日本言語学会第 162 回大会ワークショップ (2021/6/27・Zoom 開催)
言語理論における真の説明を目指して

極小主義理論の基礎仮説群

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1. Genuine Explanation, Learnability, Evolvability and Universality[1]

(1) why should linguistics alone among the sciences contented itself with taxonomy, instead of seeking explanations? (Chomsky 2020a (LSJ); 16:39)

(2) 例えば、骨格の機能とは何かを尋ねられて、「骨格は身体が直立するのを支え、地面に倒れ込むのを防ぐためのものだ」と答えたら、それは間違いではありません。しかし、同じことはカルシウムを貯蔵する機能や血液細胞を作り出す機能、骨格が担うその他の機能全般についても当てはまります。(...) 機能が何であるかは、観察者が何に興味を抱くかで決まります。 (チョムスキー 2016: 31)

(3) A generative grammar is a theory that seeks to explain the properties of the **I-language** possessed by an individual language user, at a deeper level, the theory of **the language faculty**, **UG** in modern terms, as concerned with the innate factors that make **language acquisition** possible. (LSJ; 19:37)

(4) UG must meet three conditions. (LSJ; 20:16)

Learnability: it must be rich enough so that can overcome the general problem called **poverty of stimulus**, the fact that what was acquired demonstrably lies far beyond the evidence available.

Evolvability: second, it must be simple enough, so that it could have evolved.

Universality: third, it must be the same for all possible languages.

(5) We achieve a **genuine explanation** of some linguistic phenomenon only if it keeps to mechanisms that satisfy the joint conditions of learnability, evolvability and universality, which appear to be at odds. (LSJ; 20:48)

(6) Start with evolvability. Recent genetic studies have shown that humans began to separate not long after humans appeared. There are no known differences in language faculty. Furthermore, there is no meaningful evidence of symbolic behavior prior to emergence of modern humans, homo sapiens. These facts indicate that language emerged pretty much along with modern humans, which is instant in evolutionary time. The same facts suggest that 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 periods since. (LSJ; 21:37)

(7) [A genetically modular "input-output" sequential processing component] might well be relatively uniform from one vocal learning species to the next [...] (Berwick & Chomsky (B&C) 2016: 40)

(8) Conceptual structures are found in other primates: probably actor-action-goal schemata, categorization, possibly the singular-plural distinction, and others. These were presumably recruited for language, though the conceptual resources of humans that enter into language use are far richer. (B&C 2016: 84)

(9) Experiments have shown that a child of two or three years old has largely mastered basic properties of its language, including some remarkable ones. That seems to indicate that UG must be very rich while the condition of evolvability demands that it be very simple. In the past few years, some hope has emerged to resolve this tangle of dilemmas within the so-called **minimalist program**. (LSJ; 22:47)

(10) A condition three, universality, arises from the conclusion that language is a species property common to humans

[1] 黒: 引用。赤: 例。**橙: 概念、操作** (*は、現在は独立のものとしては想定されないもの)。 青: 補足。

apart from severe pathology,... (Chomsky 2021a (WCCFL); 4:11)

(11) Genuine explanation extends further. The condition is satisfied when an account relies on so-called **third factor principles** such as **computational efficiency** understood in this context as **natural law**. These can just be taken off the shelf when needed with no cost and **the strong minimalist thesis** sets as an ideal that all linguistic phenomena can receive genuine explanations in this broader sense and the critical task for inquiry is to see how closely this ideal can be approximated. (WCCFL; 14:14)

2. From Scratch

(12) the boy and the girl are/*is in the room. (LSJ; 25:35)

(13) The rule of adjacency surely part of the child's cognitive repertoire. Instead, the child reflexively relies on something. It never hears. The structure that its mind creates. (LSJ; 26:01)

(14) (...) what's significant about this is not simple as it's using invisible hierarchical structure. What's crucially important is that it is not using, the child and we are not using the simplest computation. (LSJ; 28:42)

(15) this property called **structure dependence** holds for all constructions in all languages. (LSJ; 26:31)

(16) a. the mechanic fixed the car carefully (LSJ; 26:49)

b. the mechanic carefully packed his tools

c. the mechanic who fixed the car carefully packed his tools

d. carefully, the mechanic who fixed the car packed his tools

(17) The third sentence ([16]c) is ambiguous. It can be understood as either in ([16]a) or as in ([16]b). It means the sentence ([16]d), on the other hand, is unambiguous. It simply means that he carefully packed his tools. The adverb *carefully* seeks a verb. But it cannot use the simplest computation; pick the linearly closest verb, like the adjacency, this operation is certainly within the child's cognitive repertoire. (...) Nevertheless, UG forces the child to ignore it and select the more remote verb, which happens to be the structurally closest one as we see if we assign the structure and what our mind tells us is the shortest way. (LSJ; 27:18)

