Is dislocation syntax a postglacial property of language?

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1. Introduction
- Universal grammar (UG) = language acquisition device (LAD) = the information to the brain of how it has to process chunks of memorized linguistic input in order to find grammatical generalizations.
- (Briscoe 2003): LAD did not emerge in a single (and extremely unlikely) evolutionary step, but rather evolved incrementally in a number of independent steps. Hockett's features ⇒1 to ⇒11 (Hockett 1960, 1966) may have different origins.
- The FOXP2 mutation (Lai at al. 2001, Enard et al. 2002a,b) seems the most recent change of the genotype affecting human language (160,000 - 200,000 years ago).
- (Chomsky 2005): External merge forms morphosyntactic units through local combination; internal merge forms syntactic chains through dislocation.

Chomsky supposes that unbounded merge was created perhaps 60,000 years ago. I will argue that morpho-syntax (*external merge*) is much older than this, while dislocation syntax (*internal merge*) emerged much later during the neolithic transition 10 - 12,000 years ago. If that is true, dislocation syntax should be regarded as a cultural rather than a biological trait. (It is not likely to be determined by the genotype because selection pressure is required to maintain a biological trait.)

2. Four major phases in the evolution of man, including language.
- (i) Pre-human hominids, 7 to 1.8 mill. years ago: from the separation of human predecessors and chimpanzee until homo appeared
- (ii) The early man, 1.8 to 0.2 mill. years ago (100,000 generations): from the rise of homo erectus, who first left Africa, until homo sapiens appeared
- (iii) The modern man, 200,000 to 12,000 years ago (8,000 generations): from the rise of homo sapiens until the invention of agriculture (neolithic transition)
- (iv) Large and expanding human societies, from 12,000 years ago (600 generations)

Certain members of a previous phase survived in the following one:
- i. paranthropus until 1.1 mill. years ago,
- ii. homo erectus/neanderthaler until 27,000 years ago.
- iii. Traces of features characteristic of phase (iii) can be found in small and isolated linguistic communities of hunter-gatherers until today.

Phase (i): Pre-human hominids developed some prerequisites of language
- Upright moving freed the hands and allowed manufacturing.
- The neuronal mirror system for grasping was gradually extended (Rizzolatti et al. 1995, mirror system hypothesis by Rizzolatti & Arbib 1998): ⇒1 *intentionality*, ⇒2 *parity* (interchangeability of speaker and hearer roles).

Phase (ii): The early man (homo erectus), colonized the Old World
- Maintaining fire (1.5 mill. years ago) and making hand axes (1.4 mill. years ago) require intentional planning beyond the here-and-now: ⇒3 complex propositional thinking.
- Increasing size of the brain ⇔ improved sensomotoric skills (Calvin 1990): ⇒4 *fast processing*, ⇒5 *mapping from hierarchical structure to temporal ordering.*.

- Advanced sensomotoric control of manual and facial expression ⇔ further development of the neuronal mirror system: emergence of PROTOSIGN, a gestural language (Arbib 2005 Corballis 2003). Intentionality, parity, fast processing, and mapping from hierarchical structuring to temporal ordering are transferred to language.
- The child's instinct of imitation becomes the motor of language learning. Language learning becomes the motor of language evolution ⇒6 cultural evolution (Hockett's *traditional transmission*).
- Iconic encoding (in gestures) is transformed to abstract ⇒7 *symbols*.
- Combination of manual and facial gestures ⇒8 *compositionality* (productivity)

Phase (iii): The modern man (homo sapiens), colonized all parts of the world.
- Improved control of the vocal apparatus (FOXP2 mutation?): Because of inherent advantages, the ⇒9 **vocal-auditory modality** took priority over the gestural-visual modality. PROTOSIGN was gradually relieved by PROTOSPEECH.
- Studdert-Kennedy 2005, Oudeyer 2005: Automatic self-organization through random interactions among speakers-hearers forces ⇒10 *discreteness* of articulatory features and ⇒11 *duality of patterning* (minimal units do not bear meaning). All more complex combinations inherit discreteness from the minimal units.

In all sorts of combinations, some basic asymmetry is at work: one element functions as the head, defining the behaviour within a greater complex, whereas all others are non-heads.
- A vowel is the head of a syllable, and a stressed syllable is the head of a prosodic word.
- Complex predicates such as compounds and adjunction structures have one element as the head.
- The lexical inventory is partitioned into two complementary categorial types, verbs and nouns, with the verb as the head of a clause.
- The information of lexical elements is asymmetric, so that the arguments are strictly ordered, with the lower argument functioning as the 'goal' of predication (nearer to the verb).
- The element in focus is the head of a piece of discourse.

