Hierarchies of Features vs. Hierarchies of Projections

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Grammatical theory currently countenances two apparently distinct notions of hierarchy:

- Hierarchies of **syntactic features**, proposed in many theories
  Ex: 1st pers > 2nd pers > 3rd pers (Zwicky 1977)
  NOM/ABS > DAT > ACC > GEN > ERG (Silverstein 1976)
  $\theta_{AGENT} > \theta_{THEME} > \theta_{GOAL} > \ldots$ (Jackendoff 1972, Carrier-Duncan 1985, a.m.o.)

- Hierarchies of **syntactic projections**, proposed in syntactic cartography
  Ex: [FORCE [TOP [FOC [TOP [FIN [TENSE [….]]]]]]] (Rizzi 1997)
  [HABITUAL [REPETITIVE [FREQ [VOLITION [CELERATIVE [ANTERIOR [….]]]]]]] (Cinque 1999)
  [SIZE [LENGTH [HEIGHT [SPEED [DEPTH [WIDTH [….]]]]]]] (Scott 2002)

Are both notions necessary? If not, in what direction might reduction be made? Here I explore these questions using the domain of **θ-roles** and **θ-hierarchies**.

Specifically, I:

- review a theory of argument realization for the Mandarin VP based on a cartographic-style "hierarchy of θ-projections", noting some questions that arise,
- sketch an alternative view developed in Larson (2014), which recasts θ-roles as syntactic θ-features and θ-role assignment as θ-feature agreement, and which controls syntactic projection via a hierarchy of θ-features,
- draw a general conclusion about recasting of hierarchies of projections as hierarchies of features under the strategy sketched above: viz., that there must always be a single head bearing the features underlying the projection hierarchy that raises successively through its shells,
- illustrate this point in another domain looking at hierarchies of adjectival and left-peripheral projections.

1.0 A Hierarchy of θ-projections for Mandarin (Li 2014)

Li (2014) offers a theory of argument realization in Mandarin based on the cartographic-style hierarchy of vP/VP projections in (1):

(1) [AGENT/EXP *v* [$_{VP}$ TIME Lv_{temp} [$_{VP}$ LOC Lv_{loc} [$_{VP}$ INSTR Lv_{inst} [$_{VP}$ THEME V]]]]]

v assigns θ-roles born uniquely by "canonical subjects" (Agent/Experiencer).
The sequence of light verbs (Lv_{α}) assign various circumstantial θ-roles.
The core predicate (V) assigns the THEME-role, which thus projects lowest.

"Canonical" objects, e.g., *niu-rou mian* 'beef noodle' in (2a), are licensed by the lexical V *chi* 'eat' (2a').
"Non-canonical" objects, e.g., *dawan* 'big bowl' in (2b), are licensed by an Lv (2b').

(2) a. Wo chi **niu-rou mian**. — a'. [Wo *v* [$_{VP}$ **niu-rou mian** chi]]
I eat beef noodle
'I eat beef noodle'

b. Wo chi **da-wan**. — b'. [Wo *v* [$_{VP}$ **da-wan** Lv_{inst} [$_{VP}$ chi]]]
I eat big-bowl
'I eat with/using a big bowl'

c. Wo chi **guanzi**. — c. [Wo *v* [$_{VP}$ **guanzi** Lv_{loc} [$_{VP}$ chi]]]
I eat restaurant
'I dine at a restaurant'

d. Wo chi **xiawu**. — d. [Wo *v* [$_{VP}$ **xiawu** Lv_{temp} [$_{VP}$ chi]]]
I eat afternoon
'I dine in the afternoon'

With a canonical subject present at most one post-verbal object is possible (3a-f). This constraint plausibly relates to case. If *v* can assign ACC (4a) but Lv's can't, additional objects will be case-less (4b):

(3) a. *Wo chi **da-wan niu-rou mian** 'I eat beef noodle with a big-bowl'
b. *Wo chi **guanzi niu-rou mian** 'I eat beef noodle in a restaurant'
c. *Wo chi **xiawu niu-rou mian** 'I eat beef noodle in the afternoon'
d. *Wo chi **xiawu guanzi** 'I eat in a restaurant in the afternoon'
d. *Wo chi **xiawu guanzi da-wan niu-rou mian**
'I eat beef noodle with a big-bowl in a restaurant in the afternoon'

(4) a. [Wo *v* [$_{VP}$ **niu-rou mian** chi]]
ACC
b. *[Wo *v* [$_{VP}$ **da-wan** Lv_{inst} [$_{VP}$ **niu-rou mian** chi]]]
ACC ACC

With a canonical subject absent, more possibilities arise. Li (2014) discusses alternations like (5)-(8), where orderings of arguments appear to flip.

