



# On the nature of FormSet

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## Strong Minimalist Thesis (SMT)

- **Maximal operational simplicity** is not only desirable wrt. the theory
- It's a necessity (for plausible evolution)
- It's a necessity (for biological computation: slow brain)



# Merge

- Maximal simplicity doesn't necessarily mean "free" or fewer constraints (e.g. free Merge)
- Simple could be limiting options
- *I-language is basically a thought-generating system* (Chomsky MC)
- Following *Duality of Semantics*, there's a division of labor:
  - External Merge (EM): form  $\theta$ -configurations
  - Internal Merge (IM): *for other things*
- Displacement
  - IM: Q-formation, Focus etc.
  - (Chomsky) EXT: VP-fronting, Rightwards movement
  - **\*IM**: verbal head movement: **unformulable** (must be at EXT)
  - linear adjacency constraints cannot be expressed here either

EM/IM must be defined  
not to explode search  
space (**Minimal Yield**),  
*computational efficiency*

# Merge

also, by the 3<sup>rd</sup> Factor  
*(horrible combinatorics)*



- Operational Simplicity: Merge can't be free
  - No record of Merge is kept (**Markovian**)
    - "a paper trail" would be a **memory device**  
(Merge is memory-free)
    - *even Merge itself can't peek at prior Merges*  
(*never mind outsiders to Merge*)
  - also, Merge can't peek at relations computed at INT:
    - e.g. Labeling (for INT to decode structure, EXT),
    - FormCopy (affects EXT), *etc.*
  - **Oblivious Merge:**
    - Merge probing cannot refer to a Label (*maybe probing is done later*)



# Merge

- Can't tell if structure is built by IM or EM
  - No Tampering with Merge inputs or output  
(*Tampering compromises maximal simplicity*)
  - Note: feature valuation doesn't count as Tampering
  - Sets, i.e. *phrases*, have no room for extra baggage (**memory**)
  - e.g. Labels or IM/EM-feature ( $\therefore$  Labels computed at INT/EXT)
- Duality would be nice, but cannot be detected (*or enforced*)
  - $\therefore$  irreducible
- Caveat:
  - we will need to distinguish output of FormSet (a set) from Merge  
(*also a set*) as *different conditions apply*



# Theta-aware Merge

- Chomsky (p.c.):
  - Well, there are no marking for IM vs. EM.
  - INT reads the computed structure and determines how to interpret identical inscriptions.
  - **That's true, but it doesn't mean that IM can't observe theta theory (and duality ...), crashing and hence cancelling the preferred derivation.**
  - **Theta positions are detectable everywhere.**
- [T] **All relations and structure-building operations (SBO) are thought-related, with semantic properties interpreted at CI. (Chomsky MC)**
- Merge is  $\theta$ -aware &  $\theta$ -driven:
  - EM builds  $\theta$ -configurations efficiently  
(*as quickly and simple as possible*)

# Theta-aware Merge



- Efficiently **as possible**:
  - $\{XP, \{v^*, \{R, XP\}\}\}$  most efficiently built by IM, but **banned** by Duality
  - cannot dispense with Duality
  - External Merge (EM): select X, Y from WS
  - *arguably* more efficient to select X twice
  - But we don't see  $\{X, X\}$  in language (*same X*)
  - Don't see Agree(X, X) either
  - Assumption: X and Y are distinct WS elements
  - Chomsky (p.c.): **one possibility might be Moro's analysis of copula, which derives "I am I/me" from  $\{be, \{I, I\}\}$ .**



# Merge and FormSet

- Example:

- 1) (a) {like, Mary}                      predicative/substantive  
      (b) {narrow, hallway}              EM: predicate-argument (AP)  
      (c) {long, hallway}                *suppose each also in WS*  
      (d) {dark, hallway}

- FormSet ( $\{\dots\}$ ,  $n \geq 2$ ) (Chomsky *GK*):

- 2)  $\{\{\text{long, hallway}\}, \{\text{narrow, hallway}\}, \{\text{dark, hallway}\}\}$

- Need a nominal to head the NP:

