

Minimal Search

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Why study Search?

- Search applies everywhere
- *Structural dependencies* all involve search, e.g.
 - (1) an adverb must find a verb to modify,
 - (2) an anaphor an antecedent,
 - (3) EXT economy relies on structurally identical inscriptions, and
 - (4) head INFL _{ϕ} identifies a θ -relevant item.
- SMT: want the simplest formulation of **Minimal Search (MS)**. Chomsky argues there are no exceptions.
 - e.g. inputs to Merge also obey **MS**.
 - *complexity of Search*, i.e. what it can find, directly affects the complexity of human language.

Minimal Search (**MS**) and ...

1. ... External Merge (**EM**)
2. ... Internal Merge (**IM**)
3. **MS** rules out: *Principle of Minimal Compliance, Derivation-by-Phase probe-goal, Equidistance, etc.*
4. ... INFL ϕ
5. Does Spec-INFL ϕ exist?
6. ... Modification
7. ... EXT
8. ... FormSet
9. ... Phases

SMT

- Simplify **I-Language**:
 - simplicity of mechanism is needed (*evolutionary plausibility*)
 - computational efficiency is needed (*slow brain*)
 - simplicity is possible? (*Miracle Creed*)
- **Not part of core I-Language**:
 - language variation/parameterization, e.g. *word order*
 - acquisition: e.g. *words, variation in word order, surface subject*
- I-Language/E-Language divide:
 - could have a **well-formed thought** but **not** (directly) externalizable
- **Strong**: *all linguistic phenomena can be accounted for*

(Simplest) Merge

- **Basic Property** of I-Language: *structural dependency*
 - *not linear order!* (surprising: even simpler)

- **SMT:** INT/EXT: $\wedge \{C, \{train_a, \{INFL_v, \{v_{arrive:past}, \{arrive_\theta, train_a\}\}\}\}\}$

- what is the simplest mechanism that results in structure?

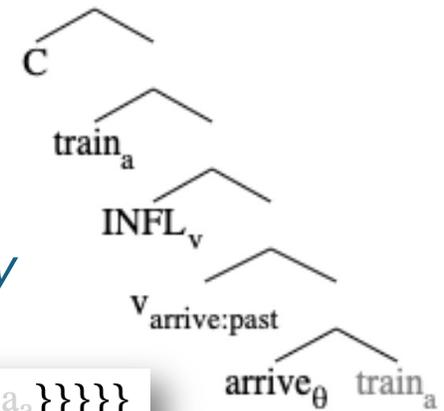
- (Mathematical) **Merge:**

- two items X and Y (*binary*)
- create {X, Y} (*set: no order*)
- **recurse:** *Merge can feed Merge (WS)*
- *no embellishments!*

(Marcoli et al. 2025)

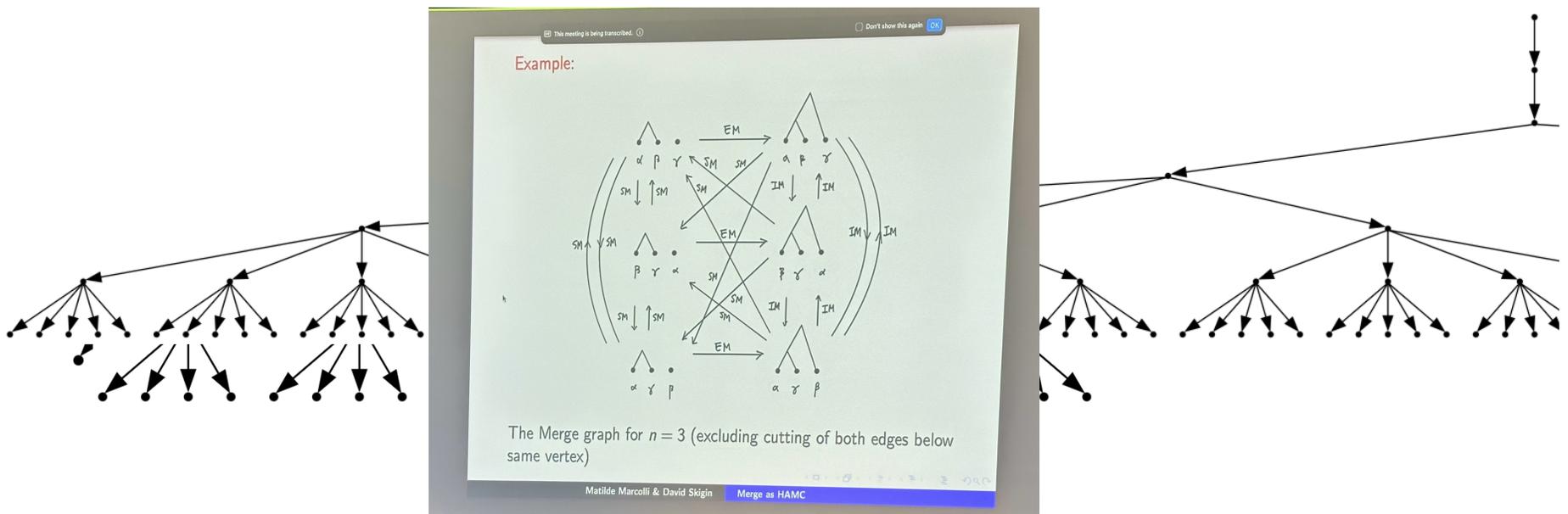
non-recursive precursors?