(5) a. xiao bei he lücha — INSTRUMENT > THEME
small cup drink green.tea
'Use the small cup to drink the green tea.'
b. lücha he xiao bei — THEME > INSTRUMENT
green.tea drink small cup
'Green tea is drunk with small cups.'

(6) a. da dianyingyuan kan dongzuo pian; xiao dianyingyuan kan katong pian.
big theater watch action film small theater watch cartoon film
'Big theaters are for watching action films; small theaters are for watching cartoons'
LOCATION > THEME

b. dongzuo pian kan da dianyingyuan; katong pian kan xiao dianyingyuan.
action film watch big theater cartoon film watch small theater
'Action films are to watch in big theaters; cartoons are to watch in small theaters.'
THEME > LOCATION

(7) a. wanshang mai lubiantan. TIME > LOCATION
evening sell street.stall
'Sell at street stalls in evenings.'

b. lubiantan mai wanshang. LOCATION > TIME
street.stall sell evening
'Sell at street stalls in evenings.'

(8) a. zaoshang qie zhe-ba dao. TIME > INSTRUMENT
morning cut this-CL knife
'Cut with this knife in the morning.'

b. zhe-ba dao qie zaoshang. INSTRUMENT > TIME
this-CL knife cut morning
'This knife is to cut with in the morning.'

Li (2014) analyzes these data as in (9). Whenever AGENT/EXP (*v*P Spec) is projected, it raises to sentence subj position (9a); but when AGENT/EXP is not projected, args with other roles (Spec of VP) raise in thematic (9b) or contra-thematic order (9c):

(9) a. [α [$_{vP}$ α *v* [$_{VP}$ … V]]] vP Spec raises

b. [β [$_{VP}$ β … [$_{VP}$ … V]]] VP Spec raises ("thematic order")

c. [γ [$_{VP}$ β … [$_{VP}$ γ … V]]] VP Spec raises ("contra-thematic order")

How is thematic order determined? Ellipsis. Li claims object deletion is possible in thematic order but blocked in contra-thematic order (10):

(10) a. wanshang mai lubiantan hen hao; zaoshang mai __ bu hao.
evening sell street.stall very good morning sell __ not good
'It's good to sell at street stalls in the evening, but not good to sell
(at street stalls) in the morning.' TIME > LOCATION

b. lubiantan mai wanshang hen hao; *baihuo-gongsi mai __ bu hao.
street.stall sell morning very good department-store sell __ not good
'It's good to sell at street stalls in the evening, but not good to sell
at department stores (in the morning).' LOCATION > TIME

Some general questions for LI's broader "cartographic" approach to argument realization:

A. What is the basis of the projection hierarchy in (1)?
In cartographic analyses, it must come from **selection**: *v* selects Lv_{temp} selects Lv_{loc} selects Lv_{inst} selects V.
Since V's and Lv's are f-cats, this is f-selection, i.e., a specific category of head selects a specific category of complement. This would seem to imply that every V projects the full hierarchy of θ-roles even when V notionally does not involve them (11a,a").

(11) a. Wo chi **niu-rou mian**.
a". [Wo *v* [$_{VP}$ _ Lv_{temp} [$_{VP}$ _ Lv_{loc} [$_{VP}$ _ Lv_{inst} [$_{VP}$ **niu-rou mian** chi]]

Is this plausible? What is the interpretation of (2a")?

B. How general is the projection hierarchy?
The cartographic program aspires to **universal orders**. But the specific ordering proposed by Li (2014) conflicts with other proposed θ-hierarchies.