- 3) {hallway,  $\{\{\text{long, hallway}\}, \{\text{narrow, hallway}\}, \{\text{dark, hallway}\}\}$ }
- 4) *a long, narrow, (and) dark hallway*              (*det PM* (Oishi, 2015))



# The Determiner



- Chomsky (p.c.):
  - **Is this External Merge?**
  - **We're just ignoring functional elements, stick them in wherever you want.**
  - **And, of course, you know there's lots of things to say about them, so why does the definite article appear before the noun?**
  - **In fact, does the definite article even apply to the noun?**
  - **Maybe the definite article's a feature of the noun phrase.**
  - **Like in Semitic, for example, it's just distributed among the elements of the noun phrase.**
- (Rubenstein 2005):
  - 5) *hay-yeled haz-ze*  
'this child'
  - **attributive adjectives must agree in definiteness; and predicative adjectives are indicated syntactically, by the lack of an article in conjunction with a definite noun.**



# FormSet

- Assume FormSet is generally available to computation
  - Note:  $n = 2$  not same as binary Merge due to different conditions
  - Note:  $n = 1$ ? a logical possibility not available to Merge, arithmetic
- Simplicity:
  - members must be a coherent of set of syntactic objects
  - members must obey some parallelism requirement for INT and wrt. Merge
- Example
  - 6) (a)  $\{\{\text{long, hallway}\}, \{\text{narrow, hallway}\}, \{\text{dark, hallway}\}\}$
  - (b)  $\{\text{hallway}, \{\{\text{long, hallway}\}, \{\text{narrow, hallway}\}, \{\text{dark, hallway}\}\}\}$
  - operate in unison: IM one, same Merge ATB similarly



# FormSet

- Chomsky GK (pg. 31):
  - unbounded unstructured sequences (UUS's)
  - 7) *John, Bill, my friends, the actor who won the Oscar, ... ran, danced, took a vacation (respectively)*
- FormSet ( $\{\dots\}$ ):
  - 8) (a)  $S_1 = \{\text{John, Bill, my friends, the actor who won the Oscar}\}$
  - (b)  $S_2 = \{\text{ran, danced, took a vacation}\}$
  - Members of  $S_1$ : referential similarity (but not NUM)
  - Members of  $S_2$ : predicatehood
  - $S_1$  and  $S_2$  can have distinct cardinality (Chomsky GK fn. 47)



# UUS: Relative clause stacking

Example:

9) *the student who lives here who studies English whom I know*

FormSet applies to:

10) (a) {student, {who {~~student~~, {lives here}}}}

(b) {student, {who, {~~student~~, {studies English}}}}

(c) {student, {who, {I, {know, ~~student~~}}}}

- relative CPs need not be identical (Williams, 1978)

Optionally spelling out as:

11) *the student who lives here, who studies English **and** whom I know*

# UUS: Relative clause stacking



[animation not visible in PDF version]