- Core-Merge (Fujita 2014)
- Conjoin (Progovac 2015)



Workspace (WS)

- **IM WS** computation space (*zoomed out*)



Workspace (WS)

Let's see (green: one structure, either total or partial ordering; blue: not one structure):

WS	Accessibility	
1. a b c	a b c	(only EM is possible from #1) ✓
2. {a, b} c	a=b c	EM from #1 ✓
3. a {b, c}	a b=c	EM from #1 ✓
4. {a, c} b	a=c b	EM from #1 ✓
5. {{a, b}, c}	c{a=b}	EM from #2 ✓ (only IM is possible from here)
6. {{a, b}, b} c	b{a c}	IM from #2 ✓
7. {{a, b}, a} c	a{b c}	IM from #2 ✓ (bfactor from #2 is 3; 1 EM, 2 IM)
8. {a, {b, c}}	a{b=c}	EM from #3 ✓
9. a {{{b, c}, b}}	a b{c}	IM from #3 ✓
10. a {{{b, c}, c}}	a c{b}	IM from #3 ✓ (bfactor from #3 is 3; 1 EM, 2 IM)
11. {{a, c}, b}	b{a=c}	EM from #4 ✓
12. {{{c}, a} b}	a{c b}	IM from #4 ✓
13. {{a, c}, c} b	c{a b}	IM from #4 ✓ (bfactor from #4 is 3; 1 EM, 2 IM)
14. {{{a, b}, c}, c}	c{a=b}	IM from #5
15. {{{a, b}, c}, b}	b{c a}	IM from #5
16. {{{a, b}, c}, a}	a{c b}	IM from #5 (bfactor from #5 is 3; 3 IM)
17. {{{a, b}, b}, c}	c{b a}	EM from #6
18. {{{a, b}, b}, a}	a{b c}	IM from #6
19. {{{a, b}, b}, b}	b{a c}	IM from #6 (bfactor from #6 is 3; 1 EM, 2 IM)
20. {{{a, b}, a}, c}	c{a b}	EM from #7
21. {{{a, b}, a}, b}	b{a c}	IM from #7
22. {{{a, b}, a}, a}	a{b c}	IM from #7 (bfactor from #7 is 3; 1 EM, 2 IM)
23. {{a, {b, c}}, c}	c{a b}	EM from #8
24. {{a, {b, c}}, b}	b{a c}	IM from #8
25. {{a, {b, c}}, a}	a{b=c}	EM from #8 (bfactor from #8 is 3; 3 IM)
26. {a, {{{c}, b}}	a{b{c}}	EM from #9
27. a {{{{c}, b}, c}}	a c{b}	IM from #9
28. a {{{{c}, b}, b}}	a b{c}	IM from #9 (bfactor from #9 is 3; 1 EM, 2 IM)
29. {a, {{{b, c}}}	a{c{b}}	EM from #10
30. a {{{{b, c}, c}}	a b{c}	IM from #10
31. a {{{{b, c}, c}, c}}	a c{b}	IM from #10 (bfactor from #10 is 3; 1 EM, 2 IM)
32. {{{{a, c}, b}, a}	a{b{c}}	IM from #11
33. {{{{a, c}, b}, c}	c{b{a}}	IM from #11
34. {{{{a, c}, b}, b}	b{a{c}}	IM from #11 (bfactor from #11 is 3; 3 IM)
35. {{{{a, c}, a}, b}	b{a{c}}	EM from #12
36. {{{{a, c}, a}, c}	c{a b}	IM from #12
37. {{{{a, c}, a}, a}	a{c b}	IM from #12 (bfactor from #12 is 3; 1 EM, 2 IM)
38. {{{{a, c}, c}, b}	b{c{a}}	EM from #13
39. {{{{a, c}, c}, a}	a{c b}	IM from #13
40. {{{{a, c}, c}, c}	c{a b}	IM from #13 (bfactor from #13 is 3; 1 EM, 2 IM)

WS: multiple structures (unconverged)

a b c #1

a=b c #2 a b=c #3 a=c b #4

b{a c} #6	#19	#21
a{b c} #7	#18	#22
a b{c} #9	#28	#30
a c{b} #10	#27	#31
a{c b} #12	#39	#37
c{a b} #13	#36	#40

