

Asymmetric Merge

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0. Background: the derivational approach to syntactic relations

- (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)

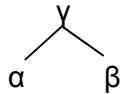
- (2) *“Narrow syntax has one operation that comes ‘free’, in that it is required in some form for any recursive system: the operation Merge. (...) Any operation other than Merge requires empirical motivation, and is a derivation from SMT [the strong minimalist thesis].”*

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)

- 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

1. Asymmetry in language

- (5) *asymmetry is inevitable*

a. linear (temporal) order

b. information (dependency)

- (6) *asymmetry is not random*

a. hierarchy = precedence (Kayne 1994)

b. coordination

i A + B

ii * A B +

c. c-command

- (7) DASR: derive asymmetry from the history of the derivation
- (8) Hypothesis: merge *creates* asymmetry

2. Symmetric vs. asymmetric merge

- (9) *Chomsky (2001, 2004)*
 - a. "the language faculty is [...] a system of discrete infinity. Any such system is based on a primitive operation that takes n objects already constructed, and constructs from them a new object: in the simplest case, the set of n objects." (2004:10)
 - b. "Merge takes two elements and creates a new one." (2001:4)
 - c. "the simplest possible [operation is] unstructured merge" (2004:13)

(10) $\{ \alpha, \{ \alpha, \beta \} \}$

(11) Alternative: merge yields an ordered pair $\langle \alpha, \beta \rangle$

- (13) *Arguments for set-merge*
 - i. simplicity
 - ii. projection
 - iii. inclusiveness

(14) Why *binary* merge (rather than *unary* merge) ?

- (15) *Merge requires minimally*
 - a. a set of elements to be merged ('numeration') = RESOURCE
 - b. a current derivation = WORK SPACE
 - c. a transfer operation from the resource to the work space

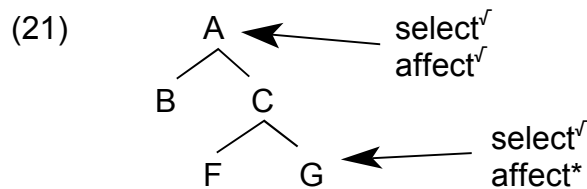
(16)	NUMERATION	MERGE	DERIVATION	SPELL-OUT
	<i>John, will, see, Mary</i>	Mary	$\langle \text{Mary}, \emptyset \rangle$	[Mary]
	<i>John, will, see</i>	see	$\langle \text{see}, \langle \text{Mary}, \emptyset \rangle \rangle$	[see Mary]
	<i>John, will</i>	will	$\langle \text{will}, \langle \text{see}, \langle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

- (17) *derives (without stipulation)*
 - a. the extension condition
 - b. binary branching
 - c. asymmetry

(18) strong hypothesis: move = transfer as well

- (19) resource contains minimally
 - a. numeration
 - b. parallel derivations
 and possibly
 - c. backups of merged material

(20) Extension condition: you may select something from inside a derivation, but not merge to (affect) something inside a derivation



(22) If move = merge (transfer), the extension condition follows if only the entire current derivation can be affected (= DASR).

3. Some interpretive effects of merge

(23) Sound: linear order (precedence), Nuclear Stress Rule

(24) Morphology: agreement

(25) Syntax: case, verb-second, linkers

(26) Meaning: predication, modification, complementation

In each case, the dependent element is the second member of the ordered pair.

(27) Asymmetry is temporal: merge turns the current derivation into a dependent

4. The typological dimension

4.1 Head marking vs. dependent marking (Nichols 1986, 1992)

CONSTRUCTION	HEAD	DEPENDENT
<i>possessive</i>	possessum	possessor
<i>attributive</i>	noun	adjective
<i>adpositional</i>	adposition	complement
<i>clausal</i>	verb	arguments

TABLE 1

(28) *possessive*

a.	DEPENDENT az ember the man 'the man's house'	HEAD haz-a house-3SG	Hungarian
b.	the man's	house	English

(29) *attributive*

a.	DEPENDENT wist high 'tall house'	HEAD t-citx° REL-house	Shuswap
b.	zelen-yj green-NOM.MASC.SG 'green house'	dom house _{MASC}	Russian

