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Where Do Personal Pronouns Come From?

Abstract

The stunning preservation of 1st and 2nd person pronouns and possessives in low-level language families turns into a relative diversity within and between macrofamilies and phyla. However, the global stock of ancestral pronoun stems exhibit particularities hardly compatible with a completely independent origin. A tentative evolutionary explanation of these apparently contradictory facts is proposed here. In the evolution of language, pronouns may have appeared only with syntactic articulation, often linked to the acceleration of cultural evolution seen in *Homo sapiens* from around 100 kyBP on. Syntax itself must have evolved over a long timespan, and the emergence of pronouns from preexisting words – nominals that were the most frequent subjects and objects of verbs referring to the speaker and the hearer, though this reference indirectly depended from their original meaning – must have taken time as well. The multiple stems reconstructed for each person in macrofamilies (and, to a lesser degree, low-level families) might be a trace of a final stage of this evolution.

The problem

In two centuries of comparative-historical linguistic research, it has become more and more evident that 1sg and 2sg pronouns and possessives are in nearly all language families like hard rocks standing in a plain, resisting erosion long after most other words have been swept by the winds of time. Dolgopolsky (1964) finds 1sg and 2sg pronouns to be the first and third longest-lasting word meanings, respectively. Pagel (2000: I, 205) calculates the time necessary for words of ancestral languages to disappear from half their descendants – an idea adapted from particle physics –, and also finds the 1sg pronoun to be an extraordinarily enduring word, with a half-life of 166 ky.[1]

In an extensive study of *m-* and *t-* stems in the Eurasiatic[2] macrofamily (Bancel *& al.* forthcoming), we have calculated their loss rates in the Proto-Indo-European (PIE) 1sg and 2sg pronouns and possessives from nearly 500 IE languages and dialects. In the four paradigms, *m-* and *t-* have survived in 98.5% to 99.6% of IE languages. With an estimated age of 8,000 years for the IE family, these figures correspond to incredibly low loss rates per millennium of 0.05% to 0.19%.[3] These rates correspond to half-lives of *m-* and *t-* in the

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1. Pagel concedes that this figure "should not be taken literally, and most certainly do[es] not imply [a] time [depth] of 166,000 years or even 15,000 years for the Indo-European data." In fact, the method relies on an estimated age of the considered family, which is already embedded in the word's estimated loss rate from which half-life is calculated.

2. We take the term "Eurasiatic" in Greenberg's (2000-2002) sense, rather than in that adopted by Gell-Mann *& al.* (2009), but it makes no real difference for our present purpose.

3. The loss rate per millennium r results from the formula $r = 1-(1-x)^{1/y}$, where x is the total loss rate over y millennia. Thanks to Sébastien Gaudry (Ecole Centrale Paris) and Sabine Bréchignac (Hôpital Avicenne, Assistance publique-Hôpitaux de Paris) for their contribution to this formula.

range of several hundreds of millennia.[4] And the situation is much the same in most other Eurasiatic subgroups.

With such inoxidizable pronouns and possessives, one would expect the situation to change very little as one proceeds back in time. By the preservation standards of PIE *m- and *t-, the pronouns and possessives of an ancestor language spoken 20 kyBP should be reflected in 96.1% to 99% of its daughter languages. Even the Proto-Sapiens hypothesis should receive quick confirmation from an expected near universality of pronouns and possessives. If Proto-Sapiens was spoken 100 ky ago, as one may reasonably estimate on archeological and genetic grounds, 1sg and 2sg pronouns and possessives should have been preserved in 82.7% to 95.1% of its descendant languages – i.e. all languages of the world – and in a still greater proportion of families, whose proto-languages by definition have had less time to evolve.

However, even at the incomparably younger Eurasiatic stage (often estimated in the 10 kyBP range), we are faced with much more diversity: Turkic, Korean, Japonic and Aleut entirely lost *t-, and in at least Korean *m- has vanished as well.[5] Enlarging our view to families more distantly related to Eurasiatic still worsens the picture. According to most Nostraticists, the families directly related to Eurasiatic are Kartvelian, Dravidian and Afroasiatic – unless it is rather Amerind, as is claimed by Greenberg (2002: 2-3). There are only scattered traces of 1sg *m- in Afroasiatic (Bomhard 2008: I, 274), which has however a 2sg *(n)t-. As to Amerind, we are faced with the uncomfortable situation where *m- is the stem of 2sg and 2pl pronouns (Greenberg 1987: 277-9, see also Nichols 2008) – though Ruhlen (1994a: 228-9) also posits an Amerind 1pl *ma. For its part, the Amerind 1sg stem *n- (Greenberg 1987: 272-5; see also Ruhlen 1994a: 192) is reconstructed in Nostratic as a 1pl (Bomhard 2008: I, 281-3), including in Indo-European (e.g. Latin nōs 'we, us,' Gothic uns 'us'), and with lesser reliability as a 2sg stem as well (Bomhard 2008: I, 287-9).

Finally, if one widens the scope unto the global level, as done by Ruhlen (1994a: 252-60), who compiled lists of 1sg, 1pl, 2sg and 2pl pronouns in the world's language families,[6] what one finds is an apparently desperate mess of *m- and *n- in the two persons and numbers, *k- 1sg and 2sg, *t- 2sg and 1pl, plus numerous erratic forms (Table 1). But is really the global diversity of pronouns a mess, and is it completely desperate? Not exactly.