WS: single structure

Partial order:

c{a=b} #5	#14
a{b=c} #8	#25
b{a=c} #11	#34

Total order:

a{b{c} #26	#32
a{c{b} #16	#29
c{a{b} #20	#23
c{b{a} #17	#33
b{a{c} #24	#35
b{c{a} #15	#38

Another example:
 c{b{a #17 #33
 #17 {{{a, b}, b}, c} c{b{a EM from #6 {{a, b}, b} c, IM from #2 {a, b} c, EM from #1 a b c
 #33 {{{a, c}, b}, c} c{b{a IM from #11 {{a, c}, b}, EM from #4 {a, c} b, EM from #1 a b c

Another example:
 c{a{b #20 #23
 #20 {{{a, b}, a}, c} c{a{b EM from #7 {{a, b}, a} c, IM from #2 #2 {a, b} c, EM from #1 a b c
 #23 {{a, {b, c}}, c} c{a{b IM from #8 {a, {b, c}}, EM from #3 a {b, c}, EM from #1 a b c

Question: do we need deep IM?
 Put another way, is Accessibility all we care about?

Relativization
 {EA, {v, {R, IA}}} (θ-configuration)
 {EA, {C_{rel}, {INFL, {EA, {v, {R, IA}}}}} (subject -EA - relative clause)
 {IA, {C_{rel}, {INFL, {EA, {v, {R, IA}}}}} (object -IA - relative clause)
 Assume IM is the relevant mechanism.

Nominalization of Adjectival phrase (non-deep):
 {IA, {A, IA}} e.g. narrow corridor as a NP

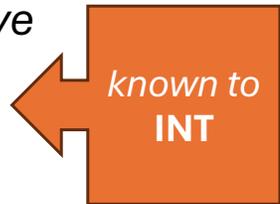
Workspace (WS)

- **EM** is more complex than **IM** (Chomsky)
- *but required by **FL** for thought construction*

- For I-Language
 - **LEX** contains heads
 - **IM** is basic, *term-of* is the simplest relation

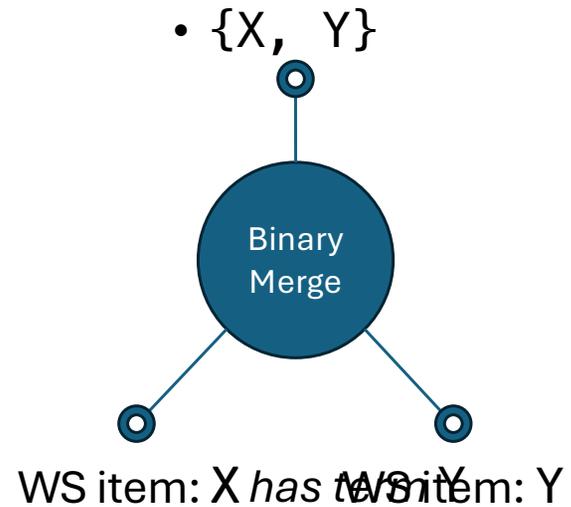
- Need also some θ -configurations:

- $\{v, \{R, IA_{\theta}\}\}$ *unaccusative*
- $\{EA_{\theta}, \{v, \{R, IA_{\theta}\}\}\}$ *transitive*
- $\{EA_{\theta}, \{v, R\}\}$ *unergative*



- Note:

- assume v & R are (**LEX**) heads: introduce θ
- see also *serial verb constructions (SVC)* later
- EA & IA could be complex objects

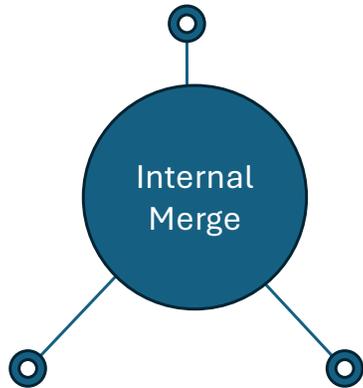


Note: assume X & Y are distinct, *i.e. can't draw the same item twice*

Duality of Semantics

Earlier theory: $\{X_i, \{t_i, Y\}\}$ vs. $\{X, \{X, Y\}\}$

• $\{X, Y\}$



WS item: X has a term Y

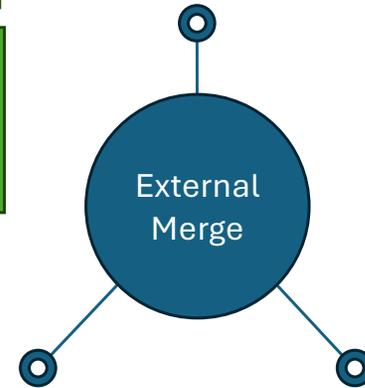
Overlap?

