

RELATING TO RELATIVES: THE CYCLICITY OF SIMPL

Ayesha Kidwai & Rosmin Mathew

<ayesha.kidwai@gmail.com> <rosmin@gmail.com>

Jawaharlal Nehru University

Goals: 1. To explore the corollaries of PM for the computational system:

- *Is PM just Merge?*
- *Why must it be late?*
- *How does it work in a phasal syntax?*

2. To explore TRANSFER, and its components, Spellout and SIMPL.

- *What does SIMPL do?*
- *Are these components of TRANSFER ordered vis-à-vis each other?*

3. To speculate whether PM works better than ‘adjunction’.

- *Case study: Center-embedding as a competence property*

Is PM just Merge?

PM: Chomsky (2001)

- PM captures the effects and consequences of base-generated adjunction.
- PM has the essential semantic contribution of predicate composition.
- PM applies cyclically forming the ordered pair $\langle \alpha, \beta \rangle$, α adjoined to β .
- β behaves throughout as if it were in a simple structure formed by SM.
- α is invisible to the operations of the narrow syntax.
- SIMPL is an optional component of TRANSFER converts $\langle \alpha, \beta \rangle$ to $\{\alpha, \beta\}$.

How do we retain the sense of Merge a symmetric binary extendable operation?

- Set-Merge (SM) is both External and Internal, PM is only External.
- SM serves SEM-IC for both core and edge interpretations, but PM is needed for a “core-type” interpretation – predicate composition.

Getting Merge

- SM involves Agree, but PM does not. If Set-Merge = Merge^{OP} + Agree^{REL}, then Pair-Merge = Merge^{OP} + ?^{REL}

(1) Merge

Merge is a symmetric binary operation that constructs a set $\{X, Y\}$ from two SOs, X and Y. Merge is subject to a *No Tampering Condition* (NTC): Merge cannot break up X or Y, or add new features to them; Merge is invariably “to the edge.”

(2) Agree

The binary relation Agree holds between *Probe* P and *Goal* G, which deletes uninterpretable features under Match, iff both P and G are active, and G is in the minimal search domain of P.

- *Does the ExCon restrict Merge or Agree? Given PM, which is not necessarily to the root/edge, and does not necessarily yield binary branching (Chomsky [2005b:16]: “external Merge yields n-ary constituents”), it must restrict Agree.*

(3) JustMerge

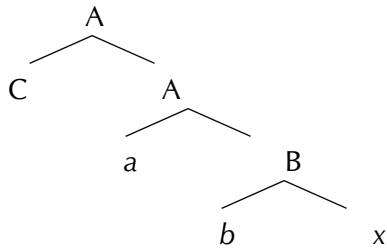
JustMerge is a symmetric binary operation that constructs a set $\{X, Y\}$ from two SOs, X and Y. Merge cannot break up X, Y, or add new features to them.

(4) *Agree (Feature sharing)*

An unvalued feature F (a *probe*) on a head H at syntactic location α (F_α) scans its command domain for another instance of F (a *goal*) at location β (F_β) with which to Agree.

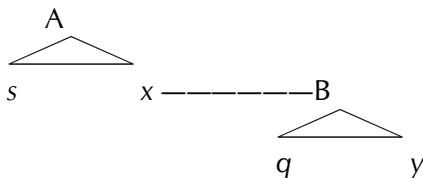
JustMerge \neq PM

(5)



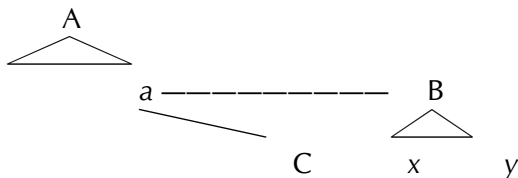
(a) JustMerge	(b) Agree
$b, x = \{b,x\}$ or $\{x,b\}$	$\rightarrow \{B\{b,x\}\}$
$a, B = \{a,B\}$ or $\{B,a\}$	$\rightarrow \{A\{a,B\}\}$
$a, C = \{a,C\}$ or $\{C,a\}$	$\rightarrow \{A\{a,C\}\}$

(6) a.



JustMerge	
(a)	$x, B = \{x,B\}$, or $\{B,x\}$
(b)	$a, C = \{a,C\}$, or $\{C,a\}$
	$a, B = \{a,B\}$, or $\{B,a\}$

b.



- The symmetry of JustMerge does not yield the asymmetry constitutive of adjunction – after all, to say that “ α is adjoined to β ” does not entail that “ β is adjoined to α ”. PM is JustMerge operating in concert with a relation, and exists to serve that part of SEM-IC that needs more than “argument structure, and everything else built out of the semantics of argument structure”.

