Towards Symmetry-driven Syntax[*]

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1 Introduction

⋆ In this talk, we will argue for the hypothesis that the computation in human language (syntax) is fundamentally driven for symmetry.

(1) *Symmetry Principle of Syntax*:
A generative procedure yields a symmetric output.

(2) *Symmetry*:
For a generative procedure GP yielding $\Sigma = \{X_1, ..., X_n\}$, Σ is symmetric $=_{def.}$ $X_1, ..., X_n$ are uniform with respect to GP, i.e., no property or relation assigned by GP makes an element X_i distinct from any other element X_j, $1 \leq i,j \leq n$).

(3) *Generative Procedures (GP)*:
a. Merge (Set-Merge, external and internal)
b. MERGE (mapping between workspaces)
c. Narrow Syntax (recursive MERGE-based computation by phase, generating "Transfer-ready" representations)

(4) Asymmetric operations, excluded from Narrow Syntax:
a. Linearization (precedence-assignment)
b. Selection
c. Projection
d. Pair-Merge

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2 Symmetry of Merge ⇒ Bare Phrase Structure

⋆ The standard assumptions, essentially originating from Chomsky's (1970, 1981, 1986) X-bar theory:

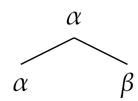
(5) *Universal projection*:
Syntactic Objects (SOs) are not "bare" but always associated with certain 'label' symbols like NP, V′, CP, etc., namely "projections" (copies) of head LIs (X^0's).

(6) *Projection = endocentricity*:
Projection is *the* device to encode endocentricity (headedness), i.e., *i.e.*, centrality of a single lexical item (LI) in determining the interpretive properties of a constituent.

(7) *Universal endocentricity*:
As a result of (5)-(6), every SO is endocentric, leaving no room for non-endocentric structures (thus departing from the traditional Phrase Structure Grammar—e.g., S → NP VP)

⋆ In Chomsky's (1994, 1995) conception of Merge...

(8) Merge(α, β) = a. $\{\alpha, \{\alpha, \beta\}\}$

b. 

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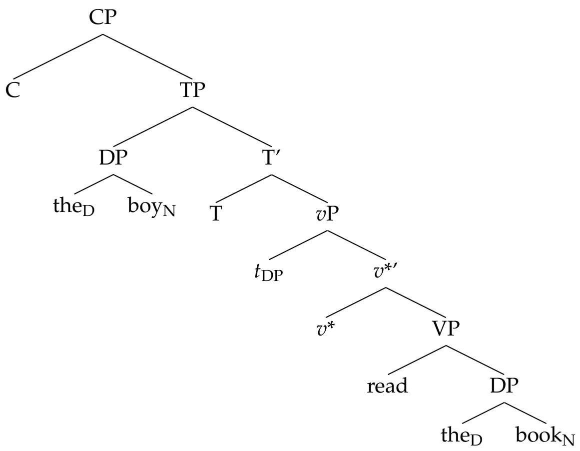
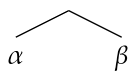
(9)



★ None of the traditional stipulations in (5)-(7) are necessary in the theory of projection-free Merge (Chomsky 2004 *et seq.*; see also Fukui 2011, Narita 2014, Fukui and Narita 2014):

(10) Merge(α, β) = Σ = a. $\{\alpha, \beta\}$

b.



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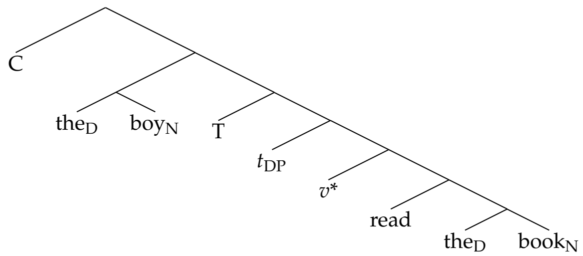
(11) a. {C, {{the$_D$, boy$_N$}, {T, {t_{DP}, {v*, {read, {the$_D$, book$_N$}}}}}}}

b.



(order irrelevant)

(12) "[R]eference to labels (as in defining c-command beyond minimal search) is a departure from SMT, hence to be adopted only if forced by empirical evidence, enriching UG." (Chomsky 2007:23)

(?) But why *couldn't* Merge be the one in (8) or any other form, if it is only a matter of random genetic mutation, an evolutionary accident? Why should Merge take the form as it is defined in (10)?

★ Merge as defined in (10) satisfies the Symmetry Principle of Syntax (13).

(13) *Symmetry Principle of Syntax* (= (1)):
A generative procedure yields a symmetric output.

(14) *Symmetry* (= (2)):
For a generative procedure GP yielding $\Sigma = \{X_1, ..., X_n\}$, Σ is symmetric $=_{def.}$ $X_1, ..., X_n$ are uniform with respect to GP, i.e., no property or relation assigned by GP makes an element X_i distinct from any other element X_j, $1 \leq i,j \leq n$).

(15) Relations assigned to α and β by Merge(α, β):
a. Sister-of: $\langle\alpha, \beta\rangle, \langle\beta, \alpha\rangle$
b. Term-of:[1] $\langle\alpha, \{\alpha, \beta\}\rangle, \langle\beta, \{\alpha, \beta\}\rangle, \langle\{\alpha, \beta\}, \{\alpha, \beta\}\rangle$
c. *Projects[2]
d. *Selects (cf. Pesetsky and Torrego's (2006) Vehicle Requirement on Merge, Wurmbrand's (2014) Merge Condition)
e. *Precedes (cf. Saito and Fukui 1998, Kayne 2011)
f. *C-commands

★ Merge (10) has the properties it has, perhaps not really because it is the simplest and the most primitive form (which is apparently false; see Narita

[1] *Term-of* is defined as follows (Chomsky 1995:247)

(i) For any SO K,
a. K is a term of K.
b. If L is a term of K, then the members of L are terms of K.

[2] Citko's (2008, 2011) notion of "Project Both" might appear to be symmetric in the sense of (14). However, Citko treats "Project Both" as a special case that can appear only when certain conditions are met, and it is not her claim that every instance of Merge yields a symmetric output.

et al. 2017),[3] but because symmetry is a fundamental principle of nature (cf. the "third factor," Chomsky 2005, 2007, 2008).

★ Merge as set-formation (10) is arguably the only combinatory procedure of Narrow Syntax in accord with the Symmetry Principle, which excludes other "asymmetrizing" operations like Linearization (Chomsky 1995, 2013), Projection (Collins 2002, Seely 2006, Chomsky 2007, 2013, Narita 2014), Selection (Chomsky 2004), and Pair-Merge (Oseki 2015).