- $\{X, \{X, Y\}\}$
1. WS: $X Y$
 2. WS': $\{X, Y\}$
 3. WS'': $\{X, \{X, Y\}\}$
- or
1. WS: $X Y X$
 2. WS': $\{X, Y\} X$
 3. WS'': $\{X, \{X, Y\}\}$

the copy/repetition problem

Less complex: always preferred

• $\{X, Y\}$



WS item: X WS item: Y

• IM for discourse/information functions

• EM for θ -configurations

MS and External Merge

MS applied to External Merge (EM)

- Search:
 - domain: Workspace (WS),
 - target: *WS item (twice)*
- Formally: find $X, Y \in WS$, form $\{X, Y\}$
- **MS**: *can't search inside X (or Y), must stop at WS item.*
 - *EM': form $\{x, Y\}$ st. x term-of X , $X, Y \in WS$, or
 - *EM'': form $\{x, y\}$ st. x term-of X , y term-of Y , $X, Y \in WS$
- **LSC**:
 - *theta structures $\{X, Y\}$, where one member receives and the other assigns a theta role, an LSC (Chomsky 2024)*

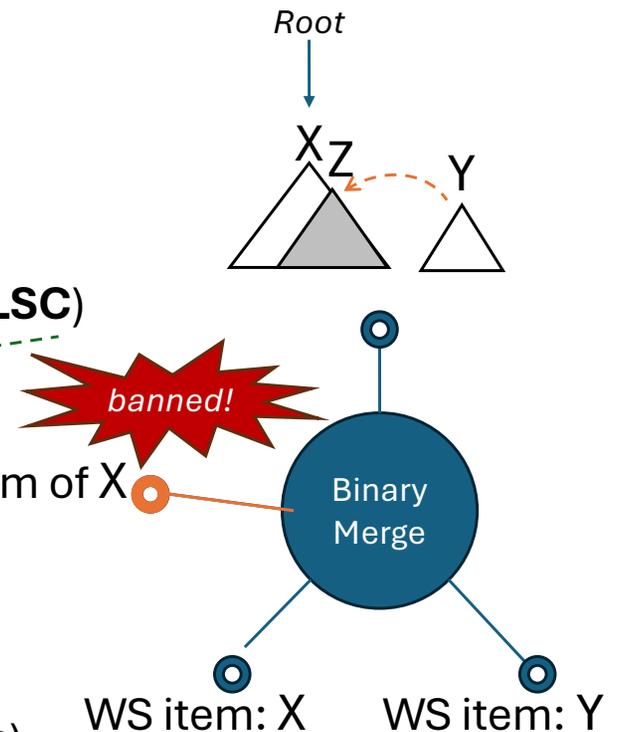
MS and Internal Merge

MS applied to Internal Merge (**IM**)

- Search
 - domain: step 1) *WS*, step 2) *WS item*
 - target: step 1) *WS item*, step 2) *term-of WS item*
- Basically:
 - 1) find $X \in WS$,
 - 2) find Y term-of X
 - 3) form $\{X, Y\}$
- **LSC**:
 - in 2), target θ -relevant item

Consequences

- **Merge** customized for I-Language use
 - **Duality: Language (Faculty)-Specific Condition (LSC)**
 - **Minimal Search (LSC)**
- **Design Principles:**
 - *baked/designed-in* **Extension Condition** (root-only)
 - *no tuck-in / splicing / no verbal head movement*
 - **Non-Tampering Condition (NTC)**
 - *deletion / turning something into a trace*
 - **Inclusiveness** (no invention during derivation)
 - *coindexation / γ -mark / assign a feature*
- **Merge** builds θ -configurations (*propositional domain*)
 - then transitions to the *clausal domain* via INFL_ϕ
 - then adds heads like C/C₀, Topic, Focus etc.
 - *probe with language-particular spellout* **EXT**



Consequences 2

- No circumvention of these principles
 - e.g. **Inclusiveness** bans indexing
 - work-around: insert *pre-indexed* heads, e.g. X_i X_i , into the WS
- Requires memory/marking:
 - *Principle of Minimal Compliance (PMC)* (Richards 1998)

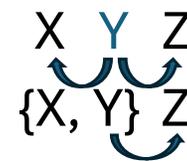
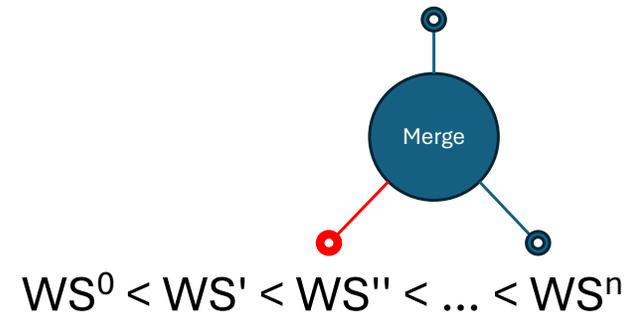
For any dependency D that obeys constraint C, any elements that are relevant for determining whether D obeys C can be ignored for the rest of the derivation for purposes of determining whether any other dependency D' obeys C.

