

On the format of dependency relations

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1. The program

- (1) *"We hypothesize that FLN [the faculty of language in the narrow sense, i.e. the computational system of human language, or narrow syntax] includes recursion and is the only uniquely human component of the faculty of language."*

Hauser, Chomsky, and Fitch (2002:1569)

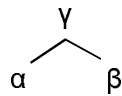
- (2) *"Narrow syntax has one operation that comes 'free', in that it is required in some form for any recursive system: the operation Merge. (...) Any operation other than Merge requires empirical motivation, and is a derivation from SMT [the strong minimalist thesis]."*

Chomsky (2001:4)

- (3) *"...syntactic relations are established between a syntactic category X and a syntactic category Y when (and only when) X and Y are transformationally concatenated (thereby entering into sister relations with each other) by (...) Merge (...) during the tree-building, iterative, universal rule application that constitutes the derivation."*

Epstein (1999:320)

- (4) a. merge yields



- b. γ may function as α/β (recursion)
c. structure is built from the bottom up (derivation)
d. the derivation comprises temporally ordered series of steps
e. grammatical relations are a function of merge
 i. format = sisterhood
 ii. determination takes place at different moments in time during a derivation

2. Main claim

- (5) Merge yields not a set {α,β} but an ordered pair <α,β>
(6) When α merges with β, yielding <α,β>
 (i) β is the dependent of α
 (ii) β is temporally ordered after α at Spell-Out ('linear order')
 (iii) β is accentually marked with respect to α ('nuclear pitch accent')

3. The properties of Merge

- (7) Numeration N = {α, β, γ, ... }

(8) Merge (“takes two elements (...) and creates a new one”, Chomsky 2001:4)

- (i) select $\alpha \in N$
- (ii) select $\beta \in N$
- (iii) Merge α and β

(9) Sample derivation (from Collins 2002:47)

$N = \{ \text{John, will, see, Mary} \}$

- (a) select *see* $\in N$
- (b) select *Mary* $\in N$
- { (c) Merge *see* and *Mary*
- { (d) select *will* $\in N$
- { (e) Merge *see* and $\{ \text{will, Mary} \}$
- { (f) select *John* $\in N$
- { (g) Merge *John* and $\{ \text{will, } \{ \text{see, Mary} \} \}$

(10) Alternative: select = merge (i.e. “add to the derivation”)

(11) First merge = (by definition) Merge with zero ($\emptyset$)

(12)	NUMERATION	MERGE	DERIVATION	SPELL-OUT
	<i>John, will, see, Mary</i>	<i>Mary</i>	$\langle \text{Mary}, \emptyset \rangle$	[<i>Mary</i>]
	<i>John, will, see</i>	<i>see</i>	$\langle \text{see}, \langle \text{Mary}, \emptyset \rangle \rangle$	[<i>see Mary</i>]
	<i>John, will</i>	<i>will</i>	$\langle \text{will}, \langle \text{see}, \langle \text{Mary}, \emptyset \rangle \rangle \rangle$	[<i>will see Mary</i>]
	<i>John</i>	<i>John</i>	$\langle \text{John}, \langle \text{will}, \langle \text{see}, \langle \text{Mary}, \emptyset \rangle \rangle \rangle \rangle$	[<i>John will see Mary</i>]

(13) *aside*

Collins' (1997:78-81) arguments against 'merger with nothing':

- a. nothing = $\{ \}$, excluded because $\{ \}$ could not be the result of Merge
- b. nothing = [nothing], excluded because unary merger, being more economical, would always block binary merger

Leads to a stipulation that Merge has to be binary (to overcome the economy problem).

(15) Merge is always unary: it takes just one element from N and adds it to the derivation (APPLICATION)

(16) Target of Merge = the existing derivation

(17) stages in the existing derivation i. *Mary* (ignoring $\emptyset$)
 ii. *see Mary*

(18) In the derivation, *Mary* exists prior to *see Mary*, so *see* is applied to *Mary* i.e. Merge yields an ordered pair $\langle \text{see}, \text{Mary} \rangle$.