(18) This universal property of structure dependence is, of course, unlearnable. So, it must be that linear order is simply not available to the system that constructs thoughts. (LSJ; 29:14)

(19) The next problem is to determine why language keep the structure dependence, ignoring the simple properties of linear order. Learning is excluded, must come from innate structure. (...) The simpler the innate structure, the deeper the explanation and the more feasible the problem of evolvability. (LSJ; 31:56)

(20) That is, an operation that takes two objects already generated forms a new one without modifying either and without adding any new structure, simply binary set formation, called **Merge** in contemporary discussion. If the internal language is based on Merge, then linear order is simply not available and structure dependence is the only option for language. (LSJ; 33:15)

(21) a. Learnability: there is no learning, so the problem of learnability is overcome. (LSJ; 34:04)

b. Evolvability: if language is to exist at all, it must include this postulated operation, so there is no problem of evolvability. (LSJ; 34:13)

c. Universality: problems of variety doesn't arise. (Chomsky 2021b (LAATU); 36:58)

(22) The shooting of the hunters is/*are a crime. (Chomsky 2021c (UABC); 38:22)

(23) The men or Mary *is/*are [in the room]. (UABC; 51:17)

(24) There's also cases where the way the simplest system operates imposes difficulties on the problems of parsing, perception, and production. But that's the way evolution works. Evolution does not aim to give you something that works well. It aims to give you something that's well-designed. (UABC; 51:54)

(25) Along the same lines, there are genuine explanations for other strange properties of language. (LSJ; 34:36)

a. The ubiquitous property of **displacement**: it turns out to be the result of the simplest subcase of Merge: what's called **internal Merge**. (LSJ; 34:44)

b. displacement with **reconstruction**: (26)

(26) a. the boys expect the girls to like each other. (LAATU; 39:35)

b. which girls do the boys expect to like each other? (LAATU; 39:53)

(27) What the brain is seeing is: which girls the boys expect which girls to like each other (LAATU; 40:13)

(28) Note that these are the first genuine explanations in the long and rich history of the study of language and mind. That's not a small matter, I think, though it's insufficiently appreciated. (LSJ; 33:51)

(29) Why, then, does speech require **linearization**? (...) The **articulatory system** cannot produce structures. So, the **externalization** process must impose linear order on an internal system of generation of thought, which is unordered. Actually sign language is less strictly ordered because the option is available in visual space greater. But these **sensory-motor systems** use for externalization have nothing at all to do with language. (LSJ; 30:32)

(30) (t)he medium that you use to externalize what's internal to you is sort of like a printer that's used by your laptop. [...] The internal program generates thoughts you can use speech, you can use vision in sign languages, virtually identical with spoken language in its internal nature. Now you can even use touch because any sensory modality just as the computer can use any printer. (LAATU; 26: 27)

(31) True language is the internal system that generates thoughts. These observations reinforce the traditional view that language is essentially a system of thought. (LSJ; 31:26)

(32) So, take Japanese and English. They are virtual mirror image of each other in basic order, but there is no difference in the thought expressed between Subject-Verb-Object and Subject-Object-Verb structures. (LSJ; 29:50)

(33) **the great variety of languages**, which appears to be incompatible with the other two conditions on UG. Now we have the sharp distinction between internal language based on Merge, yielding linguistic formulation of thought on the one hand, and externalization to a sensory-motor medium, on the other. (LSJ; 36:20)

(34) It's very natural candidate for the properties of variation, complexity and mutability, which would then not be properties of language, but properties of an amalgam of language and unrelated organic systems. (LSJ; 36:54)

(35) How do we take two systems that have nothing to do with each other and relate them, the internal program and the printer? (...) there's a lot of different ways of doing that. That's the variation of languages. The variation of languages seems to fall almost entirely in the externalization process (...) (UABC; 47:52)

(36) There's no way to learn the basic meaning of words. You can learn little bits and pieces about the periphery like you can learn what sound to attach to them. So if you're speaking English, you say *tree*. Speaking German, you say *Baum*. That's the same concept and with all of its richness and complexity. (UABC; 48:43)