Consequences 3

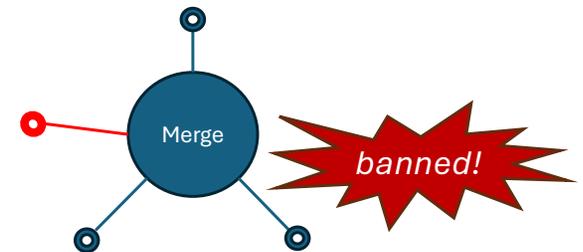
- **Idea:** check off something, it's exempt (motivation: *economy*)
- **SMT Problem:** need to mark something as exempt
 - *requires memory*
- Example (Richards 1998):
 - *Dutch: all anaphors with a clausemate binder must be zichzelf*
 - *Henk wees *zich* aan mij toe *(Henk, zich)
 - Henk wees mij aan *zichzelf* toe (Henk, zichzelf)
 - Henk wees *zich* aan *zichzelf* toe (Henk, zichzelf) mark Henk,
then ignore violation *(Henk, zich), also a timing issue
 - **Key:** toe-wees = 3.sg.past of *toewijzen* (assign), separable prefix toe-

Consequences 4

- Plain Merge means:
 - *no feature movement / inheritance*
 - *no memory devices/scratchpads*
 - *no WS history: **Markovian Assumption***
- More complex forms of Merge:
 - *useful perhaps, but also out!*
 - parallel Merge, sideways Merge
- **Minimal Yield (MY)** is a **design principle**
 - *not a **filter** on Merge output*



* $\{X, Y\} \{Z, Y\}$
*violates
Minimal Search*



Minimal Search (MS)

Chomsky (2021) (3) d. carefully, the mechanic who fixed the car packed his tools

- Examples of structural relations (*all must obey MS*):
 - an adverb must **find** a verb to modify
 - *but cannot use the simplest computation: pick linearly closest verb*
 - INFL_ϕ must **find** θ -relevant item (*with ϕ for EXT*) (*Agree*)
 - θ -relevant item: *EA for transitives, IA for unaccusatives*
- Merge must also obey MS
- Formulate the **find** operation:
 - **IM** brings the *term-of* relation
 - **EM** brings the *sister-of* relation
 - **c-command** = *sister-of* + *term-of* (**Phase**-local; related: **WS** partitioning)
 - **No embellishments!**



Minimal Search (MS) 2

- **Search:** *look for something, e.g. an identical inscription*
 - in **structure:** *for free c-command* (basic: *sister-of + term-of*)
 - in **WS:** *for free member-of* (but not *inside*)
- **MS:**
 - *1st thing you find, you have to **stop*** (3rd Factor)
 - *How to know we pick A or B? Answer: you never get to see B*
- **Minimal Yield (MY):**
 - *Merge should not explode the WS search space* (Design Principle)
- **Contrast with sorting (finding optimal):**
 - sort requires comparisons
 - compare candidates
 - must find/generate (multiple) candidates (3rd Factor)
 - *no optimality-theoretic accounts?*



Minimal Search (MS) rules out

Rules out *Derivation by Phase Model* (Chomsky 2001)

- **Multi/partial-probing:**

- T_ϕ probes EXPL (incomplete- ϕ) and R-expr (complete- ϕ)

- **Example:**

- *there is likely to arrive a man*
- $\{T_\phi, \{v, \{\text{likely}, \{\text{EXPL}, \{v, \{\text{arrive}_\theta, \text{man}_a\}\}\}\}\}\}$
- identify relations:
 - (T_ϕ, EXPL)
 - (T_ϕ, man_a)

Minimal Search (MS) rules out

- Rules out *equidistance* (Chomsky 1995)
- Chomsky (p.c.):
 - *Right now, I don't see any reason why **any operation** should be exempt from MS.*
 - *If so, MS can include structural identity checking – which is its basic intuitive content.*

MS and INFL_ϕ

- Transition (from the propositional domain):
 - to the *clausal domain* involves Merge of INFL_ϕ (and C)
 - INFL_ϕ triggers *search* for a θ -relevant item
- Only search possible is **MS**
 - $\{\text{INFL}_\phi, \{\text{EA}, \{v_\theta, \{\text{R}_\theta, \text{IA}\}\}\}\}$
 - ϕ -relation (INFL_ϕ , EA)
 - EA is found, IA is never seen.

INFL_φ and EXT

- At INFL_φ EXT, verb agreement obtains + range of spell-out options are possible for the found item, e.g. in English:
 - a. He_φ *repair/repairs_φ the cars (left edge INFL; EA Agree)
 - b. Many soldiers_φ *has/have_φ arrived (left edge INFL; IA Agree)
 - c. There *has/have_φ arrived many soldiers_φ (no edge spellout; IA Agree)
 - d. We should do this again, said_φ John_φ (right edge INFL)
 - e. In the distance stands_φ a mountain range_φ (no edge spellout; EA Agree)
 - f. In this cave was_φ found an ancient artifact_φ (no edge spellout; IA Agree)
 - g. There entered_φ the room a strange man_φ (right edge of INFL: TEC)
 - h. There hit_φ the stands a new journal_φ *ditto*. Kayne in (Chomsky, 2001)

(c,g-h) EXPL insertion. (*Not available for all languages.*)

(d) quotative inversion.