3 Symmetry of MERGE

3.1 Extending Merge to MERGE

(16) A workspace (WS) is a set of accessible SOs in a given derivation.

(17) *Merge* (generalized to n-ary):
Merge takes n elements $\alpha_1,..., \alpha_n$ from a given WS, and produces a new element $\{\alpha_1,..., \alpha_n\}$ within the WS.

★ Merge can be understood as a mapping from a WS to a modified WS (Chomsky, lecture at the University of Reading, May 11, 2017).[4]

[3]Narita et al. (2017) point out that Merge is in fact a complex operation that consists of at least two components: (i) one that selects n elements α_1, ..., α_n from a given workspace, and (ii) the other that forms a set of them, $\{\alpha_1, ..., \alpha_n\}$. They call the procedures (i) and (ii) *0-Search* (S_0) and *0-Merge* (M_0), respectively, and characterize Merge as a composite of these two operations, $M_0 \circ S_0$. See Narita et al. (2017) for the hypothesis that various other operations in syntax (such as Agree, Labeling, Chain-formation, binding, etc.) can be reformulated as instances of $M_0 \circ S_0$, articulating another characterization of Merge-only syntax. See also Kato et al. (2014).

[4]Chomsky's formulation of MERGE is as follows:

(i) Given WS, a set of SOs, let Σ be the shortest sequence (X_1, ..., X_n) such that
a. X_i is accessible, and
b. Σ exhausts WS
MERGE(Σ) = {{X_1, X_2}, ..., X_n}

In our definition (18) and its extension in (19), we eliminate the binarity restriction and the intermediate formation of sequence Σ.

(18) MERGE takes a WS $S_i = [\alpha_1,..., \alpha_m]$ and generates a modified WS $S_{i+1} = [\{\alpha_1,..., \alpha_n\}, \alpha_{n+1},..., \alpha_m]$ $(1 \leq n \leq m)$.[5]

★ We have to make room for Internal Merge, which picks out a single SO α_i and combines it with a proper term of it α_j.

(19) *MERGE*:
Given a set $\Sigma = [\Sigma_1, ..., \Sigma_m]$, $\text{MERGE}(\Sigma) = [\{\alpha_1, ..., \alpha_n\}, \beta_1, ..., \beta_k]$ $(0 \leq n,k \leq m)$, where
(i) each α_i $(1 \leq i \leq n)$ is a term of some Σ_j $(1 \leq j \leq m)$,[6] and
(ii) $\{\Sigma_1, ..., \Sigma_m\} \subset \{\alpha_1, ..., \alpha_n\} \cup \{\beta_1, ..., \beta_k\}$.[7]

★ MERGE satisfies the symmetry principle (1)/(13).

(20) Properties assigned to $\{\alpha_1,..., \alpha_n\}, \beta_1,..., \beta_k$ by MERGE:
a. Is-Accessible: $\{\alpha_1,..., \alpha_n\}, \beta_1,..., \beta_k$
b. Is-a-Root: $\{\alpha_1,..., \alpha_n\}, \beta_1,..., \beta_k$

★ Merge (17) is a sub-procedure of MERGE (19), which also satisfies the Symmetry Principle.

(21) Relations assigned to $\alpha_1, ..., \alpha_n$ by Merge (see (15)):
a. Sister-of: $\langle\alpha_1, \alpha_2\rangle, \langle\alpha_2, \alpha_1\rangle, ...$
b. Term-of: $\langle\alpha_1, \{\alpha_1, ..., \alpha_n\}\rangle, \langle\alpha_2, \{\alpha_1, ..., \alpha_n\}\rangle, ...,$
$\langle\alpha_n, \{\alpha_1, ..., \alpha_n\}\rangle, \langle\{\alpha_1, ..., \alpha_n\}, \{\alpha_1, ..., \alpha_n\}\rangle$

3.2 Formation of Lexical Array (Initial Workspace) as MERGE

★ A derivation D can be represented as a sequence $\langle S_0, S_1, ..., S_f\rangle$ $(f > 0)$, where each S_i is a given stage of WS and is mapped to S_{i+1} by a syntactic operation (such as MERGE).[8]

[5]Just for expository convenience, we will henceforth use square brackets [ ] to represent workspaces, but it should be understood that a workspace is just a set, with no internal ordering of elements.

[6]*Term-of* is a reflexive relation (see note 1). Thus, any SO is a term of itself.

[7](19-ii) represents the idea that the object produced by MERGE must exhaust the input WS.

[8] Or, perhaps MERGE is the only syntactic operation (see Chomsky 2007, 2008, 2013, 2015, Berwick 2011, Boeckx 2014, Kato et al. 2014, Narita et al. 2017).

★ The very first stage of WS S_0 is what is called the "Lexical Array" (LA), understood as a finite collection of LIs $\{LI_1, ..., LI_n\}$ (Chomsky 2000; cf. Chomsky's (1995) notion of Numeration).

(?) What is the operation that forms LA (S_0)?

★ For this matter, consider the notion of "lexicon," defined as the set of LIs in a given language.

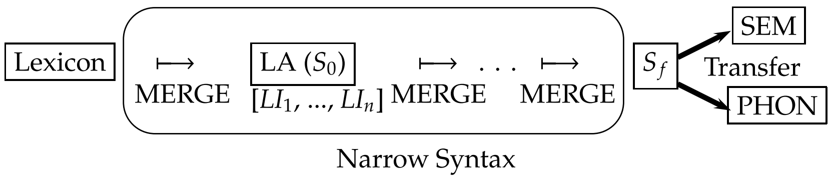
(22) The *Lexicon (Lex)* of an I-language L is a set of all LIs stored for L. Lex = $\{LI_1,..., LI_m\}$ ($m > 0$)

★ Then, given the definition in (19), MERGE may take Lex = $\{LI_1,..., LI_m\}$ as its input and produce a modified set $\Sigma' = \{\{LI_1,..., LI_n\}, LI_1,..., LI_m\}$ ($1 \leq n \leq m$).

★ $\{LI_1,..., LI_n\}$ in (22) can be identified as LA (S_0) for a derivation D.

★ No extra operation other than MERGE, such as Numeration-formation or Select (Chomsky 1995:225-226), is necessary for the formation of LA (S_0), a desirable result.