here!D

Initial SO is head of stream :**Operation**

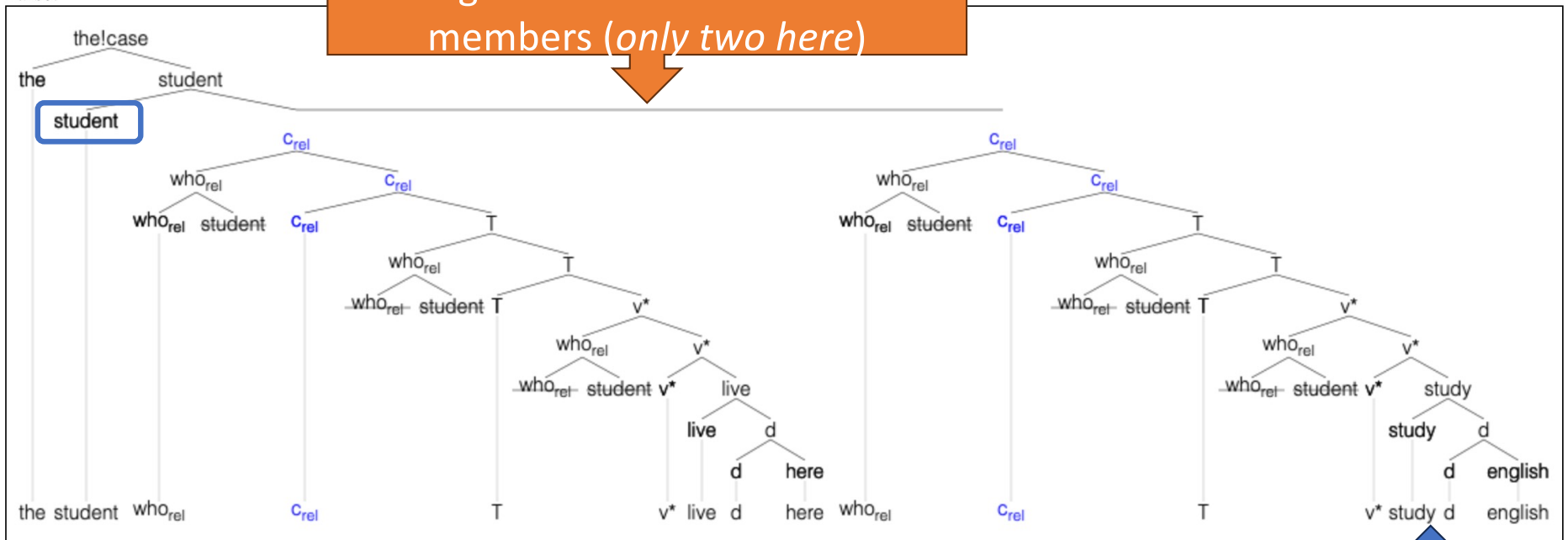
[[d!case!N],[live],[v\*!phi],[[student!D],[who\_rel!case!N]],[T!phi],[c\_rel!rel!T!phi]] :**Stream**

# UUS: Relative clause stacking



Parse:

straight line connects FormSet members (*only two here*)



Spell-out:

- the student who -s live -acc here who -s study -acc English (after morpheme realization)
- the student who live -s here -acc who study -s English -acc (after affix-hop)
- the student who live -s here -acc who study -s English -acc (after morpheme realization, stage 2)
- the student who lives here who studies English

*old computer program: DP theory*



# UUS: Relative clause stacking

- Relative clause stacking parallel to PP stacking (Chomsky GK):
  - 12) (a) *John lived on a farm with his family*  
(b) *John lived on a farm **and** with his family*
- IM in unison, targets subject/object:
  - 13) (a) *Which book did John buy and read?*  
(b) *which book did John buy ~~which book~~ and read ~~which book~~*  
(c)  $\{\{\text{John}, \{v^*, \{\text{buy}, \text{which book}\}\}\}, \{\text{John}, \{v^*, \{\text{read}, \text{which book}\}\}\}\}$
  - 14) (a) *John arrived **and** met Bill*  
(b)  $\{\{v, \{\text{arrive}, \text{John}\}, \{\text{John}, \{v^*, \{\text{meet}, \text{Bill}\}\}\}\}$

# Output of FormSet and the target of IM



- Identical inscription target requirement (Williams 1978):
  - 15) (a) \*Who *and* when did John see and ignore him?  
(b) {{John, {v\*, {see, who}}}, {{John, {v\*, {ignore, him}}}}, when}}
- FormSet :
  - 16) (a) *When and where did you see her?*  
(b) {C<sub>Q</sub>, {you, {INFL, {{you, {v\*, {see, her}}}}, {when, where}}}}



# Adjectival and Predicative Noun Phrases



## Example:

17) (a) *the politician is greedy and a charlatan*

(b) {politician, {be, {{greedy, politician}, {charlatan, politician}}}}

## Similarly:

18) (a) {hallway, {{long, hallway}, {narrow, hallway}, {dark, hallway}}}

(b) *the hallway is long, narrow and dark*

(c) *the long, dark and narrow hallway*

- (Di Scullo 2022) complex cardinals

19) (a) *two hundred and two* (additive complex)

