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 $\Sigma = \{X_1, ..., X_n\}$, $\Sigma$ 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

2 Symmetry of Merge $\Rightarrow$ 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., $S \rightarrow NP \ VP$)

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

(8) $\text{Merge}(\alpha, \beta) = \begin{cases} \{\alpha, [\alpha, \beta]\} \\ \alpha \\ (order irrelevant) \end{cases}$
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)  \[
\text{Merge}(\alpha, \beta) = \Sigma = \begin{cases} 
\{\alpha, \beta\} \\
\alpha & \beta
\end{cases}
\]

(order irrelevant)

(11)  \[
\begin{aligned}
\text{a. } & \{C, \{[\text{the}_D, \text{boy}_N], [T, \{t_{DP}, \{\text{read}, \{\text{the}_D, \text{book}_N}\}\}]\}\}\] \\
\text{b. } & \begin{aligned}
& \text{C} \\
& \text{the}_D \quad \text{boy}_N \\
& \text{t}_{DP} \\
& \text{read} \\
& \text{the}_D \\
& \text{book}_N
\end{aligned}
\end{aligned}
\]

(order irrelevant)

★ 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

(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)  \textit{Symmetry Principle of Syntax} (\textsc{= 1}): A generative procedure yields a symmetric output.

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

(15)  Relations assigned to \(\alpha\) and \(\beta\) by \textit{Merge}(\(\alpha, \beta\)):

a.  Sister-of: \(\langle \alpha, \beta \rangle, \langle \beta, \alpha \rangle\)

b.  Term-of: \(\langle \alpha, \{\alpha, \beta\} \rangle, \langle \beta, \{\alpha, \beta\} \rangle, \langle \{\alpha, \beta\}, \{\alpha, \beta\} \rangle\)\)

c.  *Projects\footnote{Term-of is defined as follows (Chomsky 1995:247)}


f.  *C-commands

\footnote{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.}
but because symmetry is a fundamental principle of nature (cf. the “third factor,” Chomsky 2005, 2007, 2008).


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 \(α_1, ..., α_n\) from a given WS, and produces a new element \([α_1, ..., α_n]\) 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

\[ \begin{align*}
\text{(18) MERGE takes a WS } S_i = [α_1, ..., α_m] \text{ and generates a modified WS } \\
S_{i+1} = [([α_1, ..., α_n], α_{n+1}, ..., α_m) | 1 \leq n \leq m].^5
\end{align*} \]

★ 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 \(Σ = [Σ_1, ..., Σ_m]\), MERGE(Σ) = \([α_1, ..., α_n], β_1, ..., β_k\] (0 ≤ \(n, k \leq m\), where
(i) each \(α_i\) (1 ≤ \(i \leq n\)) is a term of some \(Σ_j\) (1 ≤ \(j \leq m\))\(^6\) and
(ii) \(\{Σ_1, ..., Σ_m\} \subset \{α_1, ..., α_n\} \cup \{β_1, ..., β_k\}.\)

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

(20) Properties assigned to \([α_1, ..., α_n], β_1, ..., β_k\) by MERGE:
 a. Is-Accessible: \([α_1, ..., α_n], β_1, ..., β_k\)
 b. Is-a-Root: \([α_1, ..., α_n], β_1, ..., β_k]\)

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

(21) Relations assigned to \(α_1, ..., α_n\) by Merge (see (15)):
 a. Sister-of: \(⟨α_1, α_2⟩, ⟨α_2, α_3⟩, ...\)
 b. Term-of: \(⟨α_1, [α_1, ..., α_n]⟩, ⟨α_2, [α_1, ..., α_n]⟩, ...\)
   \(⟨α_1, [α_1, ..., α_n], α_1, ..., α_n⟩, [α_1, ..., α_n]⟩\)

3.2 Formation of Lexical Array (Initial Workspace) as MERGE

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

\[ \begin{align*}
\text{(19-i) is a reflexive relation (see note 1). Thus, any SO is a term of itself.}
\end{align*} \]

\[ \begin{align*}
\text{(19-ii) represents the idea that the object produced by MERGE must exhaust the input WS.}
\end{align*} \]

\[ \begin{align*}
\text{(18) MERGE takes a WS } S_i = [α_1, ..., α_m] \text{ and generates a modified WS } \\
S_{i+1} = [([α_1, ..., α_n], α_{n+1}, ..., α_m) | 1 \leq n \leq m].^5
\end{align*} \]


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\(^3\)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, \([α_1, ..., α_n]\). They call the procedures (i) and (ii) 0-Search (SO) and 0-Merge (M0), 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 \(Σ\).

\(^5\)Just for expository convenience, we will henceforth use square brackets \([ \ ]\) to represent workplaces, 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.

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.