(23) *MERGE-based Narrow Syntax* (to be elaborated):



(24) *which book$_i$* does the man read t_i?
a. MERGE(Lex) = {{the, man, read, which, book, T, C}, $LI_1,..., LI_n$} → LA (S_0): [the, man, read, which, book, T, C]
b. MERGE(LA) = S_1 = [{which, book}, the, man, read, T, C]
c. MERGE(S_1) = S_2 = [{the, man}, {which, book}, read, T, C]
d. MERGE(S_2) = S_3 = [{read, {which, book}}, {the, man}, T, C]
e. MERGE(S_3) = S_4 = [{{the, man}, {read, {which, book}}}, T, C]
f. MERGE(S_4) = S_5 = [{T, {{the, man}, {read, {which, book}}}}, C]
g. MERGE(S_5) = S_6 = [{{the, man}, {T, {{the, man}, {read, {which, book}}}}}, C]
h. MERGE(S_6) = S_7 = [{C, {{the, man}, {T, {{the, man}, {read, {which, book}}}}}}]
i. MERGE(S_7) = S_f = [{{which, book}, {C, {{the, man}, {T, {{the, man}, {read, {which, book}}}}}}}]

3.3 Narrow Syntax as a Mapping to a Unified Syntactic Object

(?) For any derivation, the end result is always that all LIs within LA are used up and incorporated into a single SO in S_f. Why should it be the case?

▹ Previous approaches avoided this question by definition or stipulation.

(25) *Some interface condition requires so* (Chomsky 1995:226): "At the LF interface, Σ can be interpreted only if it consists of a single syntactic object."

← Stipulating a tautological interface condition is clearly non-explanatory, begging the why-question (Al-Mutairi 2014, Narita 2017).

(26) *Indices of Numeration must be reduced to zero* (Chomsky 1995:225): "A computation constructed by C_{HL} does not count as a derivation at all, let alone a convergent one, unless all indices [of the given Numeration] are reduced to zero."

← In bare phrase structure in accord with the Inclusiveness Condition (Chomsky 1995, 2000), there is no such thing as Numeration, or indices assigned to LIs.

(27) *LIs bear uninterpretable features that must be checked via probe-goal relations* (Chomsky 1995:234; see also Chomsky 2000, Frampton and Gutmann 2002, Pesetsky and Torrego 2006, Wurmbrand 2014, among many others)

← Why not checking the relevant features at the stage of LA/S_0, where all LIs are accessible as such ("c-commanding" each other)?

★ The answer we propose: the Symmetry Principle again!

★ Narrow Syntax as a whole is a generative procedure, executing a series of syntactic operations (perhaps MERGE-only; see note 8) leading to S_f. Then, it should also satisfy the Symmetry Principle (28), which means that S_f is symmetric in the sense of (29).

(28) *Symmetry Principle of Syntax* (= (1), (13)):
A generative procedure yields a symmetric output.

(29) *Symmetry* (= (2), (14)):
For a generative procedure GP yielding $\Sigma = \{X_1, ..., X_n\}$, Σ is symmetric $=_{def.}$ $X_1, ..., X_n$ are uniform with respect to GP, i.e., no property or relation assigned by GP makes an element X_i distinct from any other element X_j, $1 \leq i,j \leq n$).

★ MERGE(LA) (e.g., (24b)) creates an asymmetry within the WS, an "unbalanced" state consisting of a structured SO vs. atomic/unstructured LIs.

(30) a. LA = $[LI_1, ..., LI_n]$ (symmetric, each LI_i being an independent LI)
b. MERGE(LA) = $S_1 = [\{LI_1, LI_2\}, LI_3, ..., LI_n]$
(asymmetric, $\{LI_1, LI_2\}$ is a set and others LIs[9])

▹ *Term-of* is clearly a relation assigned by Narrow Syntax (specifically by Merge).

▹ In S_1, *term-of* defined only for $\{LI_1, LI_2\}$ and constituents thereof (LI_1, and LI_2).

[9] Cf. Fukui's (2011:88) remark: "The only entity that seems to be available to Merge is the 'braces', i.e. the information regarding the layers of sets formed by (prior) applications of Merge (i.e. the concept of nth order). Thus, x and {x} should be distinguishable, if braces are indeed ontological entities (not an innocuous assumption) and Merge is able to 'see' them (ditto). In this way, Merge should be able to detect the existence of asymmetry (or lack thereof), to see whether it should apply."

▹ Since *term-of* makes $\{LI_1, LI_2\}$ distinct from other elements $LI_3, ..., LI_n$ within S_1, S_1 is not symmetric, hence it cannot constitute an output of Narrow Syntax due to the Symmetry Principle. The same is true for any stage of WS consisting of more than one SO.

★ The only way to "symmetrize" the WS $[\Sigma_1, ..., \Sigma_n]$ with respect to *term-of* is to reduce n to 1, guaranteeing that all SOs within the WS are terms of a single SO Σ_n.

★ Therefore, once MERGE applies to LA, the Symmetry Principle forces it to keep combining LIs until it yields a unified SO.

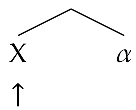
4 Symmetry of Phases

★ Let us assume with Chomsky (2004, 2007, 2008) that Transfer (mapping to SEM and PHON) has periodic access to SOs within the WS ("*phases*," to adopt a familiar terminology).

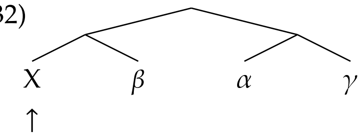
★ By definition, each Transfer domain TD constitutes the output of Narrow Syntax and the input to Transfer.

(?) It follows from the Symmetry Principle that TD must be symmetric. How can this be achieved?

★ For this matter, consider the fact that each LI X within LA may contain one or more "features" F, whose function is to make SOs containing it distinct from other SOs.

(31)


F: distinguishing X from α within $\{X, \alpha\}$

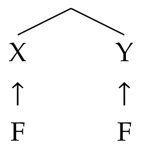
(32)


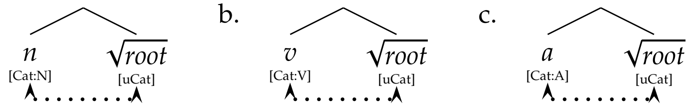
F: distinguishing $\{X, \beta\}$ from $\{\alpha, \gamma\}$ within $\{\{X, \beta\}, \{\alpha, \gamma\}\}$

⋆ Then, TD cannot be of a form like (31) or (32), because F makes X/{X, β} distinct from α/{α, γ} in violation of the Symmetry Principle. Let us call this consequence the “Phase Symmetry Condition.”

