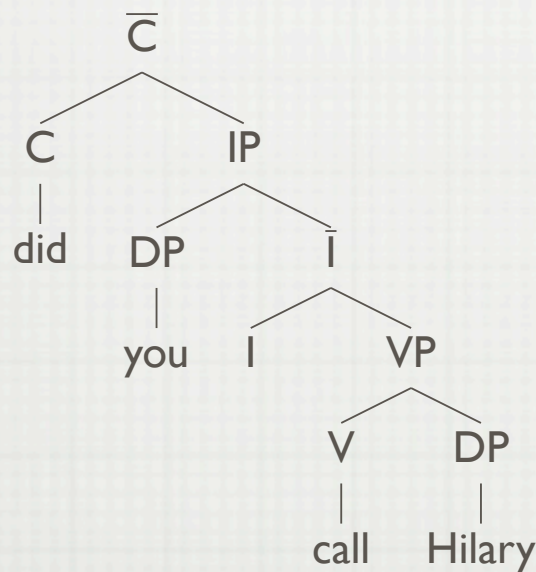
Adjoining this auxiliary tree into main clause will not separate wh-phrase from its clause
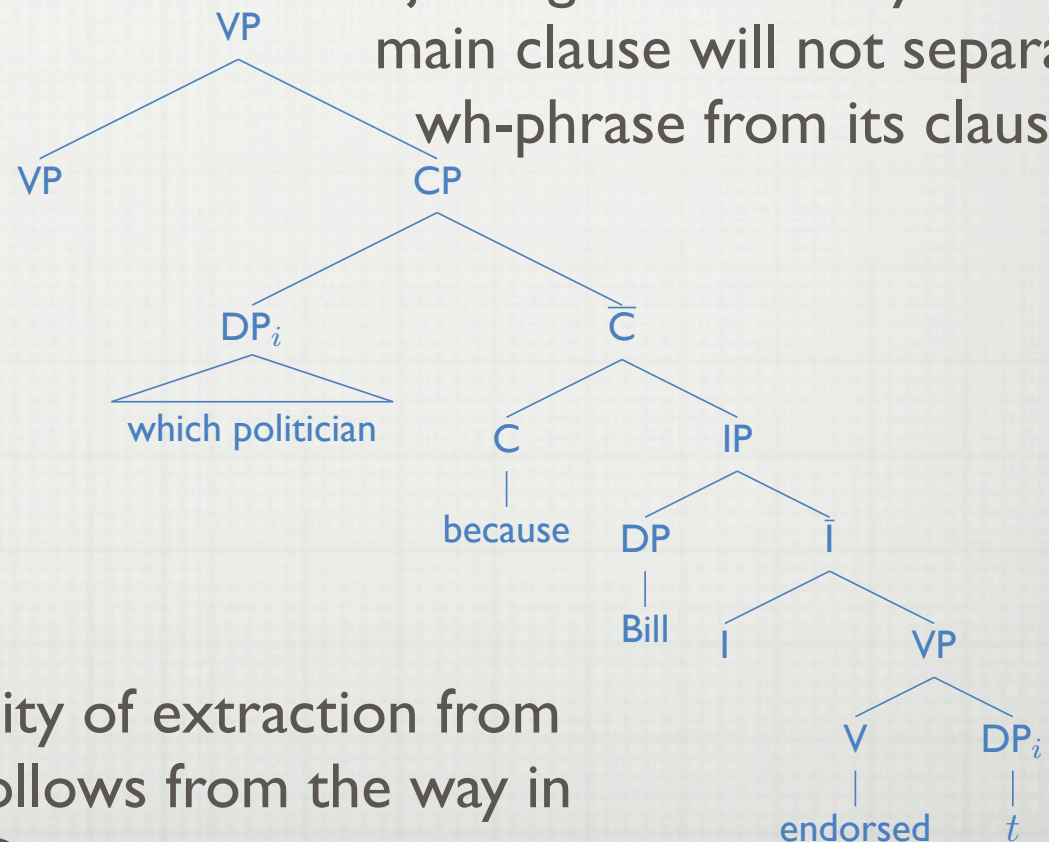
Impossibility of extraction from adjuncts follows from the way in which TAG composes structures