These prerequisites suffice to describe what is innate for the emergence of grammar.

(Categorial Grammar ≈ *external merge*): argument requirements of the combined items are either saturated or inherited to the result, and the information of modifiers is checked for whether it is compatible with what they modify

Linguistic diversity
- emerged from random fluctuations in the process of organizing articulatory features, and, based on that, organizing the vocabulary and the combinatorics, probably long before the migration phase began (60 to 30.000 years ago). Of course, groups that have separated also undergo separate changes.
- (Carstairs-McCarthy 2005:) ⇒12 **early morphology** could have started with a reinterpretation of allomorphic alternations produced by rapid speech.
- Morphophonology is perhaps the domain with the highest cross-linguistic diversity.
- In contrast, the amount of syntactic diversity seems to be smaller.

Moreover, syntactic diversity was often underestimated by syntacticians.
- Particular syntactic universals often turned out to be generalizations concerning striking linguistic families.
- Typological studies revealed that many alleged universal notions or principles are in fact not characteristic for all human languages and thus are not universals.

The notions of *grammatical subject*, *grammatical subject-object asymmetry*, and *abstract case* all together fail in the inverse type of Algonquian. These languages also violate the *binding principle* which requires that an antecedent must either c-command or linearly precede an anaphor in order to bind it. (Bailin & Grafstein 1991, Dahlstrom 1991:99, Wunderlich 2005). Both sentences in (1) and (2) are grammatical according to the co-indexation principle (3), which is language-specific insofar as obviation (or 4th person) is a category not known in languages outside the Americas. (In (1), proximate 'Mary' must be identical with the proximate possessor of 'sister', regardless of grammatical function.)

(1) Subject-object symmetry in Ojibwa

    a. o-miseez-an   o-gii-wiidookaw-**aa**-wan Mary.   b. o-miseez-an   o-gii-wiidookaw-**ig**-wan M.
         3-sister-OBV 3-PAST-help-**DIR**-OBV   M.   3-sister-OBV 3-PAST-help-**INV**-OBV   M.
         'Mary$_i$ helped her$_i$ sister.'   'Her$_i$ sister helped Mary$_i$.'

(2)   Co-indexation between dependent and matrix clause in Ojibwa

    a. John o-gikeendaan   aakozi-d.   b. o-gikeendaan aakozi-d John.
         John 3-know   [sick-3]   3-know   [sick-3   John]
         'John$_i$ knows he$_i$ is sick.'   'He$_i$ knows John$_i$ is sick.'

(3)   Co-indexation principle: Only elements of the same obviation status, that is, either proximate or obviative elements, can be co-indexed.

3. Morpho-syntax versus dislocation syntax

It is doubtful whether morphology and syntax emerged at the same time.
- Morphology and syntax can in principle do the same job, so that one of them seems superfluous. Some languages nearly lack morphology (isolating languages such as Vietnamese), while others nearly lack syntax (polysynthetic languages such as Yimas of New Guinea, Nivkh of Siberia, and Greenlandic). Isolating and polysynthetic are nearly incommensurable types. It is rather difficult to characterize the sort of language from which both could have developed.
- Bickerton 1981 (and later) claims that Creole languages, created under the influence of poor input from a pidgin, show most clearly the influence of UG. Klein & Perdue 1997 assume that UG is involved in the Basic Variety created by foreign workers in Europe, which has a poor syntax and no morphology. These authors believe that linguistic compositionality started with simple syntax.
- Polysynthesis is centered around the concept of head-marking, including noun incorporation and verb serialization, and also involves bound morphemes with adverbial or attributive functions. Mattissen 2004 distinguishes two types of internal organization: templatic or scope-ordered, and various sorts of fusion of independent chains. Polysynthesis itself seems to be a late product of repeated grammaticalizations.
- In general, head-marking languages have rich morphology but quite simple syntax. An inflected verb already represents a full clause. Independent nouns or NPs serve for more explicit referential specification; they have the status of free adjuncts.

Comparison of morphology and syntax
- A morphological complex is less flexible than a syntactic combination. It is characterized by fixed positions (except some forms of polysynthesis), and no dislocation of elements, no agreement between elements, and no assigment of focus or topic takes place.
- A morphological complex is affected by more phonological rules, and thus susceptible to more irregularities, than a syntactic combination.
- A memorized morphological complex is more rapidly processed than a syntactic combination.
- Morphology is more difficult to get acquired by adult learners than syntax.