(33) *Phase Symmetry Condition* (*PSC*):
Transfer can apply only to symmetric SOs.

⋆ Symmetric SOs are illustrated by:

(34)


a. b. c.


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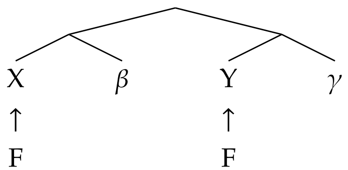
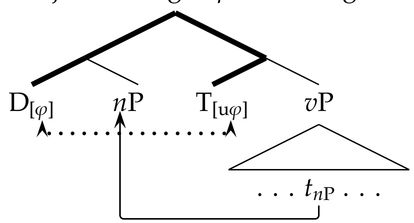
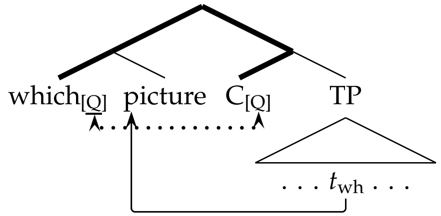


a. Subject-raising + φ-feature agreement:

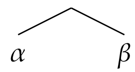


b. *Wh*-movement + Q-feature agreement (see Cable 2007, 2010, Narita 2011/2014, Chomsky 2013):



▹ We may call such featurally symmetric SOs “F-equilibria” (Narita and Fukui 2014, 2016, Fukui and Narita 2012/2017).

(36) *F-Equilibrium*:
Given a formal feature F in a syntactic object (SO) $\Sigma = \{\alpha, \beta\}$, Σ is *in an F-equilibrium* (or *F-symmetric*) if α and β share a matching feature F that is equally prominent in α and β, and there exists no feature $G \neq F$ that is more prominent than F in Σ. Otherwise, the SO is *asymmetric with respect to F* (*F-asymmetric*).

(37)


... Both α and β are free from active features

▹ We will discuss cases of (37) in §5.

⋆ Transfer contributes to cyclic reduction of computational resources: it applies to each symmetric SO Σ as soon as possible (cf. Pesetsky’s (1989) Earliness Principle), strips off features relevant to interpretation, and terminates access to Σ for further computation (the Phase-Impenetrability Condition; Chomsky 2000, 2001).

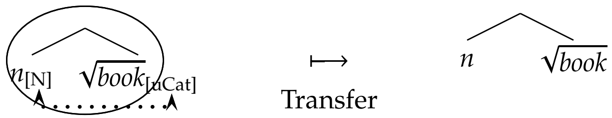
(38) *Transfer*:
a. applies to a symmetric SO Σ as soon as it can.
b. strips off relevant features from Σ for CI- and SM-interpretations.
c. makes Σ “frozen in place,” no longer accessible for further computation (PIC; while remaining unvalued feature [uF] may

still contribute to symmetry-formation as in (39g), (39m);[10] see Bošković 2007).

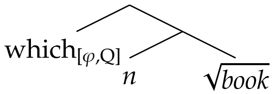
(39) *Which book$_i$* does the man read t_i?

a. LA (S_0): [which$_{[\varphi,\mathrm{Q}]}$, $\sqrt{book}_{[\mathrm{uCat}]}$, $n_{[\mathrm{N}]}$, $\mathrm{C}_{[\mathrm{Q}]}$, $\mathrm{T}_{[\mathrm{u}\varphi]}$, the$_{[\varphi]}$, $\sqrt{man}_{[\mathrm{uCat}]}$, $v^*_{[\mathrm{V},\mathrm{u}\varphi]}$, $\sqrt{read}_{[\mathrm{uCat}]}$]

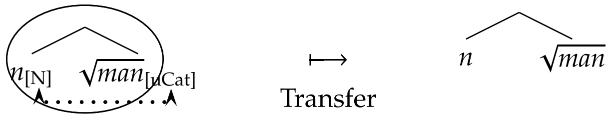
b. Merge($n_{[\mathrm{N}]}$, $\sqrt{book}_{[\mathrm{uCat}]}$) =



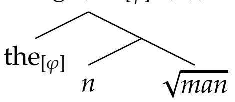
c. Merge(which$_{[\varphi,\mathrm{Q}]}$, (b)) =



d. Merge($n_{[\mathrm{N}]}$, $\sqrt{man}_{[\mathrm{uCat}]}$) =

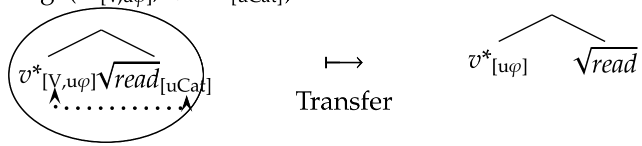


e. Merge(the$_{[\varphi]}$, (d)) =

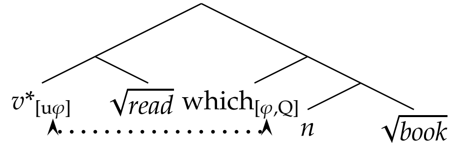


[10]The principle of Full Interpretation (FI; Chomsky 1995:194) requires uF to contribute to interpretation in some way or the other. Entering into an F-equilibrium is one way to satisfy FI, as we will assume.

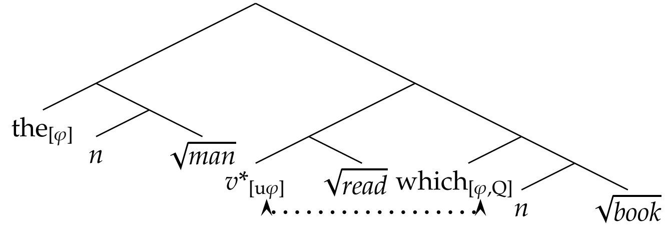
f. Merge($v^*_{[\mathrm{V},\mathrm{u}\varphi]}$, $\sqrt{read}_{[\mathrm{uCat}]}$) =[11,12]



g. Merge((f), (c)) =[13]