Hinzen (2005)

- ✗ “Adjuncts are things that are ‘not needed’.
- ✗ “Adjunction, as an operation [is] more primitive than argument-taking, ...does not require the apparatus of hierarchical syntax.”
- ✗ Adjunction “has no significant syntax at all.”
- Invisibility is ‘Intelligent Design’: If embedded terms in an adjunct SO were visible to a Probe in the main predication, the interpretation(s) of secondary predication could never obtain. Invisibility, traced to the unavailability of Agree, ensures that a predicate composition semantics is never lumped together with an “argument structure vs./plus everything else” semantics.

How late is PM?

PM is slightly later than Set-Merge

- Chomsky’s insight: An SO A is Pair-Merged to SO B only after SO B has been Set-Merged into some other SO. Pair-Merge is therefore “later” than Set-Merge.

(7) he_v saw_p the [man [that John liked]]]

- Only inactive SOs (in which all feature-sharing relations are complete) may be pair-merged – otherwise, the derivation will crash after SIMPL (at PF).

But not timed...

- In a derivational workspace, multiple LAs are assembled in parallel. SOs may be related by sideward movement (Nunes 2002) through intra-arboreal Copy and Rmerge between SOs yet

to be Merged into a unique SO. To prevent the copying of non-active SOs, these OPs are “timed” to take place while both SOs contain an active feature. Relations are “across” the workspace, as well as “down the tree”.

- ✗ *Exponential growth in computationally complexity, given discrete infinity.*
- ✗ *Thrives on chronology and ‘timing’ of assembly/adjunction. Unlikely that this chronology has value for the evaluation of a phase or at the interface.*
- ✗ *No SMT motivation either - if no look-ahead, then no look-around*

(8)	LA1 = {he, saw, the, man}	LA2 = {that John liked e}
i.	SM {D} {N}; {{V}{D,N}}	SM to {CP}
ii.	PM {CP},{N}	

(9)	LA1 = {he, saw, the, man}	LA2 = {that John liked e}
i.	Don't SM (*LOOK-AHEAD)	SM to {CP}
ii.	PM {CP},{N} (*LOOK-AROUND)	
iii.	Set Merge {{V}{N,CP}}	

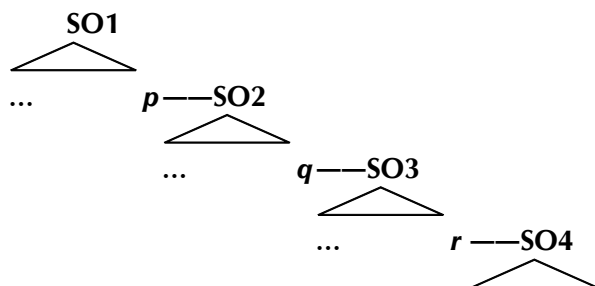
(10) **The Principle of Blinkered Independence**

{LA₁}, {LA₂}, ..., {LA_n} are computed independently to yield {SO₁}, {SO₂}, ..., {SO_n}, such that the functioning terms of {SO₁}, {SO₂}, ..., {SO_n} are drawn only from their respective LAs {LA₁}, {LA₂}, ..., {LA_n}.

Corollary: External Merge may access {SO₁}, {SO₂}, ..., {SO_n} only after their respective LAs, {LA₁}, {LA₂}, ..., {LA_n} are exhausted.

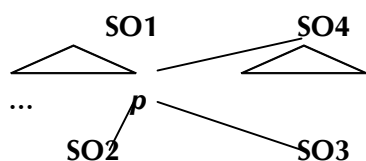
An example: Multiple Relatives in English

- (11) This is the rat that ate the malt that lay in the house that Jack saw
 a. (rat that ate the malt) (malt that lay in the house) (house that Jack saw).



This is (the cat that killed (the rat that ate (the malt that lay in (the house that Jack built)))) [Frank 2005]

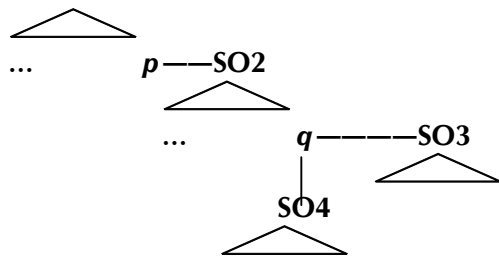
- b. (rat that ate the malt) (rat that lay in the house) (rat that Jack saw).