The Lexicon (Lex) of an I-language $L$ is a set of all LIs stored for $L$.

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.

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

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.

Some interface condition requires so (Chomsky 1995:226):

“At the LF interface, $\Sigma$ 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).

**3.3 Narrow Syntax as a Mapping to a Unified Syntactic Object**

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**Indices of Numeration must be reduced to zero** (Chomsky 1995:225):

“A computation constructed by $CHL$ 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.

**LIs bear uninterpretable features that must be checked via probe-goal relations** (Chomsky 1995:234; see also Chomsky 2000, Framp-}

| a. MERGE(Lex) = $[\{\text{the, man, read, which, book, T, C}\}]$, $LI_1, ..., LI_n$ |
| b. MERGE(LA) = $S_1 = [\{\text{which, book}\}, \text{the, man, read, T, C}\}$ |
| c. MERGE($S_1$) = $S_2 = [\{\text{the, man}\}, \{\text{which, book}\}, \text{read, T, C}\}$ |
| d. MERGE($S_2$) = $S_3 = [\{\text{read, which, book}\}, \{\text{the, man}\}, T, C]$ |
| e. MERGE($S_3$) = $S_4 = [\{\text{the, man}\}, \{\text{read, which, book}\}], T, C]$ |
| f. MERGE($S_4$) = $S_5 = [\{\text{[the, man], read, [which, book]}'\}], C]$ |
| g. MERGE($S_5$) = $S_6 =$ |
| h. MERGE($S_6$) = $S_7 =$ |
| i. MERGE($S_7$) = $S_f =$ |

4
Why not checking the relevant features at the stage of LA/S₀, 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 S₁. Then, it should also satisfy the Symmetry Principle (28), which means that S₁ 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 Σ = {X₁, ..., Xₙ}, Σ is symmetric if X₁, ..., Xₙ are uniform with respect to GP, i.e., no property or relation assigned by GP makes an element Xᵢ distinct from any other element Xⱼ, 1 ≤ i, j ≤ n).

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

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.

Since term-of makes {LI₁, LI₂} distinct from other elements LI₃, ..., LIₙ within S₁, S₁ 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 [Σ₁, ..., Σₙ] with respect to term-of is to reduce n to 1, guaranteeing that all SOs within the WS are terms of a single SO Σ₁.

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

\[(33) \quad \text{Phase Symmetry Condition (PSC):} \]
Transfer can apply only to symmetric SOs.

* Symmetric SOs are illustrated by:

\[(34) \quad \]

\[X \uparrow \]
\[F \]
\[\rightleftharpoons \quad Y \uparrow \]
\[F \]

a. \[n \quad \sqrt{\text{root}} \]
\[\text{[Cat:N]} \]

b. \[v \quad \sqrt{\text{root}} \]
\[\text{[Cat:V]} \]

c. \[a \quad \sqrt{\text{root}} \]
\[\text{[Cat:A]} \]

\[(35) \quad \]

\[X \quad \beta \quad Y \uparrow \gamma \]
\[F \quad F \]

a. Subject-raising + \(\phi\)-feature agreement:

\[\text{D}_{\phi} \quad nP \quad T_{\text{[uP]}} \quad vP \]

\[\ldots \quad \text{[uP]} \quad \ldots \]


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

\[(37) \quad \alpha \quad \beta \quad \quad \quad \ldots \text{Both} \alpha \text{and} \beta \text{are free from active features} \]

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

\[\text{we picture} \quad C_{\text{[uF]}} \quad TP \]

\[\ldots \text{[uP]} \quad \ldots \]
still contribute to symmetry-formation as in (39g), (39m);\textsuperscript{10} see Bošković 2007).

\[(39) \quad \text{Which book does the man read?}\]

\begin{enumerate}[a.]
  \item LA (S\textsubscript{0}): \ [which\textsubscript{[\text{v,P,Q}]} \ \sqrt{\text{book}\textsubscript{[uCat]}}, \ n_{[\text{N}]}, \ C_{[Q]}, \ T_{[\text{v}]}, \ \text{the}\textsubscript{[v]}, \ \sqrt{\text{man}\textsubscript{[uCat]}}, \ v^\ast_{[\text{v,AP}]}, \ \sqrt{\text{read}\textsubscript{[uCat]}}]
  \item Merge(n_{[\text{N}]}, \ \sqrt{\text{book}\textsubscript{[uCat]}}) = \]
  \item Merge(which\textsubscript{[\text{v,P,Q}]} (b)) =
  \item Merge(n_{[\text{N}]}, \ \sqrt{\text{man}\textsubscript{[uCat]}}) =
  \item Merge(the\textsubscript{[v]}, (d)) =
  \item Merge((f), (c)) =\textsuperscript{11,12}
  \item Merge((e), (g)) =
  \item Merge((which\textsubscript{[\text{v,P,Q}]} \ {n, \sqrt{\text{book}}}), (h)) =
\end{enumerate}

\textsuperscript{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 FL, as we will assume.