h. Merge((e), (g)) =

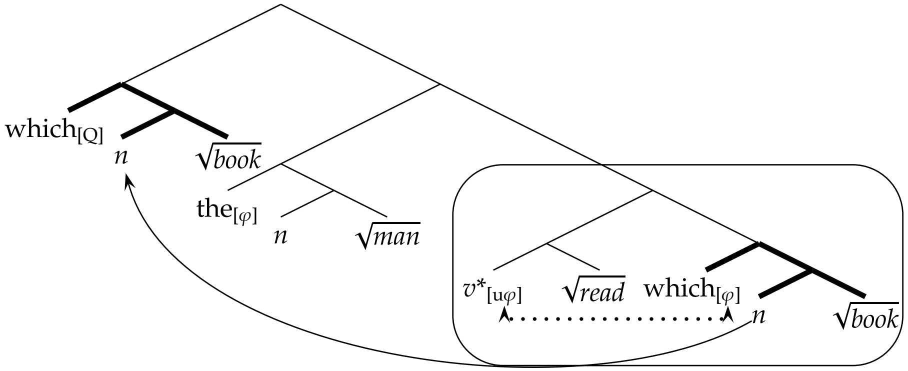


i. Merge({which$_{[\varphi,\mathrm{Q}]}$, {n, $\sqrt{book}$}}, (h)) =

[11]We assume with Borer (2005, 2017) that a verbal root directly merges with v/v^* for categorization, with both external and internal arguments severed from the verbal complex {v, $\sqrt{root}$} (Kratzer 1996, 2000).

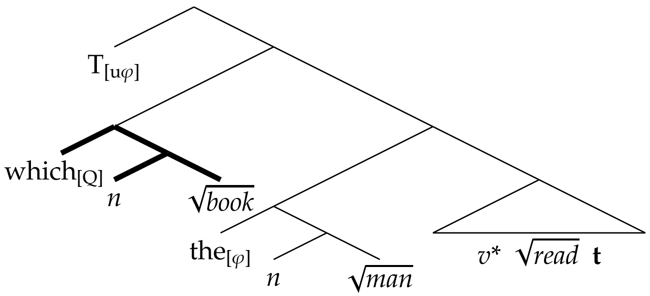
[12]We assume that Transfer can selectively strip off features contributing to symmetry, leaving other features for later computation. See also Obata and Epstein (2008, 2011) and Obata (2010, 2012) for the notion of "feature-splitting."

[13]We assume that Agree(ment) is not an independent operation but essentially reducible to minimal search, applying from top-down and relating matching features for an F-equilibrium. See also Narita et al. (2017).

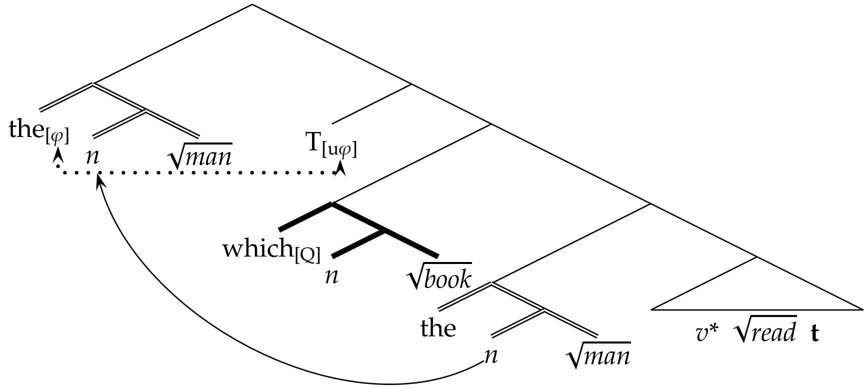


⟼ Transfer

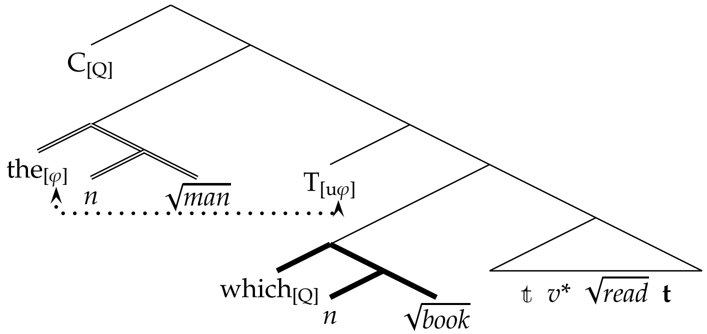
j. Merge($T_{[u\varphi]}$, (i)) =



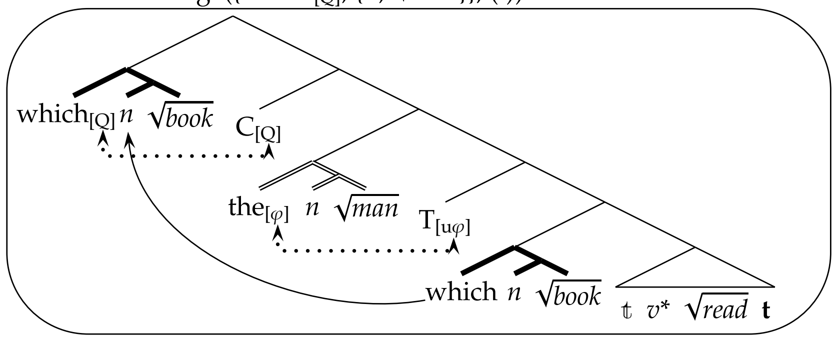
k. Merge({$the_{[\varphi]}$, {n, $\sqrt{man}$}}, (j)) =



l. Merge($C_{[Q]}$, (k)) =



m. Merge({$which_{[Q]}$, {n, $\sqrt{book}$}}, (l)) =



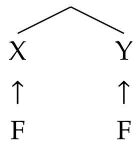
★ It follows that Agree(ment) typically appears at each Transfer-domain as a result of F-equilibrium-formation.

5 Symmetry of Root Clauses

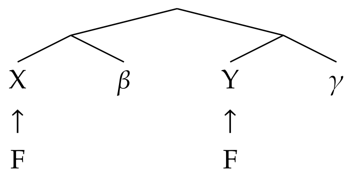
5.1 On Feature-free Symmetry

⋆ Symmetric SOs susceptible to Transfer:

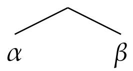
(40)



(41)



(42)



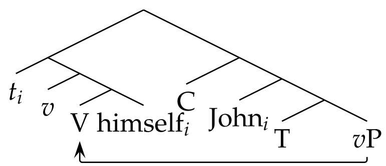
... Both α and β are free from active features

⋆ (42) arises for cases where the formal features within α and β are already subjected to Transfer.

⋆ *Case 1*: predicate-fronting

(43) a. [$_{v\mathrm{P}}$ Criticize himself$_i$], John$_i$ did $t_{v\mathrm{P}}$.

b.