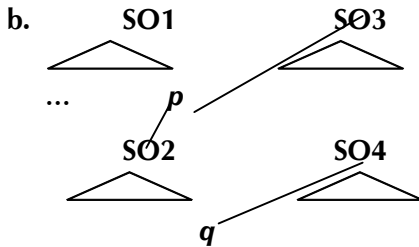
(This is the cat) (that killed the rat) (that ate the malt) (that lay in the house) (that Jack built) [Frank 2005]

- c. (rat that ate the malt) (malt that lay in the house) (malt that Jack saw).

SO1



(12) a. *(rat that ate the malt) (rat that lay in the house) (malt that Jack saw)

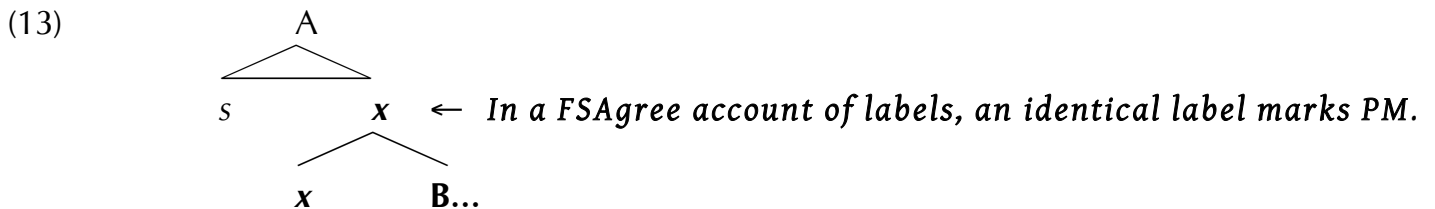


c. This is the rat that lay in the house that ate the malt that Jack saw.

What does SIMPL do?

Motivation

- The point of TRANSFER is determined inspecting the root label of the SO thus far formed.
- Post-TRANSFER operations/relations have access to terms of a pair-merged SO.
- Since those Ops are relevant to both interfaces, SIMPL must apply at the point of TRANSFER. – SIMPL is “in effect part of Σ and Φ ”.
- SIMPL must only work on the output of Merge, and not tamper/efface the relation Pair – hence, SIMPL converts $\langle \alpha, \beta \rangle$ to $\{\alpha, \beta\}$

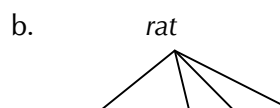
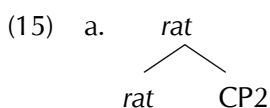


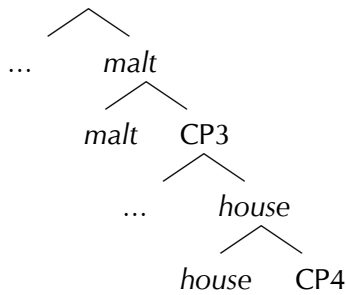
- No violations of NTC: reflexivity is a relation that comes for free under set inclusion – for any set A, $A \subseteq A$ – SIMPL simply ‘employs an alternative notation’. Adjunct labels too are necessary, and are determined trivially.
- SIMPL is necessary only to recover information insulated from the interfaces, but not obligatory. If it does not apply, no predicate composition semantics, but Spellout applies.

(14) Every student_i, who*_i attended my course, submitted a term paper.
 He_i, whose name is Claudius_i, is blessed.

How does it apply?

- SIMPL must apply top-down universally, as in a system that only derivationally marks out the (temporary) “endpoints”, operations must work backwards.
- SIMPL has a “Noah’s Ark” property, works pair-by pair, and is Iterable.





rat ...malt ...house ... Jack

- SIMPL cannot undo the islandhood., as the Phase Impenetrability Condition (PIC) bars the covert extraction of any LI out of the adjunct:

(16) *The Phase Impenetrability Condition*

In the structure $[_{ZP=PH1} \dots Z \dots [_{HP=PH2} XP [H YP]]]$

Spellout for PH1 is at PH2, where PH2 is a strong phase. The domain of H, for strong phase HP, is not accessible to operations at ZP, but only H and its edge (where edge is the residue outside of H).

Are the Components of TRANSFER ordered?