- (30) *adpositional*
- | | | | | |
|----|----------------|------|----------------|-----------|
| | | HEAD | DEPENDENT | |
| a. | bez | | brat-a | Russian |
| | without | | brother-GEN | |
| b. | r-umaal | | aa Yaax | Tz'utujil |
| | 3SG-by | | CL Yaax | |
| | 'by Yaax' | | | |

- (31) *clausal*
- | | | | | | |
|----|------------------------------------|--------------------|----------------|-----------------------|----------|
| |DEPENDENTS..... | | | HEAD | |
| a. | a-xàc'a | a-pñ°ès | a-š°q'è | ə-l è-y-te-yt' | Abkhaz |
| | the-man | the-woman | the-book | it-to.her-he-gave-FIN | |
| | 'The man gave the woman the book.' | | | | |
| b. | boku-ga | tomodati-ni | hana-o | ageta | Japanese |
| | 1SG-NOM | friend-DAT | flower-OBJ | gave | |
| | 'I gave my friend flowers.' | | | | |

(32) *Phrase structural definition of dependency (Nichols 1986:57)*

- a. a head determines the presence and properties of other material within the phrase (selection)
 b. a head determines the features of the phrase as a whole (projection)

4.2 The expression of dependency

- (33) Dependency is which must be can be and
- | | | | |
|----|----------------------------------|------|---------------------|
| a. | a <i>semantic</i> relation | e.g. | predication |
| b. | <i>syntactically</i> realized, | | in phrase structure |
| c. | <i>morphologically</i> marked, | | by agreement |
| d. | <i>phonologically</i> expressed. | | via cliticization |

- (34) The relations ((SEM → SYN) → MORPH) → PHON) need not be homomorphic.

I SEM → SYN

- (35) a. *subject* *predicate*
- | | | | | | | |
|----|--------------------|------------|----------------|------|------|-------|
| | Jij | eet | vlees | [NP] | [VP] | Dutch |
| | you | eat | meat | | | |
| b. | Eet | jij | vlees ? | [V] | [NP] | [NP] |
| | 'Do you eat meat?' | | | | | |

II ((SEM → SYN) → MORPH)

- (36)
- | | | | | |
|---------------------------|--------------|------------------------|--------------------|--------|
| | <i>verb</i> | <i>complement.....</i> | | |
| Ich | liebe | mein-en | Gartenzwerg | German |
| I | love:1SG | my-ACC.SG | garden-gnome | |
| 'I love my garden gnome.' | | | | |

(37) *incomplete dependency marking (standard)*

A dependency relation between α and β may be marked on γ , a term of β

(38) *dependent head-marking*

A dependency relation between α and β may be marked on γ , the head of β

(39) A marking on a head does not signify head marking

III (((SEM → SYN) → MORPH) → PHON)

(40) *head* **nəp'idi-da** *dependent* **gənanəm xa guk^w sa t'isəm** Kwakwala
 throw-DEIC child OBJ house OBL rock
 'The child hit the house with a rock (by throwing).'

(41) *phonological expression on an outsider (the subject)*
 nəp'idi-da **gənanəm=xa** gukw sa t'isəm

(42) *head dependent*
 a cup of coffee > a cup=of [cuppə] coffee

(43) cliticization onto a head does not signify head marking

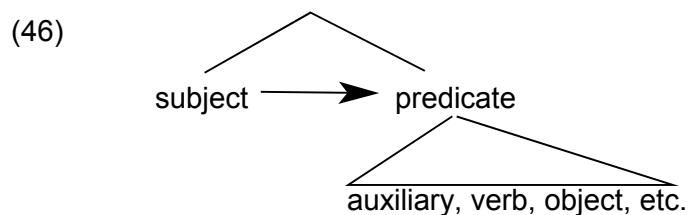
4.3 The nature of subject-verb agreement

(44) *semantic relation* predication
syntactic realization NP, XP
morphological marking head of XP (unmarked case)

(45) *other morphological markings*

a. *multiple marking*
Juma a-li-kuwa a-ngali a-ki-fanya kazi Swahili
 Juma₁ 1-PAST-be 1-still 1-PROG-do work
 'Juma was still working.'

b. *agreement on object*
 i. **Dios tupo'-n naxo-xt'e'wal wako'** Coahuilteco
 god DEM-1AGRS 1PL:SU-annoy CAUS
 'We annoyed god.'
 ii. **Dios tupo'-m xa-ka'wa xo e ?**
 god DEM-2AGRS 2SU-love AUX Q
 'Do you love god?'