$\theta_{AGENT/EXP} > \theta_{TIME} > \theta_{LOC} > \theta_{INSTR} > \theta_{THEME}$ Li (2014)
$\theta_{AGENT} > \theta_{THEME} > \theta_{INSTR} > \theta_{LOC} > \theta_{TIME}$ Jackendoff ('72), Carrier-Duncan ('85)

(12) [Col. Mustard] killed [the victim] [with a knife] [in the conservatory] [at midnight].

C. How are contra-hierarchical orders derived?
In the MP, a head α bearing an edge feature and a feature [F] that may undergo agreement probes for an [F]-bearing β in its domain (13a). Probing β, α agrees on [F], activates its edge feature and raises β to Spec (13b). The probe-goal relation respects Minimality; α cannot to probe γ "through" an intervening β that is a potential [F]-bearer (13c):

(13) a. [$_{αP}$ α . . . [. . . β . . .]] b. [$_{αP}$ β α . . . [. . . β . . .]]
[F] → probes → [F]

c. [$_{αP}$ α . . . [. . . β . . . [. . . γ . . .]]]
[F] → probes → X → ⋯ → [F]

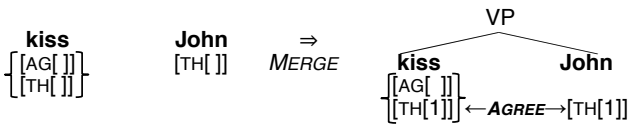
Given the possibility of (9b), (9c) plainly violates Minimality. The higher probe must agree with γ through the intervening β.

2.0 θ-projections from θ-features (Larson 2014)

Larson (2014) offers an account of projection that analyzes **θ-roles as syntactic features** and **θ-role assignment as feature agreement**, and controls projection via a **θ-feature hierarchy**.

In simplest form: assume θ-features [AG], [TH], [GL], [LOC], etc. born by preds and args that undergo agreement at the point of external merge:

(14)

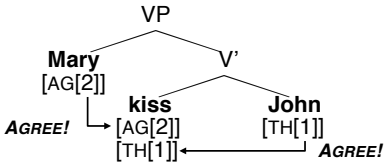


Assume a feature hierarchy [AG] > [TH] > [GL] > [LOC] >… and constraint (15):

(15) **Constraint**: a feature in a set can undergo agreement only if there are no lower-ranked, unagreed features in the set.

Then the hierarchy of θ-features will determine the hierarchical projection of args:

(16)



Given [AG] > [TH] and (15), [TH] must merge first!

2.1 Syntactic Features

Syntactic theory now distinguishes instances of features F according to whether they are **interpretable**, **valued** or neither (i.e., **uninterpretable-unvalued**).

(17) a. [iF[ ]] **interpretable** F, associated with a "meaning"
b. [Fval[ ]] **valued** F, associated with visible marking
c. [F[ ]] **uninterpretable-unvalued** F, concordial

Unvalued features ([iF[ ]] or [F[ ]]) probe their c-command domain seeking to agree with another instance of F. For F to be licensed, it must have <u>both</u> interpretable and valued instances linked by agreement. Thus (18a-c) will be licensed, but (19a-e) will not:

(18) a. iF[n] … Fval[n] b. iF[n] … F[n] … Fval[n]
c. iF[n] … F[n] … F[n] … Fval[n]

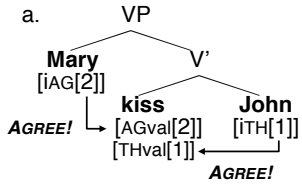
(19) a. iF[ ] b. iF[n] … F[n]
c. Fval[ ] d. F[n] … Fval[n]
e. iF[ ] … Fval[ ]

(20) a. [$_{vP}$ v *küsste* [$_{DP}$ *den* *hübschen* *Mädchen*]]
kissed the.**ACC** pretty.**ACC** girl.**ACC**

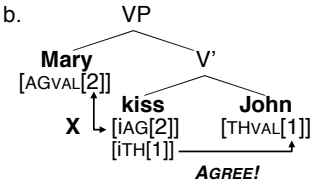
b. [$_{vP}$ v … [$_{DP}$ D AP NP]]
[**iACC**[1]] [ACC[1]] [ACC[1]] [**ACCval**[1]]
PROBE and *AGREE*

This refinement obliges us to decide where θ-features are interpretable and where valued: on args vs. on preds.