(19) *technically*

$\langle \alpha, \beta \rangle \equiv \{ \beta, \{ \alpha, \beta \} \}$ where β marks some special feature of the set $\{ \alpha, \beta \}$, e.g. a category label or (in this case) prior existence

3. First Merge

(20) Which is merged first, a head or its complement?

- (21) *a priori argument*
A complement is complex, i.e. the output of Merge, therefore it must have been merged prior to the head.
- (22) Empirical argument: known cases of Merger to existing structure yield
(i) temporal ordering (i.e. adjunction always 'to the left', Kayne 1994:xiii)
(ii) weak-strong intonation pattern (e.g. Zubizarreta 1998:43)
- (23) Cases in point: a. specifiers (24)/(26)
 b. adjuncts (25)/(27)

precedence

- (24) a. S precedes VO/OV in around 90% of the world's languages
 b. S precedes O in around 95% of the world's languages (Tomlin 1986)
- (25) Candidates for right adjunction reanalyzed (cf. also Kayne 1994)

a. verb clustering ('verb raising') in Dutch (Zwart 1996)

- i *..dat Jan [het boek lezen] wil → dat Jan het boek t_i wil-lezen_i
 that John the book read-INF wants
- ii *..dat [Jan [wil [lezen [het boek]]]] → dat Jan [het boek]_i wil lezen t_i

b. extraposition in Dutch (Koster 2000a)

- i *..dat Jan [dat het regent] zei → dat Jan t_i zei [dat het regent]_i
 that John that it rains said
- ii .. dat Jan [_{&P} [[e] zei] [& [dat het regent]]]

cf. ..dat Jan Piet zag en Marie [_{&P} [Piet zag] [& [Marie]]
 that John Pete saw and Mary

c. adverbs in English (Koster 2000b)

- i John [[saw Mary] yesterday]
- ii *John yesterday [saw Mary] → John [saw Mary]_i yesterday t_i

d. right dislocation (Zwart 2001)

- i Jan [[zag Marie] gisteren/*gisteren]
 John saw Mary yesterday
- ii gisteren [Jan zag Marie] → [Jan zag Marie]_i gisteren t_i

intonation

- (26) a. [john] [will see MARY]
 b. #[JOHN] [will see mary]
- (27) a. (that's) [very] [STRANGE]
 b. #(that's) [VERY] [strange]

head-complement relation

- (28) temporal order = universally head complement (Kayne 1994) [contentious]
- (29) stress = head COMPLEMENT
(Nuclear Stress Rule, Bresnan 1971, Cinque 1993, Zubizarreta 1998, Zwart 2003)
- (30) <head, complement>

4. More on merge and intonation

(31) *juxtapositions* (exx. from Dutch, but probably universal?)

a. sports result	1-1	één-ÉÉN	
b. digit sequence	1, 2, 3	één-twee-DRIE	
c. numbers	21	een-en-TWINTIG	[one and twenty]
d. the time	1:30	half TWEE	[half two]
e. the amount	2,50	twee-VIJFTIG	
f. reduplication	ZOZO	ZO-ZO	'so-so'
g. titles		luitenant-kolonEL	'wing commander'
h. acronyms	PvdA	[pevedeA]	[socialist party]

(32) *composite names*

a. (neelie) smit-KROES	(husband's name + maiden name)
b. (pietjan) prinsen GEERligS	(double name)
c. (marian) klein GUNnewiek	(farm name + diacritic adjective)
d. humbert HUMbert	(first name + family name)

(33) *family names derived from phrases* (Van den Toorn 1980, Zwart 2003)

phrase		family name	
a. met GOD	'with god'	(johnny) METgod	(PP)
b. vijf Eiken	'five oaks'	(wiljan van) VIJFeiken	(NumP)
c. jonge VOS	'young fox'	(houthandel) JONGevos	(AP)
d. huis in het VELd	'house in the field'	(rex) HUIS in 't veld	(NP)
e. boter en BROOD	'butter and bread'	(helen) BOTerenbrood	(&P)
f. blij LEVEN	'happily live'	(jeroen) BLIJleven	(VP)
g. wel tevreden	'quite happy'	(henk) WELtevreden	(DegP)