(f-g) locative inversion.

(d,g-h) right edge of INFL_φP spellout. (*Spanish has subject-verb inversion.*)

Do we have spec-INFL_ϕ?

(Chomsky 2021) notes that there are semantic, i.e. non-stylistic, effects, if argument spellout is at the left edge of INFL

- a. *There* is a flaw in my argument/bottle
 - b. *A flaw is in my argument
 - c. A flaw is in my bottle
 - d. {{INFL_ϕ, {v, {R, IA_ϕ}}}}, in my argument/bottle}
- *there*-existentials generally signal new information, which interacts with *definiteness* (Milsark 1974)
 - e. *there* arose a/**the* storm
 - f. a/*the* storm arose (last night)

Language Variation

- However, this kind of information will be coded differently depending on particular language.
- suggests this also belong to EXT (*directly signaling C-I interface*)
- Chinese has no expletive *there*; instead, signal is encoded via word order variation (Wu 2020, *citing earlier work*).
 - a. 老师 来了
teacher come.PERF (old)
'*the teacher came*'
 - b. 来了 一个 老师
come.PERF one.CLF teacher (new) cf. *那个老师 / that.CLF teacher
'*there came a teacher*'

Language Variation

- In Spanish, the presence of impersonal verb *haber* (*have*) signals the *there*-existential:

a. *un* policía está aquí / *hay un* policía aquí (Tubens, p.c.)

a policeman is here there.is a policeman here
'a policeman is here' / 'there is a policeman here'

b. (**había*) surgió *una* tormenta

there.was arose a storm
'a storm arose'

MS and Modification

The adverb *carefully* seeks a verb in (a) (Chomsky, 2021). Sentence is structurally ambiguous.

- a. the mechanic who fixed the car *carefully* packed his tools
- b. relation (carefully, fix), right edge vP spellout, or
- c. relation (carefully, pack), left edge vP spellout

MS applies to compute relations (b–c) from (d–e), respectively.

- d. {mechanic, {v_θ, {*carefully*, {fix_θ, car}}}}, or
- e. {mechanic who ..., {v_θ, {*carefully*, {pack_θ, his tools}}}}

(b–c) can also be spelled out as unambiguous (f–g), respectively.

- f. the mechanic who *carefully* fixed the car packed his tools
- g. the mechanic who fixed the car packed his tools *carefully*

Notes:

- adverb *carefully* appears in a sub-**WS** in (d), but in the main/matrix **WS** in (e)
- structures (d–e) assume θ -theory has primacy: {R_θ, IA} must be built first
- adverbs not part of θ -Merge, but **MS** still generally applies (no *Pair Merge*)

MS and EXT

- **Economy of spellout applies at EXT**

- MS within a **Phase**
- e.g. for c-commanded **structurally identical inscriptions**, only the highest occurrence is pronounced (in English).

In (a) below, Phase = { ... }, see fn.30 in (Chomsky 2024). (TNS, as part of v, not shown.)

- a. {INFL_φ, {John, {v_θ, {see_θ, John}}}} ⇒ *John saw John, not John saw*
- b. {INFL_φ, {v, {arrive, John}}}} ⇒ *John arrived*
- c. {INFL_φ, {most people, {v_θ, {try, {v, {honest, most people}}}}}} ⇒ *Most people try to be honest*

For (c), copy relation (most people, ~~most people~~) computed by MS and used at EXT.

MS and FormSet

- *The only other permissible relation is unbounded set, with the **SBO** FormSet (**FS**) (Chomsky 2024)*

Question: what's different about the fundamental *Structure Building Operation* (**SBO**) **FS**, cf. Merge?

Answer: they have different conditions for formation and use, no overlap

For FS, the minimal assumptions (Fong & Oishi 2025):

1. Members must be a coherent set of **WS** objects
2. Members must obey some parallelism requirement for **INT**
3. **MS** applying to FormSet, all members must be treated alike

MS applies to **FS** inputs just like in the case of **EM**:

- i.e. inputs must be WS objects, not sub-objects of the WS.

FormSet

Example:

- a. John arrived *and* met Bill
- b. {v, {arrive, John}}
- c. {John, {v_θ, {meet, Bill}}}
- d. {{v, {arrive, John}}, {John, {v_θ, {meet, Bill}}}}
- e. {INFL_φ, {{v, {arrive, John}}, {John, {v_θ, {meet, Bill}}}}}

• Notes:

- (b) and (c) are *coherent WS* objects, both are θ -configurations.
- PST tense, part of v, not shown.
- **FS** applied to (b–c) produces (d), also a WS object. (Notation: FS object {...}.)
- Merge of INFL_φ triggers **MS**.
- following (3 – *previous slide*), **MS** finds the identical inscription *John* in both members.
- economy of spellout applies for (e), lower occurrences of *John* are not pronounced.