(21) a.



b.

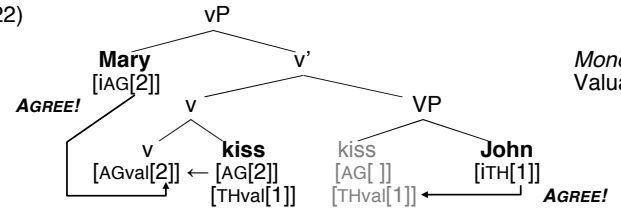


2.2 Further Refinements

Larson (2014) proposes:

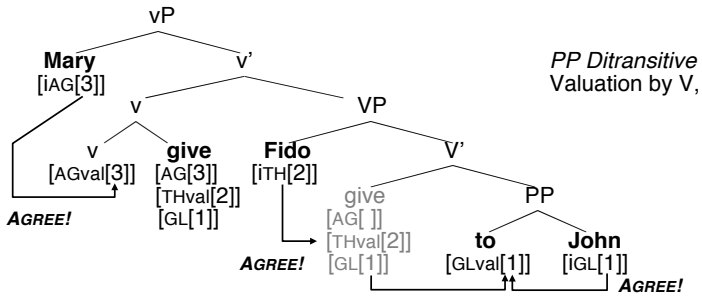
- θ-features are interpretable on arguments
- θ-features are valued on V's, *v*'s and P's
- if α bears a set of features of the same type, then **at most one can be valued**.

(22)



Monotransitive
Valuation by V and v

(23)



PP Ditransitive
Valuation by V, P and v

These refinements retain the basic picture in (16): θ-feature hierarchy determines the hierarchical projection of args. Additional elements (v's, P's) enter the picture to enable the valuation that V cannot accomplish on its own.

2.3 Some Comparisons between Li (2014) and Larson (2014)

- Both involve hierarchical projection via θ-roles
- Both involve a stipulated hierarchy

- Li: f-selection (*v* f-selects Lv_{temp} f-selects Lv_{loc} f-selects Lv_{inst} f-selects V). Grounded in ???
- Larson: ranked θ-features [AG] > [TH] > [GL] > [LOC] > … + (15) Grounded in cognitive markedness/perceptual salience (Dowty (1991)?

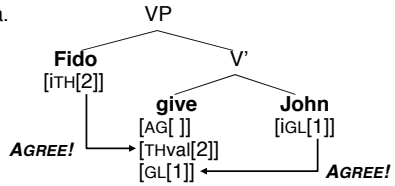
- Li (2014): potentially all Lv's, and hence all roles, must be projected with every V Larson (2014): only roles associated featurally with V are projected.
- Larson (2014) requires the existence a **single head** (here V) bearing a set of θ-features whose ranking "organizes" projection.

What about universality of hierarchy and contra-thematic ordering of args?

3.0 Argument Alternations (Larson 2014)

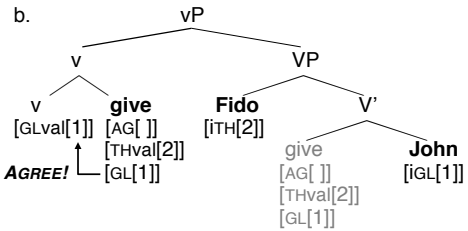
The existence of a single head carrying the set of θ-features has another consequence beyond organizing hierarchical projection. It enables argument inversion without violating Minimality. The steps in (24a-e) show how.

(24) a.



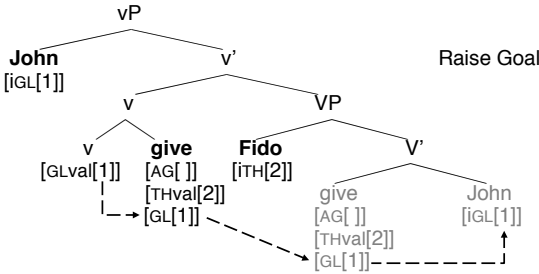
Merge Goal (*John*)
Merge Theme (*Fido*)

b.



