From Merge to MERGE

Toward a Genuine Explanation in Linguistic Theory

Keio Colloquium

07/31/2021

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1 Genuine explanation

(1) Three conditions on Universal Grammar (UG)

a. Learnability: UG must be rich enough to overcome Poverty of Stimulus (POS)

b. Evolvability: UG must be simple enough, so it could have evolved.

c. Universality: UG must must be same for all possible languages

(2) Overcoming the conflict among three conditions on UG

a. Learnability: Structure Dependency suggests that there is no learning. The hierarchical structure formed by Merge is not learnable.

b. Evolvability: "... the basic structure of language should be quite simple. The result of some small rewiring of the brain that took place once and has not changed in the brief since." (Chomsky 2020)

c. Universality: The variety of language comes from the externalization: "...sensory-motor systems use for externalization have nothing at all to do with language" (Chomsky 2020)

(3) Strong Minimalist Thesis (Enabling function: Chomsky 2021)

a. "Ideally, it might turn out that the internal language is fixed and invariant, close to it. That would be the optimal solution to the problem of generation of an infinite number of thoughts."

b. "the strong minimalist thesis holds that I-language, the system that generates thought, keeps to Merge and language independent principles, suich as computational efficiency. Optimally, any departure from the strong minimalist thesis should be so slight as to be susceptible to a simple account of its origin."

c. "...we have to make clear that we understand the computational operation on which explanation is based. Merge proves to be defective in a way that has been familiar since the origins of the generative enterprise"

2 Merge to MERGE

(4) Phrase Structure Grammar
   a. VP → V NP, *PP→ V NP
   b. X → Y Z, No restriction in principle

(5) X'-theory
   a. cross-categorical generalization
   b. Universal endocentricity

(6) Merge (Chomsky 2013, Epstein et al. 2014, Collins 2017)
   a. Merge(X,Y) = {X,Y}
   b. A hidden assumption: Merge applies on workspace
   c. A hidden assumption: The formulation of Merge departs from standard recursion.
      → Remove
      • *Remove* is a departure from SMT and from standard recursion

(7) Empirical Evidence
   a. If we assume standard recursion (e.g., propositional calculus, (Chomsky 2019b:274,fn28)), we can generate derivations that violate any kinds of constraint on movement (islands)
      i. Merge(P,Q) → {P,Q}, P, Q
      ii. build up structure with P such as [. . . [Z . . . [. . . P]]] = Y
      iii. WS = [P, Q, Y, {P,Q} . . .]
      iv. Merge(P,Y) = [{P,Y}, Q, Y, {P,Q} . . .], where Y includes P.
   b. We don't want to assume standard recursion due to the empirical reasons
   c. At the same time, we don't want to stipulate *Remove*, which is a departure from SMT.

(8) Resource Restriction (RR): (cf. Fong et al. 2019)
   a. Language is an organic system
   b. Merge "will always add one new element to the workspace. Namely,{P, Q}, but it should have no more than one new accessible element." (Chomsky 2020)
   c. ". . . no operation Remove is needed. It's effects follow from the minimal yield condition on MERGE, principle of Resource Restriction." (Chomsky 2020)
   d. "Resource Restriction renders strictly Markovian."

(9) MERGE(P,Q,WS) = WS' = {{P,Q}, $x_1 \ldots x_n$}, where conditions . . . hold.
   a. MERGE applies to P, Q, and WS.
   b. Nothing should be lost by the operation
   c. A member of WS is accessible in WS'
   d. n (in $x_1 \ldots x_n$) should be minimal
   e. "MERGE will always add one new element to the workspace."

f. "an element a can be accessible to MERGE even if it's not part of the workspace"

i. a term of: "a term of some element x is a member of x or a member of a term of x."

g. Accessibility for MERGE
A term of x might be inaccessible by

1. Phase impenetrability Condition (PIC)
2. Minimal search (cf. EKS 2020)

(10) Copies, Deletion and Minimal Search (Chomsky 2020)

a. "Copies are formed by internal Merge, but more generally, we can assume that copies are formed generally by MERGE."

b. "Copies are deleted for reasons of computational efficiency, but only if they're MERGE configurations."

c. "minimal search, . . ., can be an operation which searches everything that's been generated and marks everything it finds undeletable."

d. "The only thing that minimal search can't find is something that it's c-commanded by a head, the head of chain.. . .so, it doesn't mark undeletable, therefore it deletes."

e. "You can form copies anywhere you want. You get deletion if they're not mark undeleted by minimal search."

2.1 Legitimate Derivations: EM and IM

(11) External Merge (EM)

a. i. WS_1 = [a, b]

ii. MERGE(a, b, WS_1) = [{a,b}] = WS_2

b. No violation of RR.

(12) Internal Merge (IM) (Chomsky 2019a)

a. i. WS_1 = [{c,{a,{b,d}}}]

ii. MERGE(d,{c,{a,{b,d}}}, WS_1) = [{d,{c,{a,{b,d}}}}] = WS_2

b. Minimal search → the lower copy is inaccessible.

2.2 Illegitimate Derivations

(13) Parallel Merge (cf. Citko 2005, Citko and Gračanin-Yuksek 2021)/ Sideward movement (Nunes 2001, 2004)

a. WS_i = [{a,b}, c]

b. MERGE(b,c,WS_i) = [{a,b},{b,c}] = WS_j

- After parallel Merge/sideward movement, *b* in $\{b,c\}$ and $\{b,c\}$ itself are new accessible elements.

(14) Late-Merge (cf. Lebeaux 2000)

a. WS_i = [{a,b}, {c,d}]

b. MERGE(a,{c,d},WS_i) = [{a,{c,d}}, {a,b}] = WS_j

- There are new two accessible items, i.e., a in $\{a,\{c,d\}\}$ and $\{a,\{c,d\}\}$ itself.

(15) Counter-cyclic movement (cf. Chomsky 2008, 2013, Epstein et al. 2012)

a. WS_i = [{a, {b, {c,d}}}]

b. MERGE(d,{b,{c,d}},WS_i)
=[{d,{b,{c,d}}},{a,{b,{c,d}}}]=WS_j

- After counter-cyclic IM, there are two identical and accessible SOs, namely, {b,{c,d}}.

3 Conclusion

(16) Seeking a genuine explanation

a. MERGE is implemented in an organic system: resource restriction

b. MERGE adds one new element to the workspace (minimal yield condition).

c. All elements in WS_n are accessible in WS_{n+1}, except for

- the elements that are in PIC domain
- the elements that are c-commanded by the higher copy

d. "extension of Merge" yields illegitimate derivations (, which yields lethal ambiguity)

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