⋆ *Case 2*: Multiple Spec constructions in Japanese[14]

[14] See Goto (2013) for the idea that scrambling in languages like Japanese may result in structures unlabelable by Chomsky's (2013, 2015) labeling algorithm. Capitalizing on Chomsky's (2008) hypothesis that labeling is necessary only for further computations, he argues that the root CP is a special case that requires no further computation and therefore no labeling.

(44) *Japanese*: Multiple Subject (Kuno 1973)

Bunmeikoku-ga dansei-ga heikinzyumyoo-ga mizikai.
civilized.countries-NOM male-NOM average.lifespan-NOM is.short

'As for civilized countries, speaking of men, their average lifespan is short.'

(45) *Japanese*: Scrambling

a. *sono hon-o$_j$* *Mary-ni$_i$* John-ga t_i t_j watasita
that book-ACC Mary-DAT John-NOM handed
'*That book$_j$*, *to Mary$_i$*, John handed t_j t_i.'

b. *Mary-ni$_i$* *sono hon-o$_j$* John-ga t_i t_j watasita
Mary-DAT that book-ACC John-NOM handed
'*To Mary$_i$*, *that book$_j$*, John handed t_j t_i.'

(46) Japanese syntax lacks φ-features, hence nominals never define φ-(a)symmetry (Fukui 1986/1995, Kuroda 1988, Narita and Fukui 2014, 2016, forthcoming, Fukui and Narita 2012/2017, Saito 2014, 2016, Sorida 2017a,b).

⋆ *Case 3*: Topicalization

(47) *Mary's book*, I have to read *Mary's book*.

... also interpretable as left-dislocation, in which case the two instances of *Mary's book* are not copies but independent repetitions.

(48) In German, declarative root(-like) contexts at least and at most one XP must occupy the position before the finite verb (V2 realized at C) (see Emonds 2004, 2012 and Blümel 2017 for recent accounts).[15]

(49) *German*:

a. [$_{\mathrm{DP}}$ Maria] hat t_{DP} den Mann gestern gesehen
Mary has the man yesterday seen
'Mary has seen the man yesterday.'

[15] Capitalizing on Chomsky's recent theory of labeling algorithm (Chomsky 2013, 2015), Blümel argues that declarative root clauses in German must remain labelless, and prefield-occupation in V2-languages is one strategy to ensure this. We will argue against Chomsky's notion of labeling algorithm in §5.2.

b. [$_{\text{AdvP}}$ gestern] hat Maria den Mann t_{AdvP} gesehen
yesterday has Mary the man seen

c. [$_{v\text{P}}$ den Mann gesehen] hat Maria gestern $t_{v\text{P}}$
the man seen has Mary yesterday

d. [$_{\text{CP+fin}}$ dass die Sonne scheint] hat Maria t_{CP} gesagt
that the sun shines has Mary said
'That the sun shines, Mary said.'

e. [$_{\text{CP-fin}}$ die Scheibe einzuschlagen] hat Maria t_{CP} beschlossen
the window to-crush has Mary decided
'Mary decided to crush the window.'

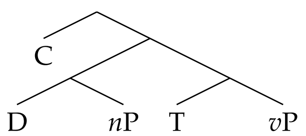
f. [$_{\text{PP}}$ über den Wolken] muss die Freiheit t_{PP} wohl grenzenlos sein
above the clouds must the freedom PTCL limitless be
'Freedom must be limitless above the clouds.'

g. [$_{\text{AP}}$ schön] ist Maria t_{AP}
beautiful is Mary
'Mary is beautiful.'

▹ Root clauses are by definition the final output of syntax, which must be symmetric ("exocentric") due to the Symmetry Principle.

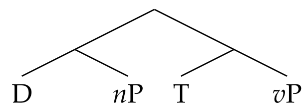
▹ In order to generalize the Symmetry Principle effect, we may adopt Bošković and Lasnik's (2003) idea that matrix declarative clauses in languages like English lack C, as in (51). Alternatively, we can also say that the matrix subject DP obligatorily moves to Spec-C via topicalization, as in (52).

(50)

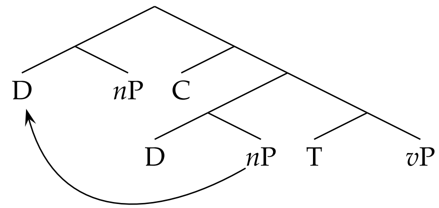


... asymmetric ({LI, phrase})[16]

(51)



(52)



5.2 Against Universal Labeling

★ Chomsky (2013, 2015) stipulates that every SO must be labeled by the following algorithm at SEM and for the rules of the phonological component.

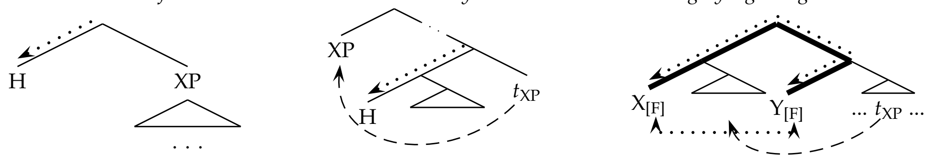
(53) *Chomsky's (2013) Labeling Algorithm (LA)*:

a. *Minimal Search of Head*:
For each SO Σ, define the most prominent lexical item (LI) within Σ as the label of Σ.

b. *Trace Invisibility*:
If α in $\{\alpha, \beta\}$ undergoes IM, the label of β becomes the label of $\{t_\alpha, \beta\}$.

c. *Labeling by Agreeing Features*:
If XP and YP share an agreeing feature F as the most prominent element, then the bifurcated inspection into XP and YP can single out F as the label of {XP, YP}.

a′. *Minimal Search of Head*: b′. *Trace Invisibility*: c′. *Labeling by Agreeing Features*:



★ However, unlabeled structures are commonly attested in natural languages, such as those exemplified above.

[16]See Fukui (2011:88), quoted in note 9.

★ Unlike Chomsky's labeling theory, our Symmetry Principle allows two notions of symmetry (stable structures):
- F-equilibrium ((40), (41))
- lack of F ((42))

6 Symmetry at the Syntax-Semantics Interface

★ The Symmetry Principle provides a general rationale for rule ordering in syntax.

(54) *Symmetry → Transfer*:
Each Transfer domain shows symmetry (with matching features of equal prominence, or with no feature involved).

(55) *External Merge → Internal Merge*:
For any syntactic feature F, an application of External Merge that creates an asymmetric structure ($\{\alpha_{[F]}, \beta\}$) entails a later application of Internal Merge that yields an F-equilibrium ($\{\alpha_{[F]}, \beta_{[F]}\}$).