FormSet

- Example:

- a. John arrived and Sally met Bill

- b. $*\{\text{INFL}_\phi, \{\{v, \{\text{arrive, John}\}\}, \{\text{Sally}, \{v_\theta, \{\text{meet, Bill}\}\}\}\}\}$

- c. $\{\{C, \{\text{INFL}_\phi, \{v, \{\text{arrive, John}\}\}\}\}, \{C, \{\text{INFL}_\phi, \{\text{Sally}, \{v_\theta, \{\text{meet, Bill}\}\}\}\}\}\}$

- Notes:

- when MS cannot operate identically across members, as in the case of (b), the derivation crashes
 - instead, (a) is derived via (c)

FormSet

- For *serial verbs constructions* (**SVCs**), independent clausal structure, as in (a – *previous slide*), is impossible
 - e.g. in Japanese or Chinese ...
 - SVCs are monoclausal constructions with verbs that *must* share (some) argument structure
- Example:
 - a. Ken-ga Miki-o home-tatae-ta
K.-NOM M.-ACC admire-praise-PST
'Ken greatly admired Miki'
 - b. {EA, {v_θ, {{admire_θ, praise_θ}, IA}}}
- Note:
 - the two **SVC** verbs are transitive, sharing both arguments
 - in (b), **EM** of **IA** invokes **MS** for each **FS** member, a predicate, to find the identical inscription *Miki* (= **IA**) in the **WS**
 - Note that **EM** of *Ken* (=EA) does not involve **FS**

FormSet

- also possible that **SVC** verbs have independent **IAs**
- Example:
 - a. Ken-ga yoru-no mati-o sake-o nomi-arui-ta
K.-NOM night-GEN town-ACC alcohol-ACC drink-walk-PST
'Ken went bar-hopping at night'
 - b. {EA, {v_θ, {{drink_θ, sake}, {walk_θ, yoru-no mati}}}}
- Note:
 - in (a), the verbs *nomu* (*drink*) and *aruku* (*walk*) have independent IAs, *sake* (*alcohol*) and *yoru no mati*, respectively
 - but the two verbs share EA *Ken*
 - in (b), **MS** finds each **IA** independently prior to **FS**

FormSet

- Example:

a. Zhangsan zhunbei gen ni qu (Huang, 1989)

张三 准备 跟 你 去
prepare follow you go

'Z. plans to go with you'

b. {EA, {v_θ, {go, {follow_θ, IA}}}}

- Notes:

- Chinese *qu* (go) and *gen* (follow) are SVC verbs
- share an **EA** in (a)
- corresponding structure is given in (b)

MS is unbounded (not Phase-bound)

- top-down **MS**: $Y = \text{term-of}(\text{sister-of}(X))$
- bottom-up **MS**: $Y = \text{sister-of}(\text{term}^{-1}\text{-of}(X))$ (term⁻¹-of is just *dominates*)

Generally, we have a need for both top-down and bottom-up **MS**.

- So-called *each*-insertion (Chomsky 1973):

- a. The men *each* hated the *other*
- b. *Each* of the men hated the *other*
- c. The men hated *each other*
- d. *The men hated the *other*
- e. $\{\text{INFL}_\phi, \{\textit{each}, \{\textit{men}, \{v_\theta, \{\textit{hate}_\theta, \textit{other}\}\}\}\}\}$ (for (a))
- f. $\{\text{INFL}_\phi, \{\{\textit{each}, \{\textit{of}, \textit{men}\}\}, \{v_\theta, \{\textit{hate}_\theta, \textit{other}\}\}\}\}$ (for (b))

- Notes:

- *each* must quantify over *men*, *other* seeks *each*
- relation (*each*, *men*) is found by top-down **MS**, and
- relation (*each*, *other*) by bottom-up **MS**

Enlarging the domain of MS

- Following (Chomsky 2021), raising to object (of *expect*) of the embedded subject:
 - a. The *candidates each* expected the *other* to win
 - b. The *candidates* expected *each other* to win
 - c. {INFL_φ, {*each*, {*candidates*, {v_θ, {*other*, {expect_θ, ...}}}}}}
 - d. {INFL_φ, {*candidates*, {v_θ, {*each other*, {expect_θ, ...}}}}}}
- Note:
 - Search is always targeted, search initiated by *other* skips NP *candidates* in (a)

Enlarging the domain of MS

- How far does bottom-up MS go?
 - *anaphora is not generally restricted by PIC* (Chomsky 2024: fn.29)
- Lower object is not subject to raising to matrix object.
- Example:
 - a. The candidates expected to defeat *each other*
 - b. The candidates *each* expected to defeat the *other*
- Notes:
 - *other* specifically targets *each*, and
 - *each other* targets the nearest θ -relevant binder.
- Examples:
 - c. The men *each* expected the soldier to shoot the *other*
 - d. *The men expected the soldier to shoot *each other*
 - e. The men *each* saw John's pictures of the *other*
 - f. *The men saw John's pictures of *each other*
 - g. The men *each* believed and expected the sniper to try to target the *other*