SIMPL 'free-rides' on Spell-Out

- Take Spellout to scan the tree to strip phonetic features from every leaf. Every time it encounters a Pair-Merged structure, identifiable by the lack of a label, SIMPL is invoked.
- ✗ *Why is Spell-Out a tree-traversal algorithm, and not all-at-once -- only good empirical reasons would force FL to makes this computationally more complex choice?*
- ✗ *Why should Spell-Out be unable to traverse non-binary branching structures?*
- ✗ *Why should it alone be the operation that can "recognize" a PM structure, when the system so clearly flags them out (by their labels)?*

SIMPL & Spell-Out are Autonomous

- SIMPL and Spell-out are autonomous and self-sufficient. Neither SIMPL nor Spell-Out is invoked by the other operation, and each autonomously determines its domain of application (follows from no look-ahead, look-around).
- Neither operation can give conflicting information to TRANSFER. In (12), while SIMPL predicts a constituency of the head and its adjunct, Spellout suggests that the constituency is with another head:

(17) The information at TRANSFER is coherent.

How does PM/SIMPL work in a Theory of Phases?

Malayalam Participle Relatives

- Malayalam participles have no relative pronoun, but are tensed.

(18) ra:mən si:ta-kʷə innəle ra:tri pəʃu-wine koɖə-ttə
 ram-NOM sita-DAT yesterday night cow-ACC give-PST
 Ram gave a cow to Sita yesterday night

- (19) a. si:takʷə innəle rɑ:tri pəʃu-wine koɖə-tt-ara:mən
 `Ram who gave a cow to Sita yesterday night'
 b. rɑ:mən innəle rɑ:tri pəʃuwine koɖətt-a si:tɑ:
 `Sita to whom Ram gave a cow yesterday night'
 c. rɑ:mən si:takʷə innəle rɑ:tri koɖətt-a pəʃu
 `The cow which Ram gave to Sita yesterday night'
- Receive exactly the same restrictive interpretations in English, and show slightly stronger evidence that an adjunct must be spelled out with the head.

(20) Jack panida vi:ʃil tɑ:məsicca eliye tinna pu:ca a:nə idə
 Jack built house lived rat eaten cat is this
 'This is the cat that ate the rat that lived in the house the Jack built'

- (21) a. rɑ:mən pəʃuwine si:takʷə koɖəttə
 b. si:takʷə pəʃuwine rɑ:mən koɖəttə
 c. koɖəttə si:takʷə rɑ:mən pəʃuwine
 d. pəʃuwine koɖəttə rɑ:mən si:takʷə
 e. pəʃuwine rɑ:mən si:takʷə koɖəttə

- (22) a. [rɑ:mən si:takʷə innəle rɑ:tri koɖətt-a pəʃu] idə t_i a:nə
 Ram Sita-DAT yesterday nightgiven -PRT cow this is
 'This is the cow that Ram gave Sita last night.'
 b. *pəʃu idə rɑ:mən si:takʷə koɖəttə a:nə
 c. *koɖəttə pəʃu rɑ:mən si:takʷə idə a:nə
 d. *rɑ:mən koɖəttə si:takʷə pəʃu idə a:nə

- No appositive interpretations are ever allowed.

- (23) a. Every student_i, who_{*i} attended my course, submitted a term paper
 b. Every student who attended my course submitted a term paper

(24) ente ko:rs attend ceyd-a ulla kuttigaʃum term paper submit ceydə
 My courseattenddo-PRT all children term paper submit did
 'Every student who attended my course submitted a term paper'

- May get wide scope interpretations without clefting.

- (25) a. [[[rɑ:mən a:re konnu ennə] ənup paraʃu]
 Ram who-ACC killed that Anup said
 (i) Anup said who killed Sita. [narrow scope]
 (ii) *Who did Anup say killed Sita? [wide scope]
- b. a:rə ezudi-ya pustəkəm si:tɑ: vɑ:yiccu?
 who wrote-PRT book Sita read
 'A book written by whom did Sita read?' [wide scope]

- Malayalam, a WH- *in situ* language, orders Move after Spellout/TRANSFER. PIC effects are overridden because Malayalam participle relatives are weak phases.

(26) A strong phase is an instance of v or C with full argument structure and an edge-feature.

Is PM better than Adjunction? A Case Study from Center-Embedding

- The infamous center-embedding effects are absent in Malayalam.

- (27) a. *The man that a woman that a child knows loves came
 b. *This is the man that a woman that a child knows loves

- c. The man that a woman loves came
- d. This is the man that a woman loves

- (28) a. kuttikʷə ariya:vunna stri snehikʷə nna a:l vannə
 child known woman loved man came
 ‘The man that a woman that a child knows loves came’
- b. kuttikʷə ariya:vunna stri snehikʷə nna a:l idə a:nə
 child known woman loved man this is
 This is the man that a woman that a child knows loves.’

Center-embedding effects are competence not performance effects!