Merge v ([GLval[ ]])
Raise V

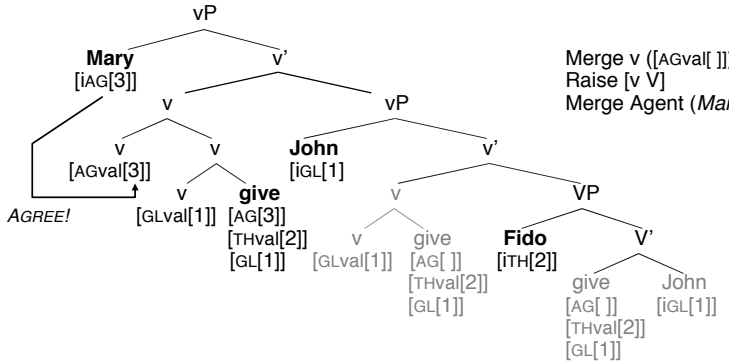
c.



Raise Goal (*John*)

v carrying an edge feature and valued [GL] feature is merged. *Give* raises to v and agrees on [GL] (4b). This yields agreement between v and *John* on [GL], **without a probe-goal relation**. *John* can thus raise to Spec of v without violating Minimality (4c). Raising of *give* to v allows v and *John* to agree "by transitivity," without intervention by *Fido*.

(25)



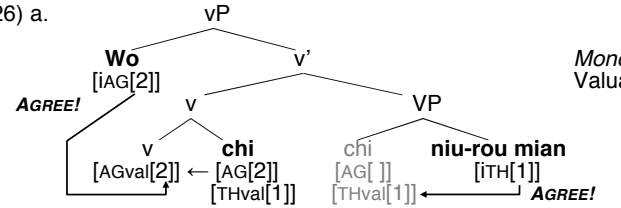
Merge v ([AGval[ ]])
Raise [v V]
Merge Agent (*Mary*)

Note again the importance of a single head (here V) that carries agreement with various arguments as it raises through the shells.

3.1 Mandarin Again

This account can apply directly to the Mandarin cases discussed by Li (2014). Transitives with canonical subjects and objects work just like English (22) (cf. 26a):

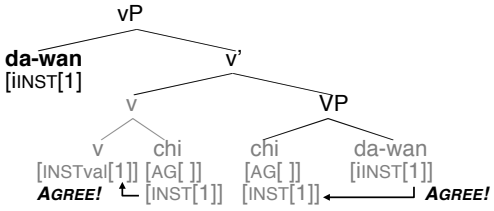
(26) a.



Monotransitive
Valuation by V and v

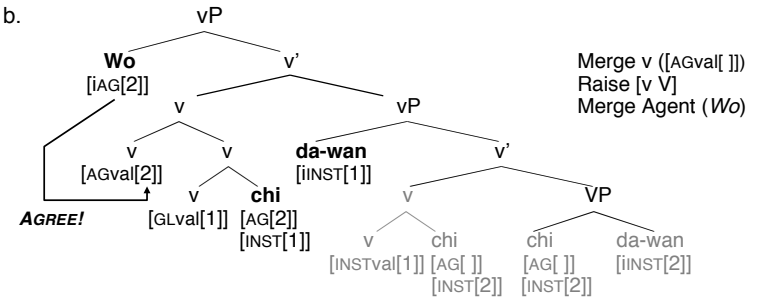
Non-canonical objects involve valuation by v carrying a θ-feature, with object raising:

(27) a.



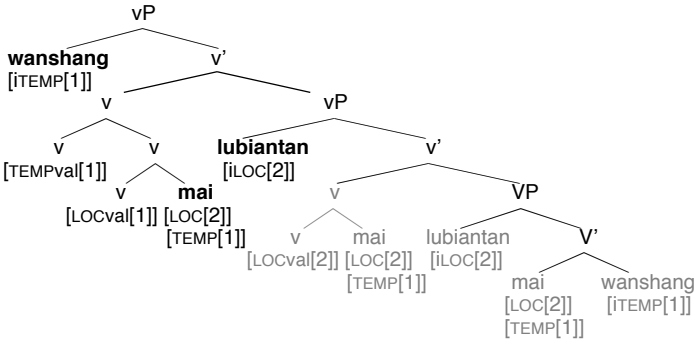
Merge Inst (*da-wan*)
Merge v ([INSTval[ ]])
Raise [v V]
Raise Inst (*da-wan*)

b.