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4. With Pagel's formula ($t_{50} = -\log_e(0.5)/r$, where r is the loss rate per millennium), a 0.05%/ky loss rate amounts to a 1,386 ky (= 1.4 My!) half-life; a 0.19%/ky loss rate "only" equals a 364 ky half-life. These results, though really indicative of a massive stability of pronoun stems, must be taken with a big grain of salt because of their sensitivity to the size of sample, an important difference with the original half-life method in physics, where all particles of the sample already exist in the beginning of the experimentation, while in language evolution they appear in the course of it with the successive divergences of the proto-language.

5. We do not count Korean uli 'we,' whose u- is taken by Greenberg (2000) to be the final outcome of *mu > *bu > wu (wuli 'we' is attested dialectally) > u on the account of analogous *m > b evolutions in Uralic, Altaic and Chukotko-Kamchatkan, as a case in which the stem consonant *m- has survived. In our Eurasiatic tables, *m- and *t- are considered surviving only when the stem consonant left a clear phonetic trace of itself.

6. The forms compiled by Ruhlen are either reconstructions (in families where the work was done) or best guesses about the most likely original forms (in each of the other families). Given the extraordinary stability of pronoun stems, there is little doubt that in the latter cases a phonologically informed inspection may allow to identify most original stems nearly as accurately as reconstruction.

First of all, phonetic diversity among pronoun stems is not as huge as it seems at first glance, with 40 stem phonemes in Ruhlen's list of 348 pronominal forms. Six consonants alone – namely *m, n, t, k, s, j* – make up nearly two thirds of the sample (217 items, or 62.4%). All six are found on different continents in various distant families. Six more sounds are relatively common: these are *h, ʔ, ŋ, w, i, u* (61 items, or 17.5% of sample). All 28 other sounds occur very scarcely, with from 4 items to a single one each.

Stems	1sg	1pl	2sg	2pl	Total	% of total
m	11	19	19	17	66	19.0
n	20	19	12	5	56	16.1
t	5	7	10	8	30	8.6
k	17	6	11	5	39	11.2
s	4	1	7	3	15	4.3
j	7	3	0	1	11	3.2
Subtotal 1	**64**	**55**	**59**	**39**	**217**	**62.4**
w	4	1	9	0	14	4.0
ŋ	8	1	4	0	13	3.7
ʔ	5	1	3	2	11	3.2
h	7	1	2	0	10	2.9
i	6	0	1	0	7	2.0
u	4	0	2	0	6	1.7
Subtotal 2	**34**	**4**	**21**	**2**	**61**	**17.5**
p/b (p/b alternating with m)	0/0 (2/2)	0/1 (2/1)	2/0 (4/0)	1/2 (1/0)	3/3 (9/3)	1.7 (3.5)
p b v d z ð r tˡ sw ɬ l š ž č ǰ šʷ šʲʷ lž ch ñ g kh kw x xw ɢ ħ a	**18**	**22**	**16**	**14**	**70**	**20.1**
Average # of occurr. of 1/40	2.9	2.0	2.4	1.4	8.7	2.5
Total	**116**	**81**	**96**	**55**	**348**	**100.0**

Table 1. Number of occurrences of each stem phoneme in Ruhlen's (1994*a*) worldwide lists of pronouns. In CV, CVC, VC and VCV forms, C_1 is considered the stem; in VV forms, V_1 is taken to be the stem. Alternate forms with different C_1 have been counted under each consonant, but alternate forms with the same C_1 have been counted only once. A few complex forms have been discarded from the count. Symbols *j* and *y* most of the time transcribe a palatal glide and have been subsumed under *j* in the table. For both *b*- and *p*- stem consonants, a subcount is given between parentheses of forms alternating with *m*- forms in the same family.

This is old news, in a way, for it has long been remarked that pronouns in most languages have a tendency to be based on a few stem consonants, which was attributed to a kind of functional convergence due to their huge frequency in discourse. Of course, the pronouns' overall shortness may be (and, in many language families, surely is) independently due to this functional constraint. However, convergence cannot explain the massive concentration of pronoun *stems* on a handful of consonants at the global level, particularly with regard to the inalterable stability of stems in low-level families: if change had always been as slow as is observed in low-level families, there would be no phonetic convergence nor divergence of any kind to be expected. Preservation would be the only choice.

However, things are not that simple. A particular form of change may be observed already in low-level families, and this change almost exclusively consists in simplification: rather than innovating or borrowing pronoun stems, descendant languages may preserve only part of the stems reconstructed in their ancestral language. It may be observed for 1sg in the

Indo-European family in our survey covering 500 languages, exactly a third (33.7%) of which lost any reflex of the PIE suppletive nominative *eghom 'I' (the whole Celtic group – save perhaps Gaulish, see Blažek 2008 –, plus parts of Romance, Tocharian, Iranian, Indic, and Anatolian). And almost no language having (often independently) lost *eghom did replace it by a new pronoun. Nearly all have generalized a form of the other PIE 1sg stem *m- instead.