- Center-embedding effects engenders a “memory overload” effect. E.g., Kimball (1973) – the processor can keep track of at most two incomplete clauses at any one time.
 - Actually, (27a,b) can neither be parsed, nor *produced*, and unlike garden path sentences, they are not “cognitively penetrable”.
- (29) *An apparently new speech disorder a linguistics department our correspondent visited was affected by has appeared. Those affected our correspondent a local grad student called could hardly understand apparently still speak fluently. The cause experts the LSA sent investigate remains elusive. Frighteningly, linguists linguists linguists sent examined are highly contagious. Physicians neurologists psychologists other linguists called for help called for help called for help didn’t help either. The disorder experts reporters SpecGram sent consulted investigated apparently is a case of pathological center-embedding!*
 Speculative Grammarian (April 2006).
- Joshi, Becker, & Rambow (1994):
- (30) “Given a property P, whether or not P is a performance or a competence property depends on the formal character of the grammars available to us. If we have a class of grammars G, which is both linguistically adequate and also captures the property P, then we adopt G and P becomes a competence property.”

Minimalism is the New Class of Grammars!

- Human producers now “have” working memory.
- (31) *A Constraint on Competence*
 At TRANSFER, only two strong phases that do not share any features may be computed at one time.
- Spellout applies to phases, so each relative constitutes a distinct domain for Spellout and SIMPL applies to each ordered pair, detected by inspection of the label. In the right-branching relative, the adjunct is then spelled out “adjacent” to its head.
- (32) This is the rat that ate the malt that lay in the house that Jack saw
- | <u>SIMPL</u> | <u>SPELL-OUT (vP & CP)</u> |
|---|---|
| a. SIMPL (<i>rat, that ate the malt</i>) | Spellout [<i>this is the rat</i>] |
| b. SIMPL (<i>malt, that lay in the house</i>) | Spellout [<i>that ate the malt</i>] |
| c. SIMPL (<i>house, that Jack saw</i>) | Spellout [<i>that lay in the house</i>] |
| d. | Spellout [<i>that Jack saw</i>] |
- In center-embedding, the information from Spellout and SIMPL does not cohere. For example, while SIMPL would tell TRANSFER that the head-adjunct pair is *man, that the woman loves*, Spellout would tell TRANSFER that the constituency is *the man came*.
- (33) The man that the woman that the child knows loves came

SIMPL

- a. SIMPL (*man, that the woman loves*)
- b. SIMPL (*woman, that the child knows*)
- c.

SPELL-OUT (vP & CP)

- Spellout [*the man came*]
- Spellout [*that the woman loves*]
- Spellout [*that the child knows*]

- A weak phase does not constitute an independent domain for the application of Spell-out, so no center-embedding effects are expected to obtain. This is what happens in Malayalam, and perhaps in English as well:

(34) The man known to the woman seen by the child loved by his mother came

The Return of the Ideal Speaker-Hearer via Chunking (Miller 1956)

- Miller's work explores the tension between "the span of absolute judgment" and "the span of immediate memory", as different kinds of limitations that are imposed on our ability to process information. Absolute judgment is limited by the amount of information – *bits* of information that allow a choice between two likely alternatives. Immediate memory, on the other hand, is limited by the number of items of information – number of *chunks*; but these that may not actually encode the requisite number of bits necessary to make the absolute judgment.
- Miller argues that given this limitation, whereby the fixed number of chunks limits access to the complete information, humans employ a strategy of *chunking*, by which "we can increase the number of bits of information that it contains simply by building larger and larger chunks, each chunk containing more information than before". **The FL property of Merge + Agree, then, is the means by which natural language builds "larger and larger chunks"**.
- One common strategy is a process of *recoding*, by which, given an input "that contains many chunks with few bits per chunk, " the input is recoded "into another code that contains fewer chunks, with more bits per chunk." **A Pair-Merged strong phase is never available for recoding, but a Pair-Merged weak phase is**, as long as the interface can read its semantic contribution.
- Miller to estimate *the channel capacity* of the observer: "it represents the greatest amount of information that he can give us about the stimulus on the basis of an absolute judgment. The channel capacity is the upper limit on the extent to which the observer can match his responses to the stimuli." **PM of strong phases reveals to us exactly what it is – two chunks at the most, and beyond this threshold must lie unacceptability – both for the speaker and the hearer.**

Conclusions

- ① *Is PM just Merge?* No
- ① *Why must it be late?* Because of SEM-IC
- ① *How does it work in a phasal syntax?* Weak phases always SIMPL, strong phases need not.
- ① *What does SIMPL do?* Using reflexivity, embed an adjunct under a label identical to its head
- ① *Are these components of TRANSFER ordered vis-à-vis each other?* No
- ① *Does PM work better than 'adjunction'.* Yes