Unary Merge

Jan-Wouter Zwart
University of Groningen

Tilburg University Grammaticamodellen
Staff Seminar, October 28, 2004

1. Merge

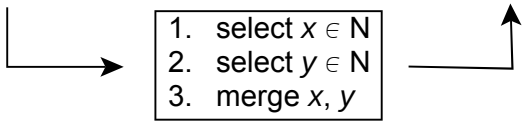
(1) ASSUMPTION
The computational system of human language (CHL) of the Faculty of Language involves a system generating structure = Merge (M).

(2) QUESTION
What is the simplest form Merge could take?

(3) Chomsky (2004): binary merge into unordered set

(4) numeration = N derivation = D

/ x, y, z, ... / { x, y }



(5) M = f (α) → S α ∈ N, S = { }

(6) What is α ?
(i) 2 elements from N = initial merge
(ii) [1 element from N] + D = external merge
(iii) [a term of D] + D = internal merge

(7) (ii)/(iii) have a fixed target = D (i.e. no selection) = Extension Condition

noninitial merge

1. select $x \in N \vee D$
2. select $y = D$
3. merge x, y

(8) Why can we not select elements *from* D (or N) in step 2 ?

(9) Two asymmetries:
a. initial vs. noninitial Merge
b. input vs. target of Merge

(10) Remerge (i.e. no internal Merge): cf. Bobaljik 1995, Koster 2004

1. select $x \in N$
2. select D
3. Merge x, D

(11) N = / you, did, see, who /
Merge yields: D = { did { you { see, who } } }
Next Merge draws *who* from N yielding
D = { who { did { you { see, who } } } }

(12) Simplest Merge

1.	select $x \in$ N
2.	Merge x, D

(i.e. Merge = *transfer* from N to D)

(13) for each step *i* in the derivation

$M_i = f(\alpha_i) \rightarrow D_i$ *where* $\alpha \in$ N, D = $< \alpha_i, D_{i-1} >$

(14) Things to consider:
a. the remerge hypothesis
b. the ordered pair hypothesis

2. Ordered output

(15)

Initial Merge	N	D
	/ John, loves, Mary /	∅
M1		< Mary, ∅ >
M2		< loves, < Mary, ∅ >>
M3		< John, < loves, < Mary, ∅ >>>

(16) Output D is not unordered: in < *x*, *y* >, *y* is 'old' and *x* is 'new' (cf. (13)) = asymmetric (cf. Jaspers 1998: 109)

(17) PROPOSAL
The asymmetry between the members of the output of Merge (= the ordered pair D) is exploited for purposes of 'information': *linear order, formal dependency, prosodic marking, semantic interpretation*.

(18) In < *x*, *y* >
(i) *y* is preceded by *x*
(ii) *y* is marked for dependency of *x*
(iii) *y* is prosodically marked w.r.t. *x*
(iv) *y* is the 'predicate' of *x*

(19) STRONGER HYPOTHESIS
Information (in the grammatical sense) ensues only as a function of the asymmetric relation between the members of the output of Merge (= the ordered pair D).

a. sisterhood condition
b. flexible, derivational basis of grammatical relations

3. Remerge

(20) Bobaljik (1995): Merge *updates* the Numeration

	N	D
	/ John, loves, <u>Mary</u> /	∅
M1	/ John, <u>loves</u>, Mary, Mary /	< Mary, ∅ >
M2	/ <u>John</u>, loves, Mary, Mary, loves+Mary /	< loves, < Mary, ∅ >>
M3	/ John, loves, Mary, Mary, loves+Mary, John+loves+Mary /	< John, < loves, < Mary, ∅ >>>

ASIDE: In fact, Bobaljik has *only* N, i.e. no designated output. Advantage: no extension condition violation with head movement. Disadvantage: totally unrestricted derivation (interarboreal, countercyclic, etc).