At the Eurasiatic level, the 2sg PIE pronoun stem *t- is also generally attested in Uralo-Yukaghir, Mongolic, Tungusic[7], and Chukotko-Kamchatkan as a pronoun stem as well, so that there may be no doubt about its Eurasiatic ancestry. But there is another Eurasiatic 2sg pronoun stem *s-, found in Turkic, Tungusic, Korean, Japonic, Gilyak, and Kartvelian, also represented in the Eastern Itelmen 2pl suze 'you' (cp. 1pl muze 'we') and in the Eskimo 2pl subject marker of intransitive verbs -si (Greenberg 2000: 74-6). In PIE, it is also represented by a 2sg verb ending – and, since most personal verb endings derive from grammaticalized pronouns, there may be little doubt that the ancestor language of PIE had a 2sg pronoun stem *s-. Where has gone this Eurasiatic *s- pronoun stem in the Indo-European, Uralo-Yukaghir, Mongolic, Chukotko-Kamchatkan (save Eastern Itelmen) and Aleut lineages? It clearly underwent a severe loss rate, hardly compatible with those observed in low-level families.

This apparent multiplication of pronoun stems in ancestral languages as one goes farther back in time poses a strong typological problem, aptly spotted and exposed by Babaev (2008: 8): no known language possesses as many pronominal stems as are reconstructed for Proto-Nostratic. However, Babaev's explanation of this ancient variety as an artifact of reconstruction, resulting from innovations having piled up in descendant languages, remains puzzling, precisely because these too numerous Proto-Nostratic pronominal stems do not appear to have been innovated in each descendant language or family, most of them being found in several distant subgroups and being unlikely to have been borrowed. At the global level, with a half-dozen consonants gathering a large majority of low-level ancestral pronoun stems, one may only expect that the stock of pronoun stems in each of the most ancient macrofamilies will more or less be the same, though they will not match systematically with regard to person and number across macrofamilies.

Besides this distribution of pronouns stems over families and time, the global stock of pronoun stems also exhibits a phonetic particularity. As compared to dental-alveolar t and velar k, plain oral labials are amazingly underrepresented. To be sure, p- is not completely absent from Ruhlen's lists, nor is its voiced counterpart b- (18 items together, or 5.2% of sample), but exactly two thirds of them (12 out of the 18 items) appear to alternate with an m-form, e.g. in Ruhlen's Altaic 1sg forms *mi ~ *bi, where *bi is the suppletive nominative of *mi and certainly derives from it. This leaves us with only 6 occurrences (1.7% of sample) of undoubtedly original b- and p- stems (3 each, or 0.9%), to compare to the 66 occurrences of their nasal counterpart m-, and the 30 and 39 occurrences, respectively, of their dental t- and

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7. In Tungusic, 2sg *t- is represented in the 1pl inclusive miti, literally 'I-thou' (Greenberg 2000: 72).

velar *k-* counterparts. Since plain oral labial stops are among the most widespread consonants in the languages of the world, their discretion among the global stock of pronouns would be a big stroke of luck if pronouns had arisen in complete independence from one another.[8]

How to reconcile the extraordinary stability of personal pronouns in low-level families with their relative divergence within deeper-level families, while they however concentrate on very few stem consonants at the global level (though they do not match semantically), and display a typologically striking lack in their phonetic distribution? We will propose below a conjectural solution, deriving them from kinship appellatives like *mama, nana, tata, kaka, jaja,* etc., which must have preexisted them.

A solution

Before exposing our arguments, a warning is here in order. We are not reconstructing, with whatever method, be it "standard" or multilateral comparison, the ancestry of such or such pronoun stem, e.g. Eurasiatic **m-* and **t-,* as interpreted by Babaev (2009: 142) in his review of Bengtson (2008), where our conjecture was first exposed.[9] We did not (nor do today) intend to claim that any particular pronoun stem descends from such or such kinship appellative. In particular, we do not claim that speakers of Proto-Eurasiatic (nor of any other known proto-language) had changed some of their kinship terms into personal pronouns. Rather, we wanted (and still want) to suggest that 1st and 2nd person pronouns *as a category* might – and, in our opinion, may only – have evolved from that of kinship appellatives, in the course of a radical transformation of the nature of language, namely the emergence of syntactic articulation, by far anterior to Eurasiatic and Nostratic (though it was perhaps not completed at their respective stages).

Of course, this conjecture being correct would imply that most pronoun stems in the world's languages, and among them Eurasiatic **m* and **t,* would in all likelihood remotely descend from kinship appellatives. But the demand presented by Babaev (2009: 142) of typological evidence for such a shift is impossible to satisfy, precisely since pronouns change so little in modern languages – and the situation is absolutely not the same as it was at the time where human language acquired pronouns, both linguistically (1st and 2nd person pronouns now exist in all languages) and sociologically (kinship must have then been the only mode of social organization). As to the comparative evidence required by Babaev, it is also

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8. Another distributional particularity in Ruhlen's list is the low number of voiced stops. With 3 *b-,* 4 *d-,* 2 *g-* and 1 *G-,* against 30 *t-* and 39 *k-,* they are nearly 10 times scarcer than their unvoiced counterparts. It may be (and surely in some cases is) an artifact of comparison: since initial voiced consonants do not very often get devoiced, one is tempted, when faced with *p- ~ b-, t- ~ d-* or *k- ~ g-* correspondences, to posit preferentially an unvoiced original consonant. But, precisely since initial voiced consonants do not often get devoiced, if numerous families have had originally voiced pronoun stems, one should retrieve them in their descendant languages and not be tempted to posit an unvoiced original stem consonant.
9. Babaev's mistake may in great part be due to the structure of our paper, most of which dealt with Eurasiatic pronouns, then shifted abruptly subject to this conjecture, and to our admittedly unusual method, as well as, and perhaps mainly, to lacunas in our argumentation, which we will try to mend here.

impossible to satisfy, for the same reason – except collectively, with the fact that a great majority of pronoun stem consonants, known not to be innovations (at least within our comparative reach), also are the stem consonants of kinship appellatives, which in turn must have preexisted pronouns (a claim independent from the belief that modern appellatives descend from Proto-Sapiens, as we will see).