★ If we combine (54) and (55) with a couple of other observations below, then we can derive the overarching paradigm in (59).

(56) *Duality of semantics* (Chomsky 2004, 2007, 2008):
The bifurcation of External and Internal Merge correlates with the duality of "d(eep)-structure" and "s(urface)-structure" interpretations (θ-related properties like selectional properties and predicate-argument structure vs. discourse-related properties such as new-old information, specificity, topic-focus, scopal effects).

(57) *D-structure semantics ≈ Endocentricity*:
Properties of d-structure interpretation are primarily configured by a designated lexical item (a *head*).

(58) In contrast, it is not clear whether s-structure semantics is endocentric in any meaningful sense.
a. topic-focus, theme-rheme structure
b. operator-scope
c. new-old information, specificity

(59) *Generalization*:

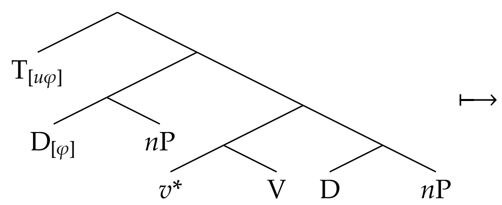
a. asymmetry	b. symmetry
: introduced by External Merge	: typically (but not always) derived by Internal Merge
: shows no agreement	: shows agreement or no feature is involved
: appears phase-internally	: appears at each Transfer domain
: shows endocentricity	: shows no endocentricity
: contributes to lexical, "d-structure" interpretation (predicate-argument structure, selection, etc.)	: contributes to discourse-related, "s-structure" interpretation (quantificational, topic-focus, etc.)

7 Implications for Comparative Syntax

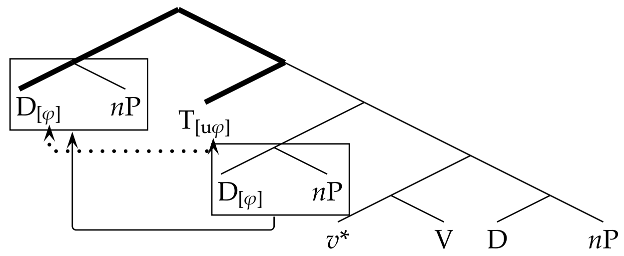
(60) Japanese is a language that lacks active φ-features for nominal declensions and subject-verb agreement (Kuroda 1965, 1988, Fukui 1986/1995, 1988, 2006).

(61) Watasi-ga/anata-ga/gakusei-ga maitosi ronbun-o kak-u.
I-NOM/you-NOM/student-NOM every.year paper-ACC write-PRES
'I/you/a student (students) writes a paper (papers) every year.'

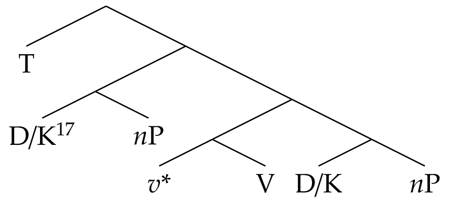
★ **Consequence 1:**
There is no obligatory φ-driven A-movement in Japanese-type languages.

(62) English-type: A-movement obligatory for φ-equilibrium-formation:
a.


b.

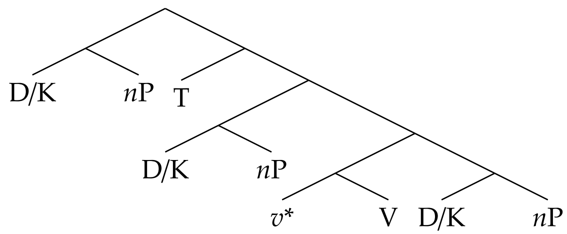


(63) Japanese-type: Lack of obligatory A-movement:



★ **Consequence 2:**
The "Spec-T" position thus remains as a vacant site for "major subject" (topic-like elements) in Japanese-type languages.

(64)



(65) *Japanese*: major subject construction

natu-ga biiru-ga umai.
summer-NOM beer-NOM tasty
'As for the summer, beer tastes good."

(66) *Summer, beer tastes good.

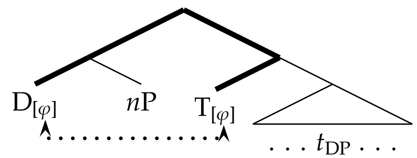
★ **Consequence 3:**
TP need not get "closed-off" by Transfer in Japanese-type languages due to the lack of F-equilibrium. Thus, any number of nominals can be merged into this domain (cf. Fukui 1986/1995, 1988, 2006).

(67) *Japanese*: sentence with more than one major subject (Kuno 1973)

Bunmeikoku-ga dansei-ga heikinzyumyoo-ga mizikai.
civilized.countries-NOM male-NOM average.lifespan-NOM is.short
'It is civilized countries that men, their average lifespan is short in.'

(68) *Civilized countries, male, the average lifespan is short (with the intended meaning 'it is civilized countries that men, their average lifespan is short in.')

(69) TP undergoes Transfer as soon as it enter into a φ-equilibrium. It is hence "closed-off," disallowing further merger in languages like English:



★ **Consequence 4:**
Nominativeless sentences are possible in Japanese, due to the lack of [$u\varphi$] on T (Kuroda 1978:note 2).

(70) a. Siguretekita.
shower-started
'It started to shower.'

b. Watasi-ni-wa [soo da to] omow-are-ta.
I-to-TOP so CPL that think-PASS-PAST
'It seemed to me that way.'

[17] The φ-less counterpart of D in Japanese may be what is sometimes called "*K(ase)*" (Fukui 1986/1995: 107, fn. 11, Lamontagne and Travis 1986, Bittner and Hale 1996a,b, Neeleman and Weerman 1999, Asbury 2008, Caha 2009, Saito 2014, 2016, Sorida 2017a,b and references cited therein; cf. Chomsky's 2007 n*). It is also possible that argument nominals are bare nPs without further projections in languages like Japanese. We will not pursue this matter here.

c. Haha-kara kane-o okuttekita.
mother-from money-ACC sent
'Mother sent me some money.'

d. [Obama-ga moosugu rainitisuru to]
Obama-NOM soon come.to.Japan that
iw-are-teiru.
say-PASS-PROG.PRES
'It is said that Obama will come to Japan soon.'

★ **Consequence 5:**
PP-subjects are possible in Japanese, due to the lack of [$u\varphi$] on T.