(34) Family name: syntactic structure is erased → phonologically determined intonation

(35) Phonologically determined stress in Germanic = first syllable (Prokosch 1939:118)

<i>non-Germanic names</i>	<i>fantasy names</i>
(alex) paSTOOR	(professor) prlwytzKOFSky
(dick) paSSCHIER	
(tino) taBAK	<i>stress attraction by latinate suffixes</i>
(philip) coCU	JANSEN > jansenius
(arie) deLMOTte	van BAARle > barLAEUS

(36) *Conversely*: stress pattern in phrases is a function of structure

(37) *place names show both the pattern of family names and that of phrases*

a. GRAVen-burg	vs.	's-graven-HAge	
count-borough		DET:GEN-count:GEN-hague	
b. DRIE-bergen		hooge-VEEN	(cf. family name HOOgeveen)
three-mountains		high-marsh	

(38) *syntactic default stress assignment procedure*

When α and β are combined (merged), yielding $\langle \alpha, \beta \rangle$, β is accentually marked (i.e. receives a focus feature [+f], to be spelled out as acoustic prominence)

(39) *noun-headed compounds show STRONG-weak pattern*

SLAGveld	'battle field'	SLAVeld	'lettuce field'
VELDslag	'battle' (lit. field battle)	VELDsla	'corn salad' (lit. field lettuce)
TAFELberg	'table mountain'	MANwijf	'virago' (lit. man woman)

- (40) *Compound Stress Rule (CSR):*
When α and β are combined (merged), yielding **a compound** $\langle\alpha,\beta\rangle$, α is accentually marked
- (41) *Romance compounds*
 ouvre-BOITE 'bottle opener' (lit. open bottle) French
 hombre-RANA 'frog man' (lit. man frog) Spanish
 asciug-a-CAPELLI 'hair dryer' (lit. dry hair) Italian
- (42) *Generalizing the default procedure:*
 (i) all compounds are the result of Merge
 (ii) stress is assigned by (10)
 (iii) the STRONG-weak pattern involves movement Kayne 1994:41
- (43) *complementation*
 [veld (van) slag] $\rightarrow$ slag_i [veld t_i] 'battle field' cf. Selkirk 1984:245
 [+f] [+f]
- (44) *predication*
 [berg (is) tafel] $\rightarrow$ tafel_i [berg t_i] 'table mountain'
 [+f] [+f]
- (45) *binding morphemes* De Vries 1972:60-68
 hond-e-kop 'dog's head'
 hand-je-klap 'dealings' (lit. hand-DIM-clap)
 moeder-s-zijde 'mother's side'
- (46) [e [kop (van/is) hond]] $\rightarrow$ [hond_i [e [kop t_i]]]
 [je [klap (van) hand]] $\rightarrow$ [hand_i [je [klap t_i]]]
 [s [zijde (van) moeder]] $\rightarrow$ [moeder_i [s [zijde t_i]]]
- (47) *CSR = phrasal stress rule (38) + movement (i.e. there is no CSR)*
- (48) *Consequence: focus [projection principle]*
 Movement does not affect focus marking
- (49) *Null hypothesis for (unmarked) sentence intonation:*
 focus is a function of the sequential application of (38) with each step in the derivation
- (50) *Derives*
 a. Cinque (1993:245): "stress prominence in a phrase is a mere reflection of depth of embedding"
 b. Zubizarreta (1998:43): "given two sister nodes [α and β], the one lower in the asymmetric c-command ordering is more prominent"
- (51) *Differences*
 a. (38) extends to pairs of sisters (more basic)
 b. statements in (50) are representational (less local; requires scanning of at least an ordered pair of ordered pairs, whereas (38) yields an outcome with each ordered pair)