We use the results of linguistic comparison to try and gain a view of very ancient facts, which linguistic comparison alone could not attain. Our results may certainly seem less secure than those obtained through regular sound correspondences, but asking questions like "Of the phonetic and syntactic articulations, which one may have appeared first?" or "What does it take for a language to have personal pronouns?" also is historical linguistics, even if sound correspondences alone may never answer them. The reader is thus urged not to apply automatically his/her knowledge of comparative linguistic procedures (though this and other knowledge may certainly be useful) in assessing our evolutionary arguments. Here they are.

As already mentioned, the six stem consonants (*m, n, t, k, s, j*) grouped in the first part of Table 1, totalizing 62.4% of ancestral pronominal forms worldwide, also are stems of globally-spread kinship appellatives, namely the five Proto-Sapiens words *mama, nana, tata, kaka* and *jaja* (Bengtson *& al.* 1994: 292-3; Ruhlen 1994*b*: 122-4; Bancel *& al.* 2002, 2005, in press; Matthey de l'Etang *& al.* 2002, 2005, 2008, in press)*,* plus *ise* 'father,' widespread in Eurasiatic, Amerind and Niger-Congo. Most other stems listed in Table 1 may derive phonetically from one or another of these six consonants.[10] From a general phonetic viewpoint, this makes kinship appellatives unproblematic ancestors of personal pronouns. But why should they be the pronouns' ancestors? Why could not pronouns always have coexisted with them?

To answer these questions, we must leave the domain of strict linguistic comparison and enter those of general theory of language and human evolution. Human languages are known to be doubly articulated, phonetically and (morpho)syntactically (Martinet 1960: 13-5, 17-8). The phonetic articulation consists in meaningless elements, phonemes, combined into sequences to form simple meaningful elements, called *monemes* by Martinet, a term of his own coinage referring to both simple words and morphemes. In turn, the syntactic articulation consists in the combination of these elementary meaningful monemes into complex sentences.

Martinet orders these two articulations into a first and a second one, and finds that syntax comes first. His reasoning is based on a representation of language, viewed only from the speaker's side, in which the speaker has something to make known to someone else (*"tout*

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10. Only the basic plain velar nasal *ŋ,* represented in the second part of Table 1, does not appear as a very likely descendant of any of consonants *m, n, t, k, s, j*. We leave the question pending, noting that (i) cases of evolution *m > ŋ*, though not common, are not exceptional, (ii) in our global database of kinship terms, there are relatively numerous instances of an appellative *(ŋ)aŋa* 'mother, grandmother, aunt,' mostly in African, Indo-Pacific and Australian languages, even though they do not make a very strong case for a regional etymology, while Proto-Niger-Kordofan 1sg independent pronoun **ŋgai* exactly matches Proto-Pama-Nyungan 1sg ind. pr. **ŋgai* (Christopher Ehret, pers. comm., 2007).

fait d'expérience à transmettre, tout besoin qu'on désire faire connaître à autrui", ibid.: 13).
The speaker begins analyzing his initial, languageless (?) thought as a bunch of lexical units
corresponding (?) to this thought of his,[11] which he arranges in the right order (syntactic
articulation) and finally proceeds to convert this word sequence into a phoneme sequence
(phonetic articulation). Thus, Martinet's order of syntactic and phonetic articulations
exclusively relies on the assumption that a "thought" is entirely converted into an ordered
word sequence in the speaker's mind before being passed to the phonetic component, in order
to be converted into a phoneme sequence and uttered. With such a sequential processor,
speakers should not be able to utter two sentences in a row without at least a marked pause
between the two, since they would be able to begin to process the second one only after
having finished to utter the first. Also, one never should see a speaker stopping short in the
middle of a sentence, searching for a word not yet found in his internal lexicon. But many
speakers are perfectly able to utter an indefinite number of sentences with no other pauses
than for a short breathe, while everyone utters incomplete sentences everyday.

Instead of processing full thoughts/sentences through all components of their language
processor one after another, real speakers must handle many different subparts in extremely
short timespans, and we have as much as no understanding of this real-time language
processing – albeit it is the only grammar deserving to be called *natural.* Within the timespan
of a single sentence, speakers continuously think, spot words and morphemes corresponding
to the theme and articulations of their thought (which words may in turn modify their thought,
against which they must be checked back), organize them into groups and phrases (again with
implications on and necessary checking with their initial thought), process bits of morpheme
sequences in the morphonological component, then in the phonological, then send them to the
motor component to utter the corresponding sounds, and control a posteriori what they have
just said with regard to phonetic, syntactic, lexical and logical accuracy, while keeping a
pragmatic eye on the interlocutor and his/her reactions. The existence of all these
subprocesses is *a contrario* warranted by the most common lexical, syntactic, morphological,
phonological and phonetic speech errors.