VARIETIES OF DISPLACMENT

☐ The TAG treatment of displacement as adjoining predicts that an element that is "moved" from one clause to another should end up at the periphery of the higher clause.
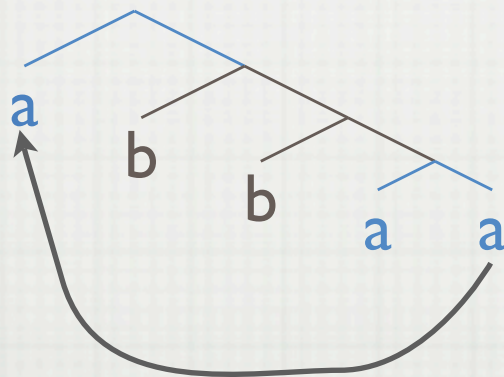
Predicted
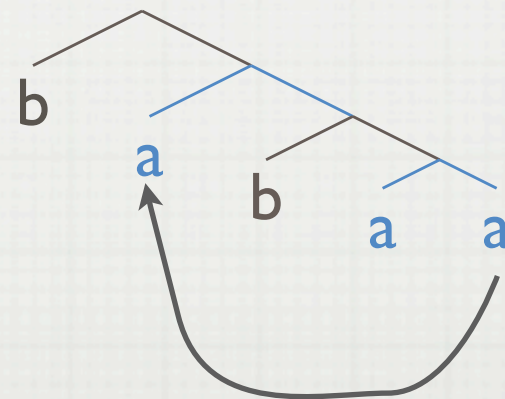
Not predicted

Is this generally true?

VARIETIES OF DISPLACMENT

☐ Problematic cases:

    ☐ Clitic climbing

        Mari te   lo quiere permitir ver
        Mary you it wants to let   to see

        'Mari wants to let you see it.'

    ☐ Raising questions

        Does John seem to annoy you?

☐ These have led some to propose extensions to TAG that are conservative in their processing efficiency, but less so in terms of their ability to preserve the linguistic consequences.

ANOTHER APPARENT PROBLEM: HUNGARIAN FOCUS

☐ Extraction to (unboundedly distant) pre-verbal focus position

Anna PETERT$_i$ akarja [hogy meglátogassam t_i]
Ann   Peter-acc wants   that visit.1sg

'It's Peter that Ann wants me to visit.'

☐ Sensitivity to islands
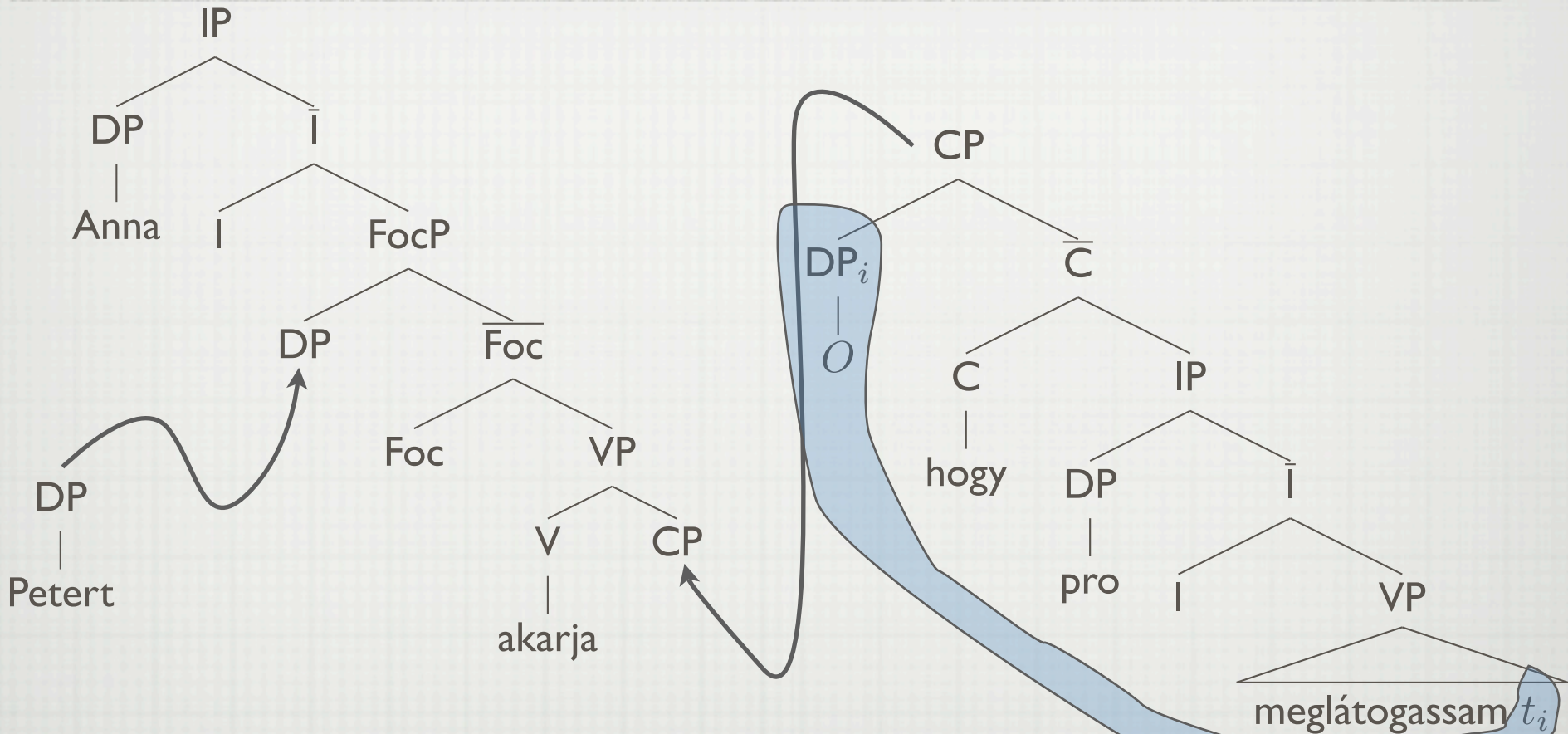
*János JULISKÁT$_i$ hallotam [a   hírt   [hogy elveszi feleségül t_i]
 John Julie-acc   heard-1sg the news   that takes   as wife