(47) Relation not between *head-dependent* but between *dependent-nondependent*

(48) Subject-verb agreement is an instantiation of *dependent head-marking* (38).

(49) *Other considerations*

- a. Consistent dependent-marking languages commonly show subject-verb agreement
- b. The subject is not directly related to the verb (arguments are—a subject can be any type of argument and even a nonargument)

(50) Question: how much *nondependent-marking* is there in the languages of the world?

4.4 Review of Nichols' (1986, 1992) observations

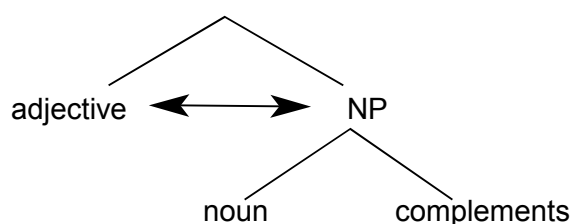
4.4.1 Possessive constructions

- (51) CONSTRUCTION SEMANTIC RELATION
- a. **Jan's boek** subject-predicate Dutch
 John-POSS book
- b. **het boek van Jan** head-complement
 the book of John
- (52) NONDEPENDENT DEPENDENT MARKING
- a. **az ember haz-a** dependent Hungarian
 the man house-3SG
 'the man's house'
- b. **the man's house** nondependent? English
 c. **het boek van Jan** dependent Dutch
 the book of John
- (53) the man his house (cf. Dutch *de man z'n [<zijn] huis*)
 the man= ='s house
- (54) *the izafet construction: dependent marking + cliticization*
- NONDEPENDENT DEPENDENT MARKING
- a. **asb= =é mard** dependent Persian
 horse EZ man
 'the horse of the man'
- b. i. **ki-tabu ch-a Juma** dependent Swahili
 7-book 7-EZ Juma
 'the book of Juma'
- ii. **vi-tabu vy-a Juma**
 8-book 8-EZ Juma
 'the books of Juma'
- (55) *genitive case: unclear*
- NONDEPENDENT DEPENDENT MARKING
- a. **kniga Ivan-a** dependent? Russian
 book Ivan-GEN
 'John's book'
- b. **Ahmeda-n wan** nondependent? Lezgian
 Ahmed-GEN voice
 'Ahmed's voice'

4.4.2 Attributive constructions

(56) the [new [students of linguistics]]

(57)



- (58) NONDEPENDENT DEPENDENT MARKING
a. **zelen-yj** **dom** *nondependent?* Russian
green-NOM.MASC.SG house_{MASC}
‘green house’
- b. **wist** **t-citx°** *dependent* Shuswap
high REL-house
‘tall house’
- (59) a. **calay** **a-monit** Karbi (Mikir)
funny REL-person
b. **monit** **calay**
person funny
- (60) a. **het** **boek-∅** Dutch
the:NTR.SG.DEF book_{NTR-SG}
‘the book’
b. **de** **boek-en**
the:PL.DEF book_{NTR-PL}
‘the books’
- (61) NONDEPENDENT DEPENDENTS.....
de **oud-e boek-en**
the:PL.DEF old-PL book_{NTR-PL}
‘the old books’

(62) Case and number are not inherent features of N, so dependent marking. Gender...?