(21) Movement (remerge): select any element from N for transfer to D

(22) a. John loves Mary
b. Mary, John loves (topicalization)

(23)

	N	D
M3	/ John, loves, Mary, Mary, loves+Mary, John+loves+Mary /	< John, < loves, < Mary, ∅ >>>
M4	/ John, loves, Mary, Mary, loves+Mary, John+loves+Mary, Mary+John+loves+Mary /	< Mary, < John, < loves, < Mary, ∅ >>>>

(24) Constraint on 'movement': move only those elements that are in N
(i) initial members of N
(ii) updated members (previous stages of the current derivation)

4. Opacity

(25) QUESTION
What are potential members of the Numeration N ?

(26) PROPOSAL
Anything: morphemes, words, phrases (cf. DiSciullo/Williams 1987, Ackema/Neeleman 2000)

(27) a. *morpheme + word* werk-er 'worker'
work-AG

b. *morpheme + phrase* dat ge-[wat gaan we doen]
that GE what go:PL we do:INF
'that constantly asking 'what shall we do' '

[ban de bom]- er
ban the bomb-AG
'person involved in anti-bomb activities'

[kat uit de boom kijk]- er- (ig/ij)
cat out the tree look AG ADJ/N
'(property/behavior of) person being hesitant, expectant'

c. *N + phrase compound* [doe dat nou niet]- houding
do that PRT not attitude
'attitute of advising caution'

d. *phrase as word* [manus-je van alles] 'factotum'
<name>-DIM of everything

(28) Separation in current and previous (auxiliary) derivation such that members of N of a previous derivation are not in N of the current derivation (cf. the concept of 'process' in Toyoshima 1997)

(29) a. Hij is een [manusje van alles]
he is a factotum

b. * Van alles is hij een manusje
c. * Overal is hij een manusje van
d. * Een manusje echter van alles is hij niet (*echter* = however)

(30) a. N = / hij, is, een, [manusje van alles] /
b. * N = / hij, is, een, manusje, van, alles / *would predict remerge (movement)*

(31) HYPOTHESIS
Opaque domains are outputs of previous derivations

(32) a. derives Lexical Integrity
b. derives CED (Condition on Extraction Domains, Huang 1982; cf. Toyoshima 1997)
c. possibly derives CSC (Coordinate Structure Constraint, Ross 1967)

(33) a. Who did you see friends of ?
b. * Who did friends of see you ?

(34) a. N = / you, did, see, friends, of, who /
b. N = / you, did, see, [friends of who] /

a. D = M1 who
M2 of who
M3 friends of who
M4 see friends of who
M5 you see friends of who
M6 did you see friends of who
M7 who did you see friends of who (*who* $\in$ N)

b. D = M1 you
M2 see you
M3 [friends of who] see you (output of previous derivation)
M4 did [friends of who] see you
M5 *who did [friends of who] see you (*who* $\notin$ N)

(35) Wh-in-situ languages lack CED-effects, but they do show wh-island effects (Huang 1982, Watanabe 1992, Hong 2003)

a. Mary-ka [[John-i nwuku-lul salangha-l] ttay] wul-ess-ni
Mary-NOM John-NOM who-ACC love-REL when cry-PAST-Q
'Who did Mary cry when John loved?'

b. * Mary-ka [[John-i mwues-lul sa-ass-nun] -ci] a-ni
Mary-NOM John-NOM what-ACC buy-PAST-REL Q know-Q
'What does Mary know whether John bought?'

(36) Given bottom-up Merge, wh-complement clauses should be transparent in principle (its constituents available for remerge), so other factors must be responsible for the opacity effects.

(37) a. I wonder why Bill left
b. * Why do you wonder Bill left

(38) Coordinate Structure Constraint: symmetric vs. asymmetric coordination

a. * I wonder which vegetable [John likes [e]] and [Mary hates spinach]
b. How much beer can you [drink [e]] and [still stay sober]

(39) Plausibly, conjuncts are always the output of auxiliary derivations, hence opaque.