→ It is highly improbable that syntax preceded morphology. In the contrary, one expects morphology to be prior to syntax. I believe that head-marking morphology is a trait of phase (iii), which survived in phase (iv), whereas dislocation syntax belongs to phase (iv).

4. Phase (iv): The development of large human societies
- Up to the last glacial period, linguistic communities were quite small and isolated groups of hunter-gatherers; with a size between 50 and 1,000 individuals. More people couldn't find their living in an area of several hundreds square miles, unless the circumstances were extremely favourable. Seasonal trading between such groups probably existed, but did not give the opportunity to much contact.
    [Still unclear: what caused the emergence of art and the astonishing improvement of tools and pottery 35,000 years ago?]
- At the end of the ice age 12,000 years ago the living conditions improved, the size of communities increased, the gatherers settled, and agriculture (and subsequently animal domestication) was invented at various places around the world, which enabled both constant access to highly nutritious food and shorter distances between births. This lead to rapid increase of population (by the factor 50 to 1000), and thus forced new societal forms of food storing and distribution, conflict management, as well as technical developments.
- Agriculture emerged about 500 years after the first settlements, 2,000 to 3,000 years later large stratified societies developed (except in New Guinea and Sahel Zone for geographical and climatic circumstances): Near East 8,500/ 5,500 B.C., China 7,500/ 4,000 B.C., New Guinea 7,000/-, Sahel Zone 5,000/-, tropical West Africa 3,000 B.C./ 500 A.D., Middle America 3,500/ 1,500 B.C., tropical South America 3,500/ 1,500, Eastern North America 2,500/ 200 B.C.

There were in fact two different reactions on the increase of population.
- *In the centres of neolithic transition* (except New Guinea): Increasing groups organized internally, associated with neighbouring people to form larger tribes, kingdoms or states: intensification of techniques, development of cities, bureaucracy, script. Neighbouring people took over agriculture, domestic animals, and metal tools. Language families influenced by the higher degree of population density: Afro-Asiatic (Near East); Sino-Tibetan (China); Aztecan, Mayan, Quechua (America).
- *At the periphery*: Increasing groups looked for new territories, spread and often displaced former groups. Language families due to expansion: Indo-European 4,000 B.C. (north of Near East), Austronesian (south of China) 3,000 B.C., Niger-Congo (Bantu) 3,000 B.C., Altai (Mongolic, Turkic, north of China) 500 B.C.

Studies investigating the relationship between geographic-cultural and linguistic factors
- Nichols (1992) found correlations between head-marking and residual zones.
  - ➢ **spread zones** (where languages or language families rapidly spread, serving as lingua franca, and consequent languages succeeded, and in which little genetic and low structural diversity is found)
  - ➢ **residual zones** (often at the periphery of spread zones, with high genetic and high structural diversity, and no lingua franca besides local bilingualism).
- Dahl (2006) distinguishes
  - ➢ **farmer zone** ("comprising languages traditionally spoken in areas with fully established agriculture")
  - ➢ **hunter zone** ("comprising languages traditionally spoken in areas not fully affected by the Neolithic transition"), Languages of the hunter zone show more "free" word order, less VO order, more morphological complexities, and do not include isolating languages.
  - ➢ Language density is nearly the same for all macro-regions (except N Guinea), whereas speaker density is much higher in the Old World than in the New World. 1 speaker/sq.km means that a group of 1,000 people occupies a region of 32 kms at each side, so that external contacts must be rare.

(4) Language and speaker density (Dahl 2006)

Macro-area	languages in area	million speakers	speakers/ language	million sq.kms	languages/ mill. sq.km	speakers/ sq.km
Europe	240	1500	6,25 mill.	10	24	151
Asia	2000	3500	1,75 mill.	45	44	77.4
Africa	2100	675	0,32 mill.	30	70	22.5
New Guinea	1200	7	5,800	0.75	1,600	9.3
Oceania	260	1	3,800	-		
North America	600	20	33,000	24	25	0.8
South America	400	20	20,000	18	22	1.1
Australia	230	0.05	220	7.5	30	0.005

→ Languages with few speakers ("small languages") are more likely to be conservative than those with many speakers ("large languages"), and they are more likely to be characterized as languages with rich morphology and poorly-developed syntax.