'As for John, it's Julie who I heard the news that John will marry.'

☐ How can we generate these kinds of structures in a TAG?

Tree-local
Multi-component substitution

The existence of this operator-
variable dependency ensures
island sensitivity

FOCUS MOVEMENT AS BASE GENERATION

☐ Evidence in favor of this approach:

    ☐ Case assignment

        János ['két dolgot   ]$_i$ szeretné,   ha 'sikerülne t_i
        John   two things-acc   would like if   succeeded

    ☐ Agreement

        Csak két dolgot$_i$ akar-ok/*om   hogy el-mond-j-ál t_i
        only two things-acc want-1sg.indef/1sg.def that   pv-say-subj-2sg.indef

        'There are only two things that I want you to say.'

        Csak ez-t$_i$ akar-om/*ok   hogy el-mond-j-ad t_i
        only this-acc want-1sg.def/1sg.indef that   pv-say-subj-2sg.def

        'It's only this that I want you to say.'

FOCUS MOVEMENT AS BASE GENERATION

☐ Evidence in favor of this approach:

    ☐ Scope

        János 'mindenkivel$_i$ szeretné   ha valamikor 'találkozhatna t_i
        John everybody-with would like if sometime could meet

        'John would like to meet everybody sometime (at a different time each).'

        János szeretné   ha valamikor 'találkozhatna 'mindenkivel
        John would like if sometime could meet   everybody-with

        'John would like to meet everybody at some particular time'
        or 'John would like to meet everybody sometime (at a different time each).'

FOCUS MOVEMENT AS BASE GENERATION

☐ TAG points us to an analysis that accounts for some otherwise surprising properties for a movement construction.

☐ This suggests that when TAG talks, we should listen...

LOOKING AHEAD

☐ By couching syntactic theory in the context of TAG, we see simplification and deepening of our explanations of universal constraints on grammars in terms of formal properties of the underlying computational system.

☐ **Lots** of open problems that need empirical and theoretical attention.

☐ However, we should be cautious about opening the floodgates to more powerful formalisms which lose the explanatory capacity of TAG.

☐ With the explosion of work in TAG semantics, it might be time to rething the assumptions underlying TAG syntax: should elementary trees still be based around a largely semantic notion (thematic completeness)?

☐ It is a largely open question as to the degree to which the kinds of explanations explored here transfer to other MCS formalisms.