(b) {two hundred, two}



# FormSet: Agree

- Given the **NTC**, how does S-V Agreement or Case assignment work?
- **phrases don't have features**: (Minimal) Search (must) find heads only
- **a big question: do these things happen in Merge Syntax or at the interface?**
- Examples:

- 20) a. *John, Bill, and the actor who won the Oscar are taking a vacation*  
b.  $S = \{\text{John, Bill, the actor who won the Oscar}\}$
- NUM PL can't be found in set S

- 21) (a) *John believes*  $\left\{ \begin{array}{l} \text{you and me} \\ \text{me and you} \\ \text{? I and you} \\ \text{you and I} \end{array} \right\}$  *are going to the movies*
- (b)  $\{\text{you, I}\}$

- NUM PL intrinsic property of  $\{\dots\}$
- Possessives: *yours and mine / mine and yours*
- Case is not relevant for Raising to Object?



# FormSet: Agree

- D-N Agreement:

- 22) (a) *this/\*these man and woman* {man, woman}
- (b) *\*this/these men and women* {men, women}
- (c) *\*this/\*these man and women* {man, women}
- (d) *\*this/\*these women and man*
- (e) *this man and these women* {this man, these women}

- Agree **must** operate in unison across FormSet members
- Maybe D-N Agree computed at a different stage than S-V Agree?



# Noun Phrase Formation

## Recap:

- 23) (a) {dark, hallway} EM: predicative-substantive  
(b) {{dark, hallway}, hallway} Nominal head needed  
(c) a {{dark, hallway}, hallway} Det

## Unaccusative:

- 24) (a) {arrive, train} EM: predicative-substantive  
(b) {{arrive, train}, train} Nominal head needed
- {arrive, train} must be EXT as an adjectival  
(c) *the arrived train / the train arrived*
- (Radford 2009)
- 25) (a) *the recently arrived train is the delayed 8:28 for London Euston*  
(b) *the train arrived (at platform 4) is the delayed 8:28 for London Euston*
- (Quirk et al. 1972):
- 26) (a) *the visible stars / the stars visible* (INT: "individual"/stage level predicate)  
(b) *the navigable river / the only river navigable during a drought*



# Noun Phrase Formation

- Causative/inchoative verb *change*:

26) (a) {change, man}

EM: predicate-argument

(b) {prt, {change, man}}

prt: passive particle

(c) {{prt, {change, ~~man~~}}, man}

Nominal head needed

- EXT prt-*change*-~~man~~ as *changed*

(d) A *changed* man

(e) A *broken* man



# Noun Phrase Formation

Radford (2009): doesn't apply to transitives and unergatives:

- 27) (a) \*The man *committed* suicide was a neighbour of mine
- (b) \*The thief *stolen* the jewels was never captured
- (c) \*The man *overdosed* was Joe Doe
- (d) \*The *yawned* student eventually fell asleep in class

Transitive predicate *steal*:

- 28) (a) {thief, {v\*, {steal, the jewels}}}
- (b) {{~~thief~~, {v\*, {steal, the jewels}}}, thief}
- can't EXT *v\*-steal-the-jewels* adjectivally
- (c) \**The thief stolen the jewels* (cf. *the thief-stolen jewels*)

predicate-arguments

Nominal head needed



## Secondary Predication and FormSet

Both are okay in English:

- 29) (a) *paint green the red wall* (resultative)
- (b) *paint the red wall green*

• FormSet doesn't seem to work:

- 30) (a) {red, wall} predicate-argument
- (b) {green, wall}
- (c) {{red, ~~wall~~}, wall} Nominal head needed
- (d) {paint, *the* {{red, ~~wall~~}, wall}}
- (e) {Peter, {v\*, {paint, *the* {{red, ~~wall~~}, wall}}}}
- (f) {{Peter, {v\*, {paint, *the* {{red, ~~wall~~}, wall}}}}, {green, wall}}

• But:

- (g) {paint, {green, {the, {{red, wall}, wall}}}} (compound predicate *paint green*)