As for hearers (because hearers are a necessary ingredient of language, and they cannot
decently be supposed to begin decoding with syntax before having heard and identified
phoneme sequences, and found corresponding words in their inner lexicon), they continuously
decode the acoustic signal hitting their eardrums, while processing what they have just heard
on both lexical and morphosyntactic levels, controlling the grammaticality of their
interpretation as well as its semantic, logical and pragmatic relevance on both levels of
discourse and external circumstances, and preselecting the most likely continuations at the
phonetic, lexical (e.g. an animate noun after adjectives such as *sympathetic* or *loath,* etc.),
syntactic (e.g., in an SVO language, verbs after a subject nominal, direct objects after a

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11. This process, if it existed under the form assumed by Martinet, would be a third articulation of language.

transitive verb) and semantic levels to speed up interpretation of the oncoming speech flow, keeping track in a permanently readjusted short-term memory of the few preceding sounds in order to rectify a possible auditory or parsing error, while they keep an eye on possible cues warning them that their speech turn is coming soon and they have to prepare to answer, or to emit some approbative grunt urging their interlocutor to speak on.

How many times these subprocesses are run during a sentence, whether they are run in parallel or not, and if so how they are synchronized, all these questions exceed our understanding today, except that one may be sure that there is a lot of comings and goings between the different components of language within the time of a sentence in the minds of speakers and hearers. As a result, from the vantage point of speech act, not only syntax certainly is not the first articulation of language but ordering the two articulations is wholly devoid of reality.

Nevertheless, it seems that another ordering of the syntactic and phonetic articulations is possible from the phylogenetic viewpoint. Many arguments converge in support of the idea that syntactic articulation must have emerged late in the evolution of language.[12] The first line of support comes from studies on language acquisition by children, who at the age of 11-12 months start uttering isolated words, then begin (at 15-18 months) to use two- or three-word combinations, and finally begin (around 20-24 months) to acquire morphological and syntactic rules (Brigaudiot *& al.* 2002): children clearly acquire the phonetic articulation first.

It is also confirmed by observations from apes trained to manipulate symbols, either chimps (e.g. Gardner *& al.* 1989), gorillas (Patterson 1987), or bonobos (Savage-Rumbaugh *& al.* 1994). They are able to learn and to relevantly use up to several hundred symbols, but most of their utterances consist in a single symbol, even if the most gifted pupils may occasionally combine two or three of them, exceptionally four, though mostly without determined order.[13] For chimps using symbols, syntax remains beyond their capacities.

Finally, the posteriority of the syntactic articulation is supported by mere commonsense: before gathering words into complex sentences, one must have words at one's disposal, which in all languages are made from phonemes. For this reason, any modern speaker must begin by the phonetic articulation in order to build words, and syntactic articulation has to come next.

How could archaic humans have built a syntactically articulated language before having invented the phonetic articulation and progressively built not only two or three articulate signs, but dozens or, more likely, several hundreds of strongly individualized words –

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12. Bickerton's (1990) theory of protolanguage, a misleading name for a primitive stage in the evolution of human language ability without syntactic articulation (and not the ancestral language of any given family), already claims that syntax should have appeared in a relatively recent stage.

13. For both apes and babies, 1-word utterances are sentences (specialists in language acquisition coined the phrase *holophrastic word* "whole-sentence word" to qualify them), and may convey complex meanings, often with heavy contextual reference, but it is not the point here. The point is that these sentences are not syntactically articulated – if they possibly are semantically, a component neglected by Martinet as if it were not part of language but contained in an extralinguistic "thought," still another dubious axiom.

otherwise, combining them would have been of little interest? And this initial process may not have been completed overnight. It is unlikely that the first phonetically articulate sequences also bore a truly symbolic meaning, as do modern words and morphemes – otherwise, it would have been like discovering at the same time the law of universal gravitation and the quarks, or the existence of microbes and the DNA. Rather, we would expect them to have fulfilled functions identical or close to preexisting animal vocalizations. Giving them a symbolic value must have been the result of a long subsequent evolution, as more phonemes became utterable with the progressive transformation of the human vocal tract, allowing to enlarge the lexicon enough to specialize some signs to designate clearcut classes of beings, things or actions – i.e. evolving them into words. Both these phonetic and semantic evolutions also must have long been dependent on the growth of brain size and processing power, as well as on such apparently hardwired behavioral evolutions as the emergence of spontaneous attention to articulate speech, the development of babbling in babies – a universal training stage, which may have appeared and spread only after mastering some degree of phonetic complexity had become a selective advantage –, or the tendency to react to speech with speech rather than directly with other acts. As a result, this initial evolution of phonetic articulation must have been anchored for most of its duration to biological evolution, whose pace is much slower than linguistic or cultural evolution.

Thus, there is an order in the two articulations of language, after all, which is historical in nature – and this order is the opposite of that found by Martinet. Phonetic articulation must have come first, and syntax only much later.

In human history, acquiring the second, syntactic articulation may not have been a small event. With syntax, you become able to tell stories, to describe precisely how to design and build any artifact, and to form complex thoughts about new ones. It is a fantastic universal tool for both innovation and transmission – technical as well as social, intellectual and religious. It must have revolutionized the life of the communities where it developed.

It happens to be the case that such a revolution has long been perceived in human prehistory. André Leroi-Gourhan (1964) studied the evolution of technical ability in humans, which he measured in meters of blade obtained per kilogram of rough silex knapped. He found that, since the earliest stone tools, ca. 2 MyBP, it had grown in direct correlation with the growth of endocranial volume, and hence brain size, until around 50 kyBP, at which point skull capacity stopped to grow while technology took off in a way silex blade length could not measure anymore. This 50 kyBP crossroads where cultural evolution finally diverged from the biological was termed the "Sapiens explosion," since new techniques of all kinds seemed to have suddenly appeared, including seafaring with the first settlement of New Guinea and Australia across at least 100 kilometers of sea (Coupé & al. 2005). For around the same time, our Sapiens ancestors had left their African homeland to colonize the whole Old World,

where they quickly supplanted the various human species having evolved there separately since hundreds of millennia, like the European Neandertals.