Application of (48) to syntactic movement (re-merge): movement does not affect [+f]-marking (cf. Bresnan 1971)

(52) *OV > VO reordering in Dutch*

- a. ..dat Jan het BOEK leest ← ... leest het BOEK complement
that John the book reads
- b. ..dat Jan het boek UIT leest ← ... leest [het boek UIT] predicate
that John the book out reads

(53) *with adverbs, stranded prepositions, auxiliaries etc.*

- a. ..dat Jan MARIE gisteren kuste
that John Mary yesterday kissed-SG.PAST
- b. ..dat Jan een BOEK wou lezen
that John a book wanted read-INF
- c. ..dat je er een BOEK voor leest
that you there a book for read-2SG.NONPAST
'..that you are reading a book for it.'

(54) *other stress patterns are marked*

Zwart 1997:92ff

- a. ..dat Jan het boek LEEST (cf. (52a))
- b. ..dat Jan Marie gisteren KUSTE (cf. (53a))

(55) *aside*

Testing marked (narrow) vs. unmarked (wide) focus

(i) *Wide focus*

An acoustically prominent element α is a term of a constituent β which can be associated with *only*.

- (ii) I *only* said that [_{±F} John kissed MARY] (not that [_{ALTERNATIVE} I need more soup])
I *only* said that John [_{±F} KISSED] Mary (*not that [_{ALTERNATIVE} I need more soup])

- (iii) Ik zei *alleen maar* dat [_{±F} Jan MARIE gisteren kuste] (niet dat [_{ALT} ik meer soep wil)
Ik zei *alleen maar* dat Jan Marie gisteren [_{±F} KUSTE] (*niet dat [_{ALT} ik meer soep wil)
I said only that John Mary yesterday kissed not that I more soup want

(56) *Wide focus ('focus projection')*

- a. focus marking by (38) [John] ↔ [_{±F} kissed Mary]
- b. spell out on an eligible term of the category marked [+f] john kissed MARY

(57) *Narrow focus: the result of a marked reversal of (38)*

- (58) Hypothesis: only dependents are eligible terms in the sense of (56b)
→ marked focus incompatible with wide focus

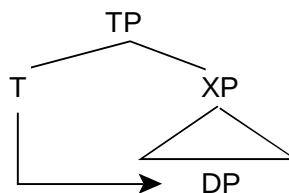
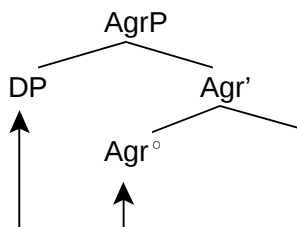
5. Taking stock

- (60) Merge creates an ordered pair $\langle \alpha, \beta \rangle$
- (61) In $\langle \alpha, \beta \rangle$, β is a dependent of α
- (62) In the unmarked case, β is marked [+f]
- (63) If β is not re-merged, β is spelled out after α
- (64) Dependency relations are sister relations involving two steps:
- (i) marking the relation on β
- (ii) spelling the relation out on a term of β

6. Agreement

(65) Two conceptions

- a. *spec-head relation* (Kayne 1989) b. *c-command relation* (Chomsky 1998)



(66) (Subject-verb) agreement is an asymmetric relation, where the subject is the antecedent and the verb is the dependent.

(67) [number] is an **inherent** feature on noun phrases
[number] is a **relational** feature on the verb

(68) Agreement: (i) a dependency relation between a subject and its sister
(ii) spelled out on an eligible term of the dependent (the sister)

(69) Covers the following situations:

- Agreement spelled out as a phrasal marker (70)
- Agreement spelled out on a nearby head (71)
- Agreement spelled out on a remote head (72)
- Multiple agreement spell out (73)

(70) wa treanrü mwâ **nrâ** [hôdrô mwâ] Tinrin (Osumi 1995)
the person there 3SG burn hut
'That person burned the hut.'

(71) Jan (*XP) **heeft** Marie gezien Dutch
John have:3SG Mary see:PERF
'John saw Mary.'