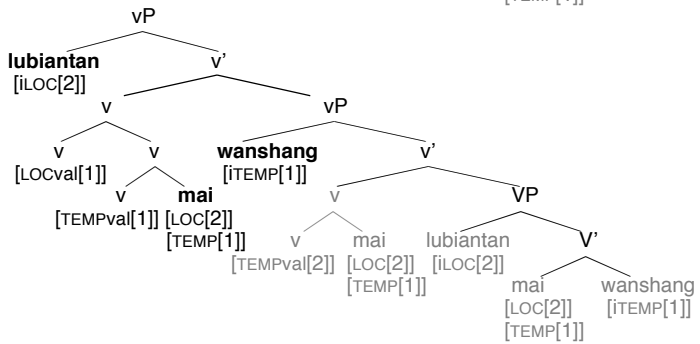


Examples with circumstantial θ-roles and inversions are also accommodated, with feature assignment of depending on the hierarchy assumed. Suppose [LOC] > [TEMP] (contra Li 2014). Then (10a,b) are derived as in (28a,b) (resp):

(28) a.



b.



Order of args reflects order of v merger: v ([LOCval[ ]]) > v ([TEMPval[ ]]) vs. the opposite.

3.2 Some Comparisons between Li (2014) and Larson (2014)

Regarding Minimality: none of the derivations in (27) or (28) incur violation, for the reasons discussed.

Regarding Universality of θ-hierarchy: Li's θ-hierarchy for Mandarin conflicts with other proposals and rests on her claim that obj deletion occurs only in canonical θ-order. Li offer's an "Economy of Derivation" account. 2 points:

- Li's account involves comparing derivations with different numerations, which is illicit in economy accounts.
- The derivations in (28a,b) suggest alternative views of when object deletion is possible. E.g., (28a) involves nested paths (LIFO); (28b) doesn't.

4.0 Other Projection Hierarchies

The general approach developed above is potentially applicable to other cartographic projection hierarchies.

4.1 Adjectival Ordering

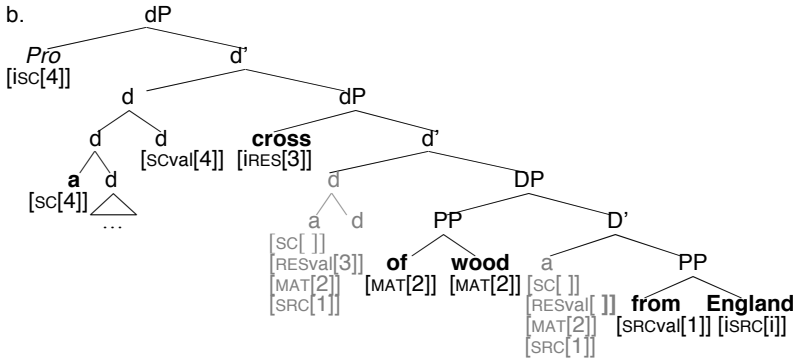
It has been proposed that observed orderings of adjectival modifiers be analyzed via a cartographic projection hierarchy:

(29) [SIZE [LENGTH [HEIGHT [SPEED [DEPTH [WIDTH [….]]]]]]] (Scott 2002, Cinque 2010)

Assume:
- a head D bearing a subset of features from {[SC], [RES], [SIZE], [LENG], [MAT], [SRC], …}
- a feature hierarchy [SC] > [RES] > [MAT] > [SRC] > …