- Trudgill 2004: Societal types determine aspects of linguistic (phonolog.) structure.
  "*Small, isolated, low-contact communities with tight social network structures* (i) will have large amounts of shared information in common and will therefore able to tolerate lower degrees of linguistic redundancy of certain types [...], (ii) are more likely to be able [...] to ensure the transmission of linguistic complexity from one generation to another. Such communities are thus likely to be more linguistically conservative, i.e., to show a slower rate of linguistic change, and more likely to demonstrate complexities and irregularities. [...]"
  "*Communities involved in large amounts of language contact*, to the extent that this is contact between adolescents and adults who are beyond the critical threshold for language acquisition, are likely to demonstrate linguistic pidginisation, including simplification, as a result of imperfect language learning." (Trudgill 2004: 306)
  Irregular and non-transparent forms cause problems of memory load for adult learners. Their mode of imperfect learning leads to regularisation of irregularities, to an increase in transparency, and to an increase in analytic over synthetic structures.

5. Some linguistic effects of the neolithic transition

- Speakers of a small community have large amounts of shared information, including memorized linguistic forms, which can rapidly be processed in repeated as well as ritual encounters.
- A change towards (more) syntax happens if the community is growing and partitioned into various specialized or areally separated groups, less information is shared, the social networks become more pervious, and the probability of external contacts increases. → Linguistic communication becomes more varied.
- More varied interaction settings force the participants
  - o to use more specifications by independent NPs
  - o to be more explicit regarding topic and focus
  - o to use more transparent combinations rather than memorized forms
  - o to use forms that are less prone to irregularities

  so that the input for the respective next learner generation gets modified.
- A spreading population experiences more external language contacts. Adults using the dominating language as a lingua franca produce more simplified and at the same time more transparent varieties, which accelerates the process of language change.
- Competition between independent demands forces the emergence of positional variants (i.e., dislocation). For instance, the requirement of realizing grammatical functions positionally (S > O) and the requirement of realizing discourse functions positionally (topic > focus) can lead to various orderings such as SVO, $O_{top}SV$ and $O_{top}VS_{foc}$.
- SVO order also facilitates serial verbs, which share arguments ($SV_1OV_2(O_2)$). Then, reinterpretation of one of the verbs as a preposition or case marker is possible.

Something of this might have happened to the previous languages with rich head-marking morphology.

Hypothesis:

> **Syntax** (in the sense that it enables flexible ordering by dislocation of elements, and that it displays particular positions for topic and focus, and eventually dependent marking such as morphological case) is a product of cultural evolution (that is, of iterated learning under the influence of cultural factors). Syntax emerges in a linguistic community with high variation of interaction settings, which is more likely to take place in languages of the farmer zone than in those of the hunter zone.

Many small languages with rich morphology remained, so that the linguistic diversity found today partly originates from more recent changes, and partly preserves elder stages. These different origins explain why such incommensurable types such as the isolating and the polysynthetic ones exist side by side. The present coexistence of dislocating syntax and head-marking morphology opens the window to different time depths.

6. Syntactic universals

Do we have to assume specific syntactic universals in order to explain the emergence of dislocating syntax?

- Hurford 2000, Kirby 2002: Simulations with iterated learning models show that a stable compositional (recursive) syntax can arise within thousands of generations given completely unstructured strings of symbols at the beginning, a learning algorithm that can induce heuristically-driven grammars, and the ability of agents to associate strings with complex meanings. These simulations did not make any distinction between morphology and syntax. If speakers already used head-marking regularly, a syntax with the dislocation property, or even an isolating language, certainly could emerge from that state within fewer generations, given certain preconditions that make the starting state unstable.

- A condition of these simulations is that speakers can assign complex meanings, which is realistic insofar as one assumes that already early homo entertained complex thoughts. If the notion of a mental attitude with a propositional object (such as 'believe') is available, recursion is available, too. Corresponding mental attitude verbs must have been present at the time 35,000 years ago when art appeared.

- The heuristics of a grammar-inducing learning algorithm can be compared with processing principles or with constraints in other frameworks.

- Some universal principles have been argued to be correlated with or grammaticalized from processing principles (Fanselow, Kliegl & Schlesewsky 1999, Hawkins 2004), characterizing how the brain works if confronted with linguistic input.

- Constraints dealing with dislocation can be adapted from the geometric system serving for an optimal perception of motion (figure-ground, locality, transformations, traces). Constraints have competing demands, and only their respective ranking regulates the actual balance between maximal expressivity (explicitness, distinctiveness, transparency) and minimal expense (rapid processing, use of contextual cues).

Dislocation-syntax could have emerged through some re-ranking of constraints, forced by external factors (a specified NP is better than a pronominal affix or zero, a topic has to be realized, the choice from an alternative set has to be made transparent as focus or contrastive topic). The invention of dislocation was an advantage because more forms could be taken into consideration. It thus expanded the grammatical space. In the end, new constructions took over the task of elder ones. In other words, syntax forces less-flexible sorts of morphology to disappear.

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