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

\textsuperscript{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.”

\textsuperscript{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).
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:

\[(40)\]
\[
\begin{array}{c}
X \\
\uparrow \\
F
\end{array}
\begin{array}{c}
Y \\
\uparrow \\
F
\end{array}
\]

\[(41)\]
\[
\begin{array}{c}
X \\
\uparrow \\
F
\end{array}
\begin{array}{c}
\beta \\
\uparrow \\
F
\end{array}
\begin{array}{c}
Y \\
\uparrow \\
F
\end{array}
\begin{array}{c}
\gamma
\end{array}
\]

\[(42)\]
\[
\begin{array}{c}
\alpha \\
\uparrow \\
F
\end{array}
\begin{array}{c}
\beta
\end{array}
\]

... Both \(\alpha\) and \(\beta\) are free from active features

* (42) arises for cases where the formal features within \(\alpha\) and \(\beta\) are already subjected to Transfer.

* Case 1: predicate-fronting

\[(43)\]
\[
\begin{array}{c}
[\text{\textsc{vP} Criticize \textsc{himself}}], \text{John, did} \text{t}_{\text{DP}}.
\end{array}
\]

* Case 2: Multiple Spec constructions in Japanese\(^{14}\)

\[(44)\]
\[
\begin{array}{c}
\text{Japanese: Multiple Subject (Kuno 1973)}
\end{array}
\]

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.’

\[(45)\]
\[
\begin{array}{c}
\text{Japanese: Scrambling}
\end{array}
\]

a. \(\text{sono hon-o} \ Mary-ni \ John-ga \ t_{i} \ t_{j} \ watasita\)

That book\(\text{acc}\) Mary\(\text{drt}\) John\(\text{nrm}\) handed

‘That book\(\text{acc}\) to Mary\(\text{nrm}\), John handed \(t_{i} \ t_{j}\).’

b. \(\text{Mary-ni} \ \text{sono hon-o} \ John-ga \ t_{i} \ t_{j} \ watasita\)

Mary\(\text{drt}\) that book\(\text{acc}\) John\(\text{nrm}\) handed

‘To Mary\(\text{nrm}\), that book\(\text{drt}\), John handed \(t_{i} \ t_{j}\).’

\[(46)\]
\[
\begin{array}{c}
\end{array}
\]

* Case 3: Topicalization

\[(47)\]
\[
\begin{array}{c}
\text{Mary’s book, I have to read Mary's book.}
\end{array}
\]

... also interpretable as left-dislocation, in which case the two instances of \(\text{Mary’s book}\) are not copies but independent repetitions.

\[(48)\]
\[
\begin{array}{c}
\text{In German, declarative root(-like) contexts at least and at most one XP must occupy the position before the finite verb (V2 realized at C) (see Emonds 2004, 2012 and Bluèmel 2017 for recent accounts).}
\end{array}
\]

\[(49)\]
\[
\begin{array}{c}
\text{German:}
\end{array}
\]

a. \([\text{DP Maria} \ \text{hat} \ t_{\text{DP}} \ den \ Mann \ gestern \ gesehen}\)

Mary has the man yesterday seen

‘Mary has seen the man yesterday.’

\(^{14}\)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.

\(^{15}\)Capitalizing on Chomsky’s recent theory of labeling algorithm (Chomsky 2013, 2015), Bluèmel 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. [AdvP gestern] hat Maria den Mann tAdvP gesehen
yesterday has Mary the man seen

c. [vP den Mann gesehen] hat Maria tAdvP
the man seen has Mary yesterday
d. [CP+fin dass die Sonne scheint] hat Maria tCP gesagt
that the sun shines has Mary said
‘That the sun shines, Mary said.’
e. [CP-fin die Scheibe einzuschlagen] hat Maria tCP beschlossen
the window to-crush has Mary decided
‘Mary decided to crush the window.’
f. [vP über den Wolken muss die Freiheit tAdvP wobl
above the clouds must the freedom PTCL
grenzenlos sein
limitless be
‘Freedom must be limitless above the clouds.’
g. [AP schön] ist Maria tAP
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 lan-
guages 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])


5.2 Against Universal Labeling

Chomsky (2013, 2015) stipulates that every SO must be labeled by the fol-
lowing 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 [α, β] undergoes IM, the label of β becomes the label of
{tα, β}.

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].

(51)

(52)

★ However, unlabeled structures are commonly attested in natural lan-
guages, such as those exemplified above.
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 ([α[F], β]) entails a later application of Internal Merge that yields an F-equilibrium ([α[F], β[F]]).