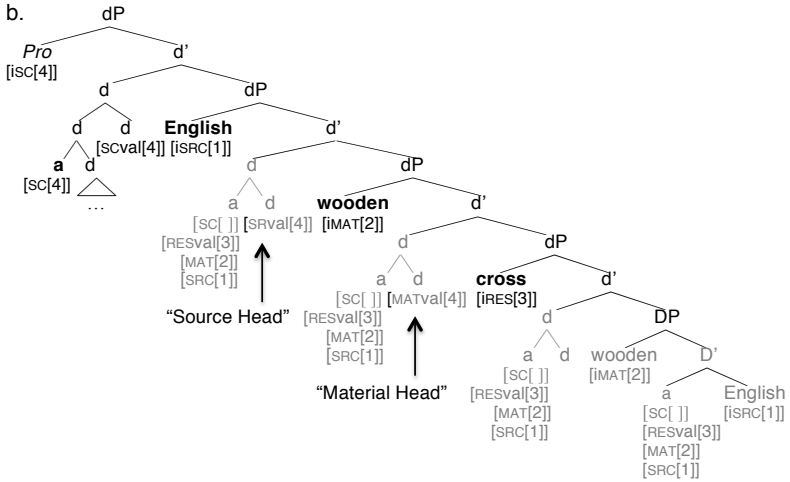
(30) a. A cross of wood from England (?*A cross from England of wood*)

b.



(30) a. An English wooden cross (?*An wooden English cross*)

b.



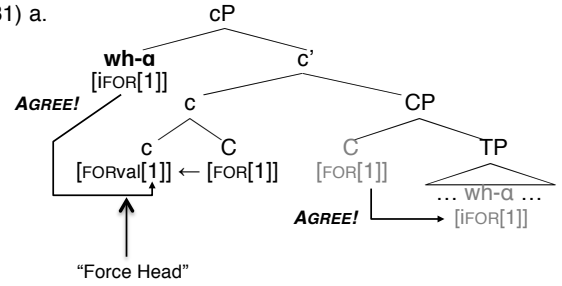
4.2 Left-peripheral Elements

It has been proposed that elements in the C domain be analyzed via a cartographic projection hierarchy:

[FORCE [TOP [FOC [TOP [FIN [TENSE [….]]]]]]] (Rizzi 1997)

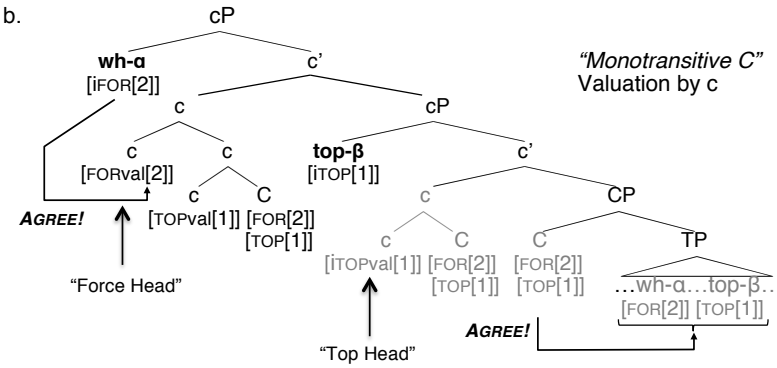
Assume:
- a head C bearing a subset of features from {[FOR], [TOP1], [FOC], [TOP2], [FIN]}
- a feature hierarchy [FOR] > [TOP1] > [FOC] > [TOP2] > [FIN]

(31) a.



"Unaccusative C"
Valuation by c

b.



"Monotransitive C"
Valuation by c

SUMMARY

- Current cartographic projection hierarchies appeal to murky notions of functional selection, the basis and consequences of which remain unclear.
- Feature hierarchies offer an alternative view of projection that do not appeal to f-selection, and whose technical implementation appears more straightforward.
- We explored this contrast in the domain of θ-relations, contrasting an approach to Mandarin argument structure using a projection hierarchy (Li 2014) with one using a feature hierarchy (Larson 2014).
- A feature hierarchy approach appears to have some benefits including:
  - a clearer account of projection.
  - an account of argument inversions that avoids Minimality violations.
  - potentially better compatibility with θ-role hierarchies proposed eslsewhere.
- We briefly discussed how a feature hierarchy approach to other domains, including adjectival modification and the structure of the left periphery.

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