This cultural explosion must today be relativized with regard to its alleged instantaneity, since it now appears to have been preceded by an evolution in the African homeland of *Homo sapiens,* as shown by the discoveries at South African sites Klasies River Mouth (Singer *& al.* 1982), Blombos Cave (Henshilwood *& al.* 2001, d'Errico *& al.* 2005, 2009) or Pinnacle Point (Marean *& al.* 2007). There one finds, as early as 80-130 kyBP (and even 160 kyBP at Pinnacle Point), clear traces of culturally modern behavior: the early *Homo sapiens* who occupied these sites cooked meat and plants on fire, fed on marine resources, made microlithic and polished bone tools, and, at Blombos in layers dated to around 80 kyBP, carved symmetrical geometric patterns on regular parallelepipeds of red ochre, and pierced shell beads (found in clusters which must have been worn in necklaces).[14] All complex behaviors which archeologists rightly link with the necessary use of a form of symbolic language close in complexity to those used by contemporary humans.

Thus, as the consensus [15] grows, the Sapiens cultural "explosion" or, rather, acceleration, would be the archeological landmark left by the apparition and evolution of syntactic articulation in human language. A process which certainly took time itself, because of the quickly growing complexity of the real-time encoding and decoding processes evoked above. And if we may consider that it was already underway around 150 kyBP, had continued to develop around 80-100 kyBP and had still made more progress at 50 kyBP, we have no idea of when it was completed (nor even, to be provocative, whether it is completed today).

Well and good, but what has this discussion about syntactic articulation to do with the origin of pronouns? Simple. The existence of pronouns and person markers directly depends on syntax. Without syntax, they are not only useless but even inconceivable.

Imagine a language without syntactic articulation – with 1-word utterances only for a very long time, and then with 2 or 3 juxtaposed words. There are no subjects, no verbs. There may be calls, and names are useful for this use as they allow to call a particular person. Other symbolic words are used as whole sentences, with the help of context and gestures. What use would be *I* and *thou*? And, above all, how could have appeared these extremely weird words – whose essential semantic feature is to change reference with the speaker? It is the very essence of symbolic language to share symbols which refer to the same objects for all users, and in all languages all words – save person markers – share this precious property, whose acquisition gives babies the key of spoken language. Only 1st and 2nd person pronouns and markers have the exotic particularity that their only meaning is to change reference with the

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14. Also, the time where the human brain reached its present size must be somewhat relativized, since early *Homo sapiens* like those of Shkul and Qafezh (ca. 90 kyBP) and even earlier *Homo neanderthalensis* (from ca. 300 kyBP on) already attained skull capacities within the range of contemporary humans.
15. Notably expressed in several papers of Botha *& al.* (2009; e.g. d'Errico *& al.*), and in Bickerton (2009).

speaker.[16] I am my own and nobody else's I. And so is each of you all – his/her own and nobody else's I. Conversely, each of you is one of my thous, which he/she is not with regard to him/herself, while I am one of your thous, which I am not for myself.[17]

1st and 2nd person pronouns and markers are highly useful tools in conversation, and no attested human language seems to lack them. However, even with syntactically fully articulate languages, they are not absolutely necessary. It is always possible to speak in the 3rd person, Benveniste's (1946) non-person, occasionally using personal names to disambiguate who is doing what to whom: *Pierre and Alain tell Readers.* In the beginning of syntactic articulation, when people progressively became more and more able to combine words and to answer other people's utterances (something which must have been difficult and rare with 1-word utterances), 3rd non-person was certainly the only way to have a subject and a verb, as well as a verb and an object.

How may have appeared 1st and 2nd person pronouns, then? It would be absurd to suppose that they were intentionally invented by people having realized how useful they would be if they existed. Rather, they must have evolved from preexisting words. And the category these words must have belonged to is easy to identify. It is that of nominals which were used to refer to the speaker and the hearer – and hence to human beings –, whose most frequent members may have been turned into pronouns under a shortened phonetic form, as the development of syntactic articulation and the parallel rise of conversation made more and more often necessary to specify who was doing what to whom.

Among these nominals referring to humans, several subcategories do not qualify as the potential ancestors of personal pronouns. It would be very difficult to conceive how ordinary common nouns (like *hunter* or *girl*) or proper nouns (like *Jehan* or *Little Big Woman*) could have given rise to pronouns and acquired the property to switch reference: most common and proper nouns refer to the same object whoever is speaking, and are thus separated from pronouns by an apparently impassable semantic wall.

Moreover, if such ordinary common or proper nouns were the ancestors of pronouns, the global phonetic picture of present-day pronouns would be very difficult to explain in all cases. On the one hand, if all modern pronouns shared a common origin, and descended from a subset of common or proper nouns in a single ancestor language, how could one explain that it is impossible to assign any of the modern pronominal stem consonants to a common global origin? It would be at odds with the exceptional preservation of pronouns in low-level families. On the other hand, if present-day pronouns descended from a subset of proper or

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16. Other words may include reference to the speaker or the hearer, like *here* 'around the place where I am,' *now* 'at the moment I am speaking,' or *this* 'the known or shown thing near me,' but only 1st and 2nd person pronouns exclusively consist in a reference to the speaker or the hearer.