(71) watasi-kara kare-ni hanasikake-ru.
I-from he-DAT talk.to-PRES
lit. 'From me will talk to him.'

(72) kodomo-tati-de asob-u.
child-PL-at play-PRES
lit. 'At the children are playing.'

(73) a. *From me will talk to him.
b. *At the children are playing.

▹ See Kishimoto (2017) for various tests for subjecthood.

★ **Consequence 6:**
Nominals do not form any F-equilibrium with their Merge-mates in Japanese-type languages, thus, without having any "magnetic" power around, they can freely undergo scrambling (optional dislocation).

(74) *Japanese*:

a. John-ga Mary-ni sono hon-o watasita
John-NOM Mary-DAT that book-ACC handed
'John handed that book to Mary.'

b. *Mary-ni$_i$* John-ga t_i sono hon-o watasita
Mary-DAT John-NOM that book-ACC handed
'*To Mary$_i$*, John handed that book t_i.'

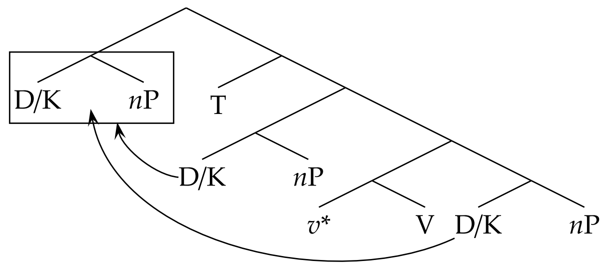
c. *sono hon-o$_j$* John-ga Mary-ni t_j watasita
that book-ACC John-NOM Mary-DAT handed
'*That book$_j$*, John handed t_j to Mary.'

d. *sono hon-o$_j$* *Mary-ni$_i$* John-ga t_i t_j watasita
that book-ACC Mary-DAT John-NOM handed
'*That book$_j$*, *to Mary$_i$*, John handed t_j t_i.'

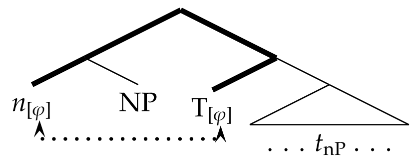
e. *Mary-ni$_i$* *sono hon-o$_j$* John-ga t_i t_j watasita
Mary-DAT that book-ACC John-NOM handed
'*To Mary$_i$*, *that book$_j$*, John handed t_j t_i.'

(75) a. John handed that book to Mary.
b. *To Mary$_i$*, John handed that book t_i.
c. *That book$_j$*, John handed t_j to Mary.
d. **That book$_j$*, *to Mary$_i$*, John handed t_j t_i.
e. **To Mary$_i$*, *that book$_j$*, John handed t_j t_i.

(76) Japanese-type: Nominals can freely raise to "Spec-T."



(77) English-type: DPs are "frozen" in positions forming a φ-equilibrium.



★ The "macro"-parametric variation discussed here simply results from the underspecified nature of UG.

8 Conclusions

★ It is still dominantly assumed that syntactic structures are universally asymmetric (in terms of labeling, linear ordering, projection, etc.).

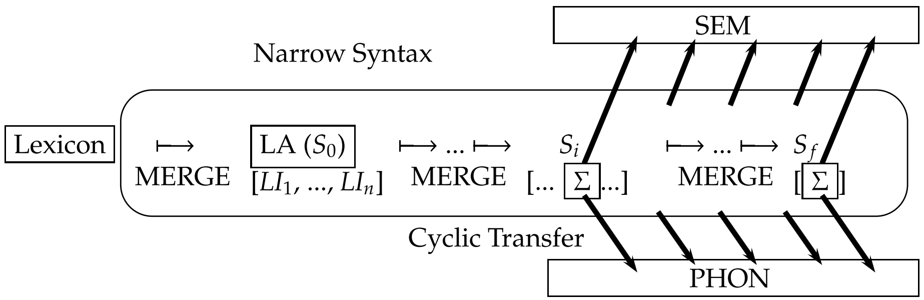
(78) *Universally asymmetric/labeled/endocentric syntax:*
Chomsky (1986, 1995, 2000, 2001, 2004, 2007, 2008, 2013, 2015), Kayne (1994, 2009, 2011), Moro (2000), Uriagereka (1999, 2012) and Narita (2011, 2012, 2014)

★ Counter to the dominant universal asymmetry hypothesis, we put forward the hypothesis that syntax is fundamentally driven for symmetry. Specifically, we showed that the Symmetry Principle governs every aspect of syntactic computation.

(79) *Symmetry Principle of Syntax*:
A generative procedure yields a symmetric output.

(80) *Symmetry*:
For a generative procedure GP yielding $\Sigma = \{X_1, ..., X_n\}$, Σ is symmetric $=_{def.}$ $X_1, ..., X_n$ are uniform with respect to GP, i.e., no property or relation assigned by GP makes an element X_i distinct from any other element X_j, $1 \leq i,j \leq n$).

(81) *Symmetry-driven Syntax (MERGE-only)*:



(82) The Symmetry Principle yields a number of consequences:
a. Merge is restricted to a bare set-formation operation, assigning only relations like *Sister-of* and *Term-of*.
b. Asymmetric operations like linearization (precedence-assignment), selection, projection, and pair-Merge are excluded from Narrow Syntax.
c. Universal projection and universal labeling are both untenable.
d. No operation other than MERGE, Numeration-formation or Select, is required for the formation of LA.
e. Once MERGE starts applying to LA, it is forced to apply recursively until the WS is reduced to a single unified SO.
f. Each domain Σ of Transfer, which applies cyclically in order to restrict computational complexity, must be symmetric in terms of features.
g. Featurally asymmetric SOs are typically generated by External Merge, while Internal Merge can serve to derive featural symmetry.
h. Agreement, if it exists, typically occur s at the boundary of a Transfer-domain as a result of F-equilibrium-formation.
i. Feature-free (and label-free) symmetry typically arises at root clauses.
j. φ-feature-free languages like Japanese exhibit a number of properties different from φ-feature-based languages like English.

★ There is perhaps a deeper sense in which human language is "Merge-only" (see Chomsky 2007, 2008, 2013, 2015, Berwick 2011, Boeckx 2014, Kato et al. 2014, Narita et al. 2017). Merge is fundamentally an operation of "symmetric structuring," and what we have shown in this talk is that virtually every aspect of Narrow Syntax is characterizable by the notion of symmetry (80).

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