(37) Epstein, Obata and Seely 2017: languages may vary by different choices of rule ordering when the ordering is not specified by [the] factor [of language-independent principles]. Accordingly, they reject the thesis of Berwick and Chomsky (2011; also 2016) that parametrization is restricted to externalization. (Chomsky 2017: 478)

(38) 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. That, of course, is a distant goal, but work is tending in that direction. What seemed inconceivable only a few years ago, now seems to me at least, an objective that can be seriously contemplated and pursued. It's the objective that has been called the strong minimalist thesis. (LSJ; 37:14)

(39) More precisely, the strong minimalist thesis holds that I-language, the system that generates thought, keeps to Merge and language independent principles, such 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 origins. (LSJ; 37:59) (cf. (58))

3. Theoretical Apparatus

(40) **Endocentricity**: ***Phrase Structure Grammar→*X′-theory→Labeling** (cf. LSJ; 39:57)

(41) **Workspace**: the set of objects that are available for further computation (LSJ; 41:50)

(42) **MERGE**(P, Q, WS) = WS' = {{P, Q}, X1, ... Xn}, where conditions ... hold. (LSJ; 46:22)

(43) Applied two objects α and β, Merge forms the new object K, eliminating α and β. (Chomsky 1995: 243)

(44) It was really (if you look back at it) an operation that said "replace" P and Q by the set {P, Q}. And the formalizations of this, if you look at them, did add an operation (an operation ***Remove**) to get rid of elements that you've already had. That, we don't want. (Chomsky 2020b (UCLA lectures): 35)

(45) **Resource Restriction**: MERGE will always add one new element to the workspace.

(46) **Markovian Derivation**: derivations are strictly Markovian in a very strong sense. The derived workspace which is the current state of the derivation does not contain items that were generated earlier. (WCCFL; 23:04)

(47) {P, Q, {P, Q}}: it permits lethal **indeterminacy**. So if the next operation merges P with some new element, call it X. There are two possibilities, with outcomes that differ at the two **interfaces** depending on which P you pick. That's an intolerable situation. (WCCFL; 21:24)

(48) {P, {P, Q}}: Another bar to **accessibility** is the very important principle of **Minimal Search**. (LSJ; 49:32)

(49) These same restrictive properties of the strong minimalist thesis impose other conditions on linguistic operations: the one I've mentioned **binarity** follows it once, so does **strict cyclicity** which reduces search, hence the **phase impenetrability condition** PIC follows directly. Minimal Search is another corollary of restrict search space. (WCCFL; 24:34)

(50) a. Notice that Merge must also satisfy **theta theory**. That's **the output condition** that I already mentioned. (...) So a single theta assigner cannot assign two theta roles to the same element. (WCCFL; 26:04)

b. Notice that theta theory applies only to merge. It doesn't apply to other operations which aren't involved in composition. (WCCFL; 26:59)

(51) (...) if there are two structurally identical elements, we may or may not take them to be copies. (LSJ; 57:58)

(52) For expository convenience I'll assume that there's an operation interpretation call it **INT** which takes a look at the current stage of the derivation that is the workspace and it decides what can be done next. That's INT. Viewing the workspace, INT can detect the kind of structure that is created by internal Merge, let's call that an **internal merge configuration**. But INT lacks access to history so strict Markovian. It doesn't know how that IM configuration was constructed. So there has to be an operation; let's call it **Copy Formation** that assigns the copy relation to the actual cases of internal Merge. (WCCFL; 28:11)

(53) Copy formation yields two kinds of IM configurations one is just verifying the IM operation. One is configuration formed in some other way the latter type let's call **IM Gap**. Copy formation adheres to the general properties of all operations: minimal search, so it'll have the same combinatorial properties of merge but for Form Copy, bare output conditions are irrelevant. It's important principle of distinction. (WCCFL; 29:26) (cf. (50))

(54) The interpretative system applies at the phase level. (LSJ; 1:27:04)

(55) a. IM→Copy Formation (verifying the operation)

b. IM Gap as an instance of? Copy Formation

(56) ***Head Movement**

a. It's not formulable with any MERGE based system; it's not formulable by any other systems without some artifice. Also, unlike A/A'-movement, head movement typically has no semantic consequences (But see also Roberts 2010). (...) That fact has led to the suggestion that the rule is actually part of externalization. That runs afoul of the fact that it seems to be cyclic, so it can't be part of externalization, involves things internal to the syntax. It seems to be apparent contradiction. (LSJ; 1:01:47)

b. For formulation of thought head movement isn't even needed. So head movement seems unnecessary for I-language. It's not part of the core system. Externalization does require an operation that brings together the inflectional elements that's INFL, *v*, other categorizers and roots, has to bring them together cyclically. So let's say we have an operation **Amalgamate**, which just brings all these small guys together. And since it's doing it cyclically, it'll form structures like inflection followed by the element *v*-root. (WCCFL; 54:56)

c. Kitahara's suggestion: [{V, T}]→[{V, T}, <C, T>]→[{<C, T>, {V, T}}] (cf. UCLA lectures: 70)