17. To be completely true, it may occur in the inner speech that one addresses oneself as a 2nd person – *"Pierre, what did you say?"* This mild symptom of a split personality reflects the fact that self-consciousness amounts to place oneself at a remove from oneself. However, talking about oneself as a 2nd person to somebody else would be considered a symptom of a serious speech or psychic disorder.

common nouns in several different ancestor languages, how could one explain that their stems converge so massively towards a handful of stem consonants, whatever the language family they belong to, while very few seem to have been innovated in the last 10 to 15 ky?

Among nominals likely to refer to the speaker and the hearer, only kinship terms, and in particular kinship appellatives like *mama, nana, tata, kaka, jaja,* etc., appear as likely ancestors of personal pronouns. First of all, kinship appellatives definitely are of Proto-Sapiens ancestry – because of their ubiquity and the impossibility, contrary to the widespread belief following Murdock's (1957, 1959) and Jakobson's (1960) famous papers on 'Why Mama and Papa?,' that they had resulted from convergent innovations (Ruhlen 1994*b*: 122-4; Bancel *& al.* 2002, 2005, in press; Matthey de l'Etang *& al.* 2002, 2005, 2008, in press).

Kinship appellatives must even be much more ancient than Proto-Sapiens, and certainly played a major role in the emergence of phonetic articulation in Proto-Human. The first phonetically articulate words, uttered by mouths and tongues that had not been designed for speech by evolution, must have been built from the simplest consonants cast into the simplest syllable structures (Lieberman *& al.* 1972, Lieberman 1992) – which kinship appellatives still are today, with their typical CVCV, VCV or CVC reduplicative structure and their basic plain stops and vowels. Rather than meaning anything in the modern sense, they must have fulfilled some of the functions of prelanguage vocal communication, like calls – which kinship appellatives still are today, and even exclusively in the first uses of 1-year children (Grégoire 1937, approvingly quoted by Jakobson 1960), to only progressively acquire a referential value, thus opening children the door to symbolic representation and meaning.[18] The first phonetically articulate words also must have been easy to transmit from generation to generation through mouths, brains and ears lacking specialization for language, so that this invention did not get lost – and kinship appellatives, thanks to their particularly simple phonetic structure and functional usefulness, have not get lost until today. All these conditions are fullfilled by nursery kinship terms, and by them only. Finally, as said in the warning beginning this section, even those who think that modern kinship appellatives have not been inherited from Proto-Sapiens, but are innovated by children every now and then, could hardly argue against their anciency as a category. Since their acquisition by babies is – thanks to their unique phonetic and functional properties – a crucial initial step in the transmission of articulate speech and symbolic representation in all human communities of the world, arguing that kinship appellatives appeared recently would require to explain how babies (and more generally humans) managed to acquire articulate language before.

In the Paleolithic, all humans were hunters-gatherers, a lifestyle implying to live in small bands of a few dozen individuals, most of which are related. All historically known groups of hunters-gatherers have lived this way, and such was certainly the case of all groups

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18. This succession in the acquisition of language by children is another indication that phonetically articulate sequences are likely to have emerged before symbolic representation.

since the very origins of the human lineage, as testified by the parallel lineages of bonobos and chimpanzees, who also live in small foraging bands of related individuals – and these bands display primitive features of a kinship-based social organization (De Waal 1982). More generally, evolutionary biologists classically explain how cooperation may have evolved among closely related individuals,[19] which is the case of all cooperating animals, whether insects or vertebrates (Hamilton 1963). John Maynard Smith (1964) even coined the now classical cover term of *kin selection* to refer to this branch of evolutionary theory. It is thus a safe bet to assume that, in archaic humans, language and kinship-based social organization, two highly cooperation-oriented institutions, must have evolved together from start.[20]

For these reasons, kinship appellatives must have been around long before the appearance of pronouns and person markers. They must have been in daily use as calls and address terms between Paleolithic hunters-gatherers, as they still are in contemporary societies by children towards parents, and in more traditional societies towards any person, which may be addressed according to age and status as 'son/daughter,' 'brother/sister,' 'cousin,' 'father/mother,' 'uncle/aunt,' or 'grandfather/grandmother.' It is extremely likely that kinship terms have become, in the early times of syntactic articulation, the choice tools to disambiguate the human subjects and objects in sentences, since all humans known to any speaker and likely to be told to and/or about belonged to his kindred.

As for the semantic plausibility of the evolution of kinship appellatives into 1st and 2nd person pronouns, and especially with regard to the switching reference of pronouns, it may be remarked that kinship appellatives are the only other class of nominals to partly share this property. Indeed, they share referential properties with all the major classes of nominals, thus all the more qualifying as the ancestors of the entire category of nominals, beyond their internal features pointing towards their primeval ancienty. Such is the case, for instance, of English *dad*. If I ask *'Where is your dad?,'* *dad* is a common noun, but if my interlocutor answers *'At the moment, Dad is out for angling,'* *Dad* is a proper noun referring to a single person – a specificity rendered in writing by the initial capital. But this proper noun, precisely due to the relational nature of kinship terms, is again specific. I am supposed to understand that *Dad* is in fact *my interlocutor's* father, and if I reply *'Oh! That's why Dad went out so*

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19. It essentially relies on the fact that related individuals share a great part of their genes, so that a mutation resulting in greater cooperation, even detrimental to an individual's reproduction, may be selected if it enhances reproduction of its relatives, which are likely to share this mutation and hence to propagate it. Bickerton (2009: 113-5) makes the point that high predation pressure on australopithecines in the savanna must have led to the reduction of "within-group competition (and, ultimately, the birth of cooperation)."