(40) a. * I wonder who he said he saw [[e] and Mary]
b. * I wonder who he said he saw [John and [e]]

(41) Apparently, coordinate structures are themselves opaque.

(42) N = / he, saw, [John and Mary] /

5. Lexical = syntactic

(43) A lexical item in derivation **D** is the opaque output of an auxiliary derivation **d'**.

→ A 'lexical item' can be the productive result of syntactic operations (merge)

(44) N-V incorporations
lexical: no excorporation, sometimes no valency changing effect, doubling, noun root, lexical restrictions on N (animacy), morphophonological effects
syntactic: productive, sometimes valency changing effect, stranding, fed by syntactic rules, syntactic conditions on N w.r.t. V (internal argument)

(45) i. compound type (Polynesian, Micronesian)

a. kua **tā** *he* tama **e** **tau** **fakatino** (Niuean)
PERF draw ERG child ABS PL picture
'The child has been drawing pictures.'

b. kua **tā** **fakatino** *e* tama
PERF draw picture ABS child
'The child has been picture-drawing.'

ii. classifier type (Iroquoian)

a. wa-k-hninu' ka-nakt-a' (Mohawk)
FACT-1SG.SU-buy PREF-bed-SUFF
'I bought a bed.'

b. wa-k-nakt-a-hninu'
FACT-1SG.SU-bed-JOIN-buy
'I bed-bought.'

c. wa'-e-**nahskwa**-hní:nu-' **kwískwis**
fact-3SG:F-animal-buy-ASP pig
'She [animal-]bought a pig.'

(46) No opposition lexicon - syntax: auxiliary derivation = syntax, but yields opaque item

(47) applicative:

op	de	stoep	krijten	~	de	stoep	be-krijten
on	the	sidewalk	chalk		the	sidewalk	APPL-chalk

(48)

Hij	*(be)-krijt	de	stoep	(*be)
he	be-chalks	the	sidewalk	APPL

6. Asymmetries

(49) a. Kayne (1994) vs. Chomsky (1995) on the LCA
b. Epstein (1995) vs. Brody (2001) on the derivational definition of c-command
c. Chomsky (& Hauser/Fitch 2002) vs. Pinker/Jackendoff (2003) on the 'merge only' hypothesis

(50) Kayne (1994) derives linear order from asymmetry and asymmetry from tree configuration.
Chomsky (1995) notes that this capitalizes on *notation* of structure.

(51) [A B] must be written as [A [$_X$ B]]

(52) Unary merge: [A B] = ordered pair, asymmetry is inherent.

(53) *LCA*
linear order mirrors derivational history

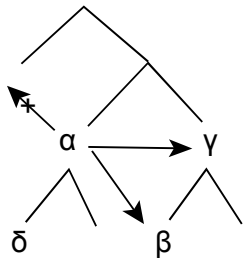
(54) Epstein (1995) derives the definition of c-command from merge
Brody (2001) notes that this predicts backwards c-command

(55) α c-commands β iff α is merged with (γ dominating) β

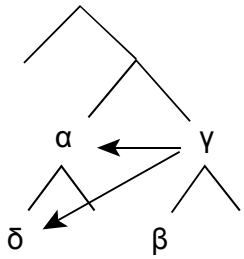
(56) In any structure, the subset of nodes c-commanded by α is the total set of nodes in existence at the moment when α is merged to the structure.

(57) Critique (Brody): then α's sister must c-command the terms of α

a.



b.



(58) Critique is voided if c-command (dependency) is a function of the asymmetry created by merge (the ordered pair)

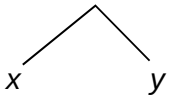
(59) Chomsky (w. Hauser/Fitch, 2002) suggests that the Faculty of Language is characterized by the ability to recursively apply the operation Merge; this the only aspect of cognition relevant to language that we can be reasonably certain that other animals lack it.

Pinker and Jackendoff 2003 reply that there is much more to language than recursion.

(60) Summary of what is missing (syntax only)
a. questions of order
b. agreement
c. case
d. various other dependencies (binding, etc.)