(57) **Unbounded Unstructured Sequences** and **Form Sequence**

a. John, Bill, my friends...ran, danced, took a vacation... (LSJ; 1:07:30)

b. <(&), X_1,...,X_n> (LSJ; 1:08:28)

(58) They fall within the domain of the explanatory theory with one minimal departure from the strong minimalist thesis, namely, the operation Form Sequence, which is unavoidable, given the empirical facts, just the fact that you have unbounded sequences. (LSJ; 1:24:29)

(59) ***the coordinate structure constraint**: There are **strict matching conditions** on coordinations. And as Riny Huybregts [cf. Huybregts and van Riemsdijk 1985] pointed out, you can assume that the coordinate structure constraint is just a special case of these. If you pull out of one element, you gotta pull out all of them otherwise the matching condition is missed. So, we can eliminate the coordinate structure constraint. (LSJ; 1:10:48)

(60) **Event**: The PP coordination can be interpreted as two independent events. (...) But the NP coordination is a single compound event. (LSJ; 1:14:20)

(61) ***the *v*-*v** distinction**: it's actually determined by the lexical content of the roots. So, we don't really have any need to postulate different categorizers, depending on the lexical content. (LSJ; 1:18:31)

(62) $\{_1$ C $\{EA_1, \{_2$ INFL, $\{_3$ EA_2, *v*P$\}\}\}$ (or the unaccusative counterpart of $\{_3$...$\}$) (LSJ; 1:28:17)

(63) ***T (as an independent head)**: It follows from that tense is a feature of small *v*, not of INFL. Tense is the feature of small *v* because it can vary in the two cases. It's not a feature of INFL; this thing is not T. It's φ-features, but not T. φ-features have to be the same, but tense doesn't. So, contrary to the what's always been assumed, tense is not a property of the inflectional object, which is why I went back to the notation INFL instead of T. (LSJ; 1:22:39)

(64) [EA_1] lacks a theta role and every relevant noun phrase ought to have a theta role, but it does have a **semantic role**.

In fact, it has the most venerable semantic role of all of them. It's **the argument of predication**. (LSJ; 1:32:28)

(65) **Theta Criterion**: each occurrence of a nominal phrase either have a theta role or **an argument role**. (LSJ; 1:34:15)

(66) **A Strong Version of Duality of Semantics**: External MERGE is one-to-one associated with theta role. Internal MERGE is one-to-one associated with argument position. (LSJ; 1:36:31)

(67) **The Case Filter**: suppose it's part of externalization. (LSJ; 1:43:00)

(68) a. No need to change the notion of copy, no special notion of ***partial control**. (LSJ; 1:45:24)

b. ***obligatory control**: an illustration of the enabling function of strong minimalist thesis. (WCCFL; 35:15)

(69) There are two kinds of IM configurations, one derived from Merge, the other from forming copy. These are ***trace** and ***PRO** in traditional terms. We don't have to distinguish them all. (WCCFL; 31:03)

(70) we can also eliminate control theory, we can eliminate PRO (...) (LSJ; 1:49:58)

(71) Notice that throughout this discussion, I haven't used the interface level, ***conceptual-intentional interface**. That hasn't been mentioned. It's not needed. At any point in the derivation, the interpretative system can apply to a phase (cf. (54)), that's been constructed. (...) We can say the same about the sensory-motor interface. (...) So, it maybe then that conceptual-intentional and sensory-motor systems are dispensable. They can be eliminated just as ***D- and S- structures** were eliminated. All that remains is generation and access by language external systems. (LSJ; 1:50:17)

4. Summary and General Architecture

(72) a. For genuine explanation, to meet learnability, evolvability, and universality is required.

b. I-language relies on structure dependence.

c. Variety comes from externalization.

d. Restrictions on derivation: 3rd factor principles, Markovian restriction, PIC, Minimal Search...

e. Conditions on interpretation: theta theory, a strong version of duality of semantics

f. MERGE creates the structure.

g. Language external systems have access to the derivation; INT and Copy Form (verifying the output of IM & IM Gap) apply at the phase level.

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