(63) *the izafet construction*

- NONDEPENDENT DEPENDENT MARKING
a. **küh=** **=e boländ** *dependent* Persian
mountain EZ high
‘high mountain’
- b. **ki-ti** **ch-a m-ti** *dependent* Swahili
7-chair 7-REL 3-wood
‘wooden chair’

4.4.3 Adposition constructions

- (64) NONDEPENDENT DEPENDENT MARKING
a. **bez** **brat-a** *dependent* Russian
without brother-GEN
b. **r-umaal** **aa Yaax** *nondependent?* Tz’utujil
3SG-by CL Yaax
‘by Yaax’
- (65) ‘head marking’ adpositions are ‘relational nouns’ (Nichols 1992:58), marked by possessor agreement
- (66) NONDEPENDENT DEPENDENT MARKING
a. **ja** **a-płči** *dependent* Burushaski
1SG:OBL 1SG-side
‘with me, beside me’
b. **Lŋa Brumo** **mo-płči**
L.B.:NOM 3SG-side ‘with Langa Brumo’

- (67) Tz'utujil: a. noun raising ?
b. dependent precedes nondependent ?

(68) *spurious cases of head-marked adpositions*

- a. i. **i'-ma** ii. **te'-ma** iii. **po'le-ma** Wappo
1SG-for 3SG-for boy-for
'for me' 'for him' 'for the boy'
- b. i. **'ab** **t-wui** ii. **'am** **'em-wui** Papago
TOWARD 1PL-to AWAY 2PL-to
'toward us' 'toward you'
- c. i. **Waraka hyaye k-omok-no** Hixkaryana
Waraka from 1SG-come-IMM.PAST
'I have come from Waraka.'
- ii. **i-hyaye k-omok-no**
3SG-from 1SG-come-IMM.PAST
'I have come from him.'

4.5 Dependency revisited

(69) *The core dependency relations*

- a. head-complement: the complement is the dependent of the head
b. subject-predicate: the predicate is the dependent of the subject

	SUBJECT/HEAD		PREDICATE/COMPLEMENT	
<i>prosody</i>	weak	(√subject/√head)	strong	(√predicate/√complement)
<i>order</i>	'left'	(√subject/?head)	'right'	(√predicate/?complement)
<i>merge</i>	new	(√subject/?head)	old	(√predicate/?complement)
<i>dependency</i>	nondependent	(?subject/√head)	dependent	(?predicate/√complement)

TABLE 2

6. Conclusion

1. Dependencies are relations between sisters
2. Participants are *dependents* and *nondependents*
3. Agreement is always *dependent marking*
4. Clear examples of nondependent marking are few

References

Chomsky, 1995. *The minimalist program*. ! 2001. Derivation by phase ! 2004. Three factors in language design ! Epstein, 1995/1999. Un-principled syntax and the derivation of syntactic relations ! Hauser.Chomsky/Fitch 2002.The Faculty of Language: What is it, who has it, and how did it evolve? *Science* 298, 1569-1579. ! Nichols 1986 Head-marking and dependent-marking grammar. *Lg* 62, 56-119. ! 1992 *Linguistic diversity in space and time*. Chicago: University of Chicago Press. ! Kayne, 1994. *The antisymmetry of syntax*.

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In a simple word, asymmetric encryption is more secure than symmetric encryption. Let's understand the key differences between symmetric vs asymmetric encryption. In a simple word, asymmetric encryption is more secure than symmetric encryption. Information security has grown to be a colossal factor, especially with modern communication networks, leaving loopholes that could be leveraged to devastating effects. Originally mentioned in #2037 (comment), I'm noticing a consistent quirk in type merging where it only works with symmetrical record sets, ie: all subschemas must provide matching records to be merged. If one service returns null for a m While symmetric encryption is often used as a synonymous of symmetric cryptography, asymmetric cryptography embraces two primary use cases: asymmetric encryption and digital signatures. Therefore, we may represent these groups as follows: Symmetric key cryptography. Symmetric encryption. Asymmetric cryptography (or public-key cryptography). Asymmetric encryption (or public-key encryption). Digital signatures (may or may not include encryption). Originally mentioned in #2037 (comment), I'm noticing a consistent quirk in type merging where it only works with symmetrical record sets, ie: all subschemas must provide matching records to be merged. If one service returns null for a m