(61) But this follows from unary merge:
a. = LCA, now a function of merge
b/d. = dependency, ideally a function of merge
c. = dependent marking, if nominative is absence of case

(62) The format of dependency



← marks dependency on (one of) its terms

a. agreement: on V, Aux, multiple, via clitics, pronouns, even arguments sometimes
b. case: on arguments (objective case), marks *y* as dependent in opposition with nominative (= null) case (d.n.a. when *x* has inherent [ergative] case)
c. tense/mood/aspect: *x* is operator, TMA marking is agreement (on Aux, V, separate morphemes, etc.)
d. negation: likewise agreement, realized via adverbs and/or negative affix on V
e. adverbial notions (Cinque 1999): realized on *y* via verbs, verbal morphology, particles
f. reflexivity: marked on *y* via verbal morphology, pronouns, (body part) NPs
g. prosody (focus): marked on *y* via (nuclear) pitch accent
h. operator-variable relation: marked on *y* via gap in spell-out

(63) A single dependency relation can be realized in various ways across languages

References

Ackema, Peter and Ad Neeleman. 2000. On the selectional properties of affixes. Paper presented in Groningen, March 3.

Baker, Mark C. 1988. *Incorporation: a theory of grammatical function changing*. Chicago: The University of Chicago Press.

Bobaljik, Jonathan D. 1995. In terms of merge. *MITWPL* 27, 41-64.

Brody, Michael. 2001. On the status of representations and derivations. In *Derivation and explanation in the minimalist program*, Samuel D. Epstein and T. Daniel Seely, eds. Malden: Blackwell.

Chomsky, Noam. 1995. *The minimalist program*. Cambridge: MIT Press.

Chomsky, Noam. 2004. Three factors in language design. To appear in *Linguistic Inquiry*.

Di Sciullo, Anna-Maria and Edwin Williams. 1987. *On the definition of word*. Cambridge: MIT Press.

Epstein, Samuel David. 1995. Un-principled syntax and the derivation of syntactic relations. Ms., Harvard University. Published in Epstein/Hornstein 1999 *Working minimalism* (Cambridge: MIT Press) as 'Un-principled syntax: the derivation of syntactic relations' (317-345).

Hauser, Marc D., Noam Chomsky, W. Tecumseh Fitch. 2002. The Faculty of Language: what is it, who has it, and how did it evolve? *Science* 298, 1569-1579.

Hong Sun-Ho. 2003. On island constraints in Korean. In *Explorations in Korean language and linguistics*, Gregory K. Iversen and Sang-Cheul Ahn, eds., 107-155. Seoul: Hankook Publishing.

Huang, C.T. James. 1982. *Logical relations in Chinese and the theory of grammar*. MIT dissertation.

Jaspers, Dany. 1998. Categories and recursion. *Interface* 12, 81-112.

Kayne, Richard S. 1994. *The antisymmetry of syntax*. Cambridge: MIT Press.

Koster, Jan. 2004. Structure preservingness, internal merge, and the strict locality of triads. Ms., University of Groningen.

Pinker, Steven and Ray Jackendoff. 2003. The Faculty of Language: what's special about it? Ms., Harvard/Brandeis.

Rosen, Sarah Thomas. 1989. Two types of noun-incorporation: a lexical analysis. *Language* 65: 294-317.

Ross, John Robert. 1967. *Constraints on variables in syntax*. MIT dissertation.

Stepanov, Arthur. 2001. The end of CED? *Proceedings of WCCFL 20*, 524-537.

Toyoshima, Takashi. 1997. Derivational CED. *Proceedings of WCCFL 15*, 505-519.

Watanabe, Akira. 1992. Subjacency and S-structure movement of wh-in-situ. *Journal of East Asian Linguistics* 1, 255-291.

Faculty of Arts, P.O. Box 716, NL-9700 AS Groningen
zwart@let.rug.nl ! http://www.let.rug.nl/~zwart/