(72) a. ..dat Jan Marie gezien **heeft** Dutch
that John Mary see-PERF have-3SG
'..that John saw Mary.'

b. John probably **has** not seen Mary

c. John probably **loves** Mary

(73) Juma a-li-kuwa a-ngali a-ki-fanya kazi Swahili (Carstens 2003)
Juma₁ SM₁-PAST-be SM₁-Still SM₁-PROG-do work
'Juma was still working.'

(74) No reason to believe that a functional head is the pivot in the agreement relation, as in both conceptions in (65)

(75) Agreement via a functional head is hard to realize with English lexical verbs, especially if the VP moves across adverbs as in (25cii), presumably blocking (LF-) verb movement to the relevant functional head.

- (76) All agreement is in fact dependent marking (as opposed to antecedent marking).
Cf. Nichols 1986, where agreement is head-marking as opposed to dependent-marking.

7. Case

- (77) a. inherent case is a function of the head-complement relation

< P/V, DP > → dependent marking

- b. structural case appears to be the converse of subject/object-verb agreement

< DP, XP > → “antecedent marking” ?

- (78) *Alternative*

The subject marks its sister with a [dependent] feature (say, *objective*), taken to mean: if there is another noun phrase in there, mark it (as objective).

- (79) Jacobson (1935)

Accusative: marks dependency relation

Nominative: unmarked (i.e. nothing signified)

- (80) *Derivation*

- a. 1. merge Object → no marking
2. merge Subject → marks sister as dependent, spelled out on Object

→ subject = NOM, object = ACC (nominative/accusative system)

- b. Ergative system: transitive subject has inherent case (instrumental/locative/genitive), does not participate in the system of case differentiation

1. merge Object/intransitive Subject → no marking
2. merge transitive Subject → no marking

→ transitive subject = ERG, object/intransitive subject = NOM

- (81) *Does not exclude a combination of Ergative case with ‘Nom/Acc’ agreement*

- a. ngaju ka-ra wangka-mi Warlpiri
I-ABS AUX:PRES-1SG:SU speak-NONPAST
'I am speaking'

- b. ngajulu-rlu ka-ra-ngku nyuntu nya-nyi
I-ERG AUX:PRES-1SG:SU-2:OB you-ABS see-NONPAST
'I see you.'

8. Extensions

Tense

- (82) Tense morphology on the verb/auxiliary may be just the spell-out of an agreement relation between a tense operator (in specifier position) and its sister; no need to label a functional head as T (cf. (65b))

consequence: tense/agreement morphology does not betray verb movement (contra Kayne 1994:52)

Negation

- (83) Negative morphology on the verb is similarly the result of agreement with a negative operator

consequence: the presence of negative morphology does not betray verb movement (contra Haegeman 2000:75)

- (84) ..da Valère dienen boek nie en-eet West Flemish
that Valery that book not NEG-has

Adverbial markers

- (85) The adverbial markers on the verb studied in Cinque (1999) may also be taken to reflect agreement rather than movement into the functional domain.

Genitive

- (86) a. agreement spelled out on head

beje halgan-in Evenki
man leg-3SG:POSS

- b. agreement spelled out as phrasal clitic

[John] [s book]

Reflexivity

- (87) a. spelled out on head

mvuvi a-li-ji-kat-a Swahili
fisherman₁ SM₁-PAST-REFL-cut-FINALVOWEL
'The fisherman cut himself.'

- b. spelled out as (phrasal) clitic

..dat Jan zich waste Dutch
that John REFL washed
'..that John washed [himself]'

9. In short

- Dependency relations are sisterhood relations.
- Merge applies an element from the numeration to the existing derivation.
- Merge yields an ordered pair (i.e. is asymmetric) $\langle \alpha, \beta \rangle$
- In $\langle \alpha, \beta \rangle$, β is the dependent element, is prosodically marked, is spelled out last, and may spell features involved in the dependency relation on one of its terms.

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