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

The bifurcation of External and Internal Merge correlates with the duality of “d(EEP)-structure” and “surface-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
   : 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


(61) Watasi-ga/anata-ga/gakusei-ga maitosi ronbun-o kak-u.
I-nom/you-nom/student-nom every.year paper-ACC write-PRO
‘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:

```
           T[ϕ]
            /\
           /   \
          nP   D[
            /\
           v*   V
           /   \
          nP   D
```

11
The “Spec-T” position thus remains as a vacant site for “major subject” (topic-like elements) in Japanese-type languages.

**Consequence 2:**
Japanese-type: Lack of obligatory A-movement:

\[
\begin{array}{c}
\text{T} \\
\text{D/K}^{17} \quad \text{nP} \\
\text{V} \quad \text{D/K} \quad \text{nP} \\
\text{v*} \quad \text{V} \quad \text{D/K} \quad \text{nP}
\end{array}
\]

\[\text{natu-ga} \quad \text{biiru-ga} \quad \text{umai.} \]
\[\text{summer-nom} \quad \text{beer-nom} \quad \text{tasty}\]

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

\[\text{‘As for the summer, beer tastes good.’}\]

\[\text{(66) *Summer, beer tastes good.}\]

\[\text{**Consequence 3:**}\]
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).

\[\text{b. Siguretekita.} \]
\[\text{shower-started’}\]

\[\text{a. Siguretekita.} \]
\[\text{shower-started’}\]

\[\text{‘It started to shower.’}\]

\[\text{b. Watasi-ni-wa [soo da to] omow-are-ta.} \]
\[\text{I-to-top so cpl that think-PASS-PAST}\]

\[\text{‘It seemed to me that way.’}\]

\[\text{TP undergoes Transfer as soon as it enter into a } \phi \text{-equilibrium. It is hence “closed-off,” disallowing further merger in languages like English:}\]

\[\phi\]

\[\text{Japanese: major subject construction}\]

\[\text{natu-ga} \quad \text{biiru-ga} \quad \text{umai.} \]
\[\text{summer-nom} \quad \text{beer-nom} \quad \text{tasty}\]

\[\text{Japanese: sentence with more than one major subject (Kuno 1973)}\]

\[\text{Bunmeikoku-ga dansei-ga heikinzyumyoo-ga mizikai. civilized.countries-nom male-nom average.lifespan-nom is.short‘It is civilized countries that men, their average lifespan is short in.’}\]

\[\text{‘Civilized countries, male, the average lifespan is short (with the intended meaning ‘it is civilized countries that men, their average lifespan is short in.’)}\]

\[\text{TP undergoes Transfer as soon as it enter into a } \phi \text{-equilibrium. It is hence “closed-off,” disallowing further merger in languages like English:}\]

\[\phi\]

\[\text{Japanese: major subject construction}\]

\[\text{natu-ga} \quad \text{biiru-ga} \quad \text{umai.} \]
\[\text{summer-nom} \quad \text{beer-nom} \quad \text{tasty}\]

\[\text{Nominativeless sentences are possible in Japanese, due to the lack of } [u\phi] \text{ on } T \text{ (Kuroda 1978:note 2).}\]

\[\text{a. Siguretekita.} \]
\[\text{shower-started’}\]

\[\text{‘It started to shower.’}\]

\[\text{b. Watasi-ni-wa [soo da to] omow-are-ta.} \]
\[\text{I-to-top so cpl that think-PASS-PAST}\]

\[\text{‘It seemed to me that way.’}\]

\[\text{As for the summer, beer tastes good.”}\]
c. Haha-kara kane-o okuttekita.
   ‘Mother sent me some money.’

d. [Obama-ga moosugu rainitisuru to] Obama-nom soon come.to.Japan that
   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 John-ga t_i t_j watasita
      Mary-nom that book-acc handed
      ‘To Mary, John handed t_i t_j.
   c. sono hon-o John-ga Mary-ni t_j watasita
      that book-acc John-nom Mary-dat handed
      ‘That book, John handed t_j to Mary.’

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

   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.).

Universally asymmetric/labeled/endocentric syntax:

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.

Symmetry Principle of Syntax:
A generative procedure yields a symmetric output.

Symmetry:
For a generative procedure GP yielding \( \Sigma = \{X_1, \ldots, X_n\} \), \( \Sigma \) is symmetric if \( X_1, \ldots, X_n \) 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 \( X_j \), \( 1 \leq i, j \leq n \).

Symmetry-driven Syntax (MERGE-only):

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 \( \Sigma \) 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 occurs 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. \( \phi \)-feature-free languages like Japanese exhibit a number of properties different from \( \phi \)-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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