Workspace (WS) 2

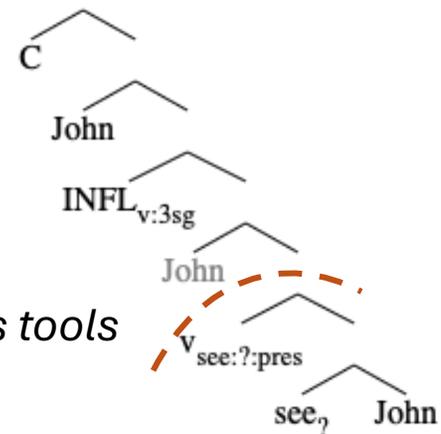
Economy of **EXT**:
in English, pronounce
only the highest copy

- **WS Partitions and Phases:**

- *John likes means the EA is in a higher Phase than the IA
- *the nice mechanic who fixed the car **carefully** packed his tools*
- WS₁: C_{rel} v fix_{PST} car who **carefully** ↷ C_{rel}P
- WS₂: C v pack_{PST} tools he mechanic nice
- or
- WS₁: C_{rel} v fix_{PST} car who ↷ C_{rel}P
- WS₂: C v pack_{PST} tools he mechanic nice **carefully**

- Note {XP, YP} generally requires WS partitioning:

- (EA) *the nice mechanic* (who ...) = XP
- EM inserts EA into matrix θ-config. {EA, {v_{PST}, {pack, {he, tools}}}}



ABBREVIATIONS/GLOSSARY

(SMT UA *Synsalon* talk)

1. {...} Non-empty set made by Merge
2. {...} Phase
3. {...} set made by FormSet
4. **1st Factor** genetic, see Third Factor
5. **2nd Factor** experience, see Third Factor
6. **3rd Factor** see Third Factor
7. **ACC** accusative Case
8. **Agree** Agreement (a relation)
9. **argument** of a predicate
10. **ATB** across-the-board
11. **Box** see **MC**
12. **C** complementizer (a head)
13. **c-command** a relation built on sister-of and term-of (set)
14. **copy** non-independent occurrence of phrase/head, see repetition
15. **E-Language** Externalized language
16. **EA** External Argument
17. **EM** External Merge
18. **EXT** Externalization (after **INT**)
19. **FL** Language Faculty (organ: biology)
20. **FS** FormSet (see **GK** and **MC**)
21. **GEN** genitive Case
22. **GK** (Chomsky 2021) in *Gengo Kenkyu* (LSJ journal)
23. **head** smallest unit (atom) in I-Language computation
24. **I-Language** contrast with E-Language
25. **IA** Internal Argument
26. **IM** Internal Merge
27. **identical inscription** structurally identical phrases
28. **INFL** Inflection (a head)
29. **LEX** Lexicon (heads & idiom chunks)
30. **OS** Object Shift
31. **INT** Interpretation (of **SOs**)
32. **LI** Lexical Item from **LEX**
33. **LSC** Language-Specific Condition
34. **M-gap** Markovian gap see **GK**
35. **MC** *The Miracle Creed and SMT* (Chomsky 2024)
36. **MS** Minimal Search
37. **MY** Minimal Yield
38. **NOM** nominative Case
39. **NTC** Non-Tampering Condition
40. **PST** Past tense (a value of **TNS**)
41. ϕ phi-features, e.g. Person, Number, (grammatical) Gender
42. **Pair Merge** not used here
43. **Parallel Merge** not part of Simplest Merge
44. **Phase** structural bound on **MS** for **EXT**
45. **phrase** structure formed by Merge, cf. head
46. **occurrence** in structure, a phrase or head may occur 1,2,3... times, see also copy and repetition
47. **SBO** structure building operation (Merge, **FS**)
48. **Sideways Merge** not part of Simplest Merge
49. **sister** sister-of (a relation: set)
50. **SMT** Strong Minimalist Thesis
51. **SO** syntactic object (built by Merge and **FS**)
52. **structure** (I-Language) structure formed by Merge
53. **R** Root (a head)
54. **repetition** independent occurrence (of phrase/head)
55. **term** term-of (a relation: set)
56. θ Theta (as in Theta Theory)
57. **Third Factor** see *Three Factors in Language Design* (Chomsky 2005)
58. **TNS** tense (a component of v)
59. **UG** Universal Grammar (a theory)
60. **UUS** Unbounded Unstructured Sequences (in **GK**)
61. v "little v " (a head), v_0 (v that introduces a θ -argument)
62. **WS** Workspace
63. **XP** some phrase (not a head)
64. **YP** some phrase (not a head)