20. In this respect, evolutionary theorist Richard Dawkins, in his world-famous book *The Selfish Gene* (1976)*,* remarked that a child's mother's brother is the closest male ascendant with whom the child may be sure to share a maximum of genes, and as such is a choice subject for kin selective processes. Dawkins asked anthropologists whether the mother's brother would not have played a role in some human societies. In a footnote to the 2nd edition of his book, he mentions to have received volumes of mail from readers telling him that the mother's brother was a central subject for social anthropologists since more than a century, because of its prominent role in a great many societies worldwide. The globally-spread kinship appellative *kaka* 'mother's brother, grandfather, elder brother' (Ruhlen 1994*b* : 122-4; Bancel *& al.* 2002, in press; Matthey de l'Etang *& al.* 2002, in press) might be the earliest trace of a kin selective process having led to the rise of the mother's brothers' role in the development of human societies.

early, they must have gone together,' he in turn understands that I am referring to *my own* father. When used as proper nouns, i.e. referring to a determined person, kinship appellatives share with pronouns and person markers the particularity to switch reference with the speaker (though in the case of *Dad* the reference is not to the speaker or the hearer himself, but to a person considered as "inalienable property" of the speaker). Moreover, some kinship terms are reciprocal, i.e. they are likely to be used towards each other by two interacting speakers, like in English *brother* and *sister*. Any male whom I may call *Brother* may call me *Brother* in return if I am a male, and if I am a female any person I may call *Sister* may also call me *Sister*. This switching reciprocal reference of *Brother* and *Sister* is still closer to that of personal pronouns (though it fails to differentiate the two interlocutors in each one's speech). Thus, kinship appellatives intrinsically share referential properties with all three nominal categories of proper nouns, common nouns, and pronouns. Like common nouns, they can refer to a class of beings, defined by common properties of these beings (in the example, the category of *dads*). Like proper nouns, they can refer to a particular individual (the speaker's *Dad*). And, in this proper noun use (but contrary to all other proper nouns), they switch reference, like pronouns, from a particular individual to another as the speech turn passes.

In the stage of Proto-Human language that preceded the apparition of pronouns, kinship terms such as *mama, tata, nana* or *kaka* may have been the most frequent way to address people, so that they might easily have given rise to a 2nd person pronoun. It may seem less straightforward for the 1st person pronoun, since by definition there is no kinship term referring to oneself. However, just like for 2nd person, the 1st person pronoun must have emerged from an earlier nominal used by the speaker to refer to himself, and no other nominal category possesses such a word. It is perfectly conceivable that, in the stage before the emergence of personal pronouns, speakers referred to themselves by the kinship term used towards them by the addressee. In modern languages with personal pronouns, such practice would seem weird, but is occasionally used when speaking to children who do not master the use of personal pronouns, as in *'Mum wants Sonny to eat up those peas.'*

From such uses, which may have been general in the first stages of emergence of syntactic articulation, may have arisen an intermediate class of "pronominoids," made of shortened forms of the most frequent kinship appellatives, able to refer to either the speaker or the hearer (and hence used as both 1st and 2nd person according to circumstances). Their exact status we must admit to ignore, even though it seems likely that the choice among the series was initially determined according to the kinship relation between interlocutors.

In a subsequent phase, each of them would have specialized as a 1st or 2nd person, while they lost any semantic connection with kinship appellatives. If we assume that the most ancient language phyla split up during this period (which may have lasted up to several dozens of millennia), it would explain why all of them have pronoun stems chosen from a very small consonant set, which appears to coincide with that of the most frequent kinship

appellatives. It would also explain why, in spite of this striking convergence, pronoun stems do not match semantically in the different phyla – since in each phylum they would have been selected independently as 1st or 2nd persons, all of them having originally had the two values. In the following millennia, their multiplicity in each language phylum would have naturally led to continuous simplification, explaining why more stems are reconstructed in more ancient ancestor languages than in recent ones, in the frequent absence of innovations in their descendants. The independent simplification processes in different phyla would also explain why not all of them have exactly the same stock of stems.

The strange lack of representation of labial oral stops among the global stock of 1st and 2nd person pronoun stems could also find a plausible explanation. Among kinship appellatives, *papa ~ baba* 'father, grandfather, brother' is one of the most widespread (it is reflected in about 70% of the some 2,200 languages in our global database of kinship terminologies). As such, if our hypothesis is correct, one would also a priori expect *p-*pronominal stems initially derived from *papa* to be widely represented. However, there is another kinship appellative *tata ~ dada,* which at present cannot be distinguished semantically from *papa ~ baba,* and is nearly equally well represented worldwide. It is well known that true synonyms cannot coexist for a long time in the same language, and the survival of both *papa* and *tata* in many languages ensures that there must have been a difference between them, whether in their respective meaning or connotation. Perhaps this difference led to preventing *papa* from being used as a pronominoid, so that today the global pronoun stem stock still exhibits this typologically unlikely dearth in labial oral stops.

These are the reasons why we think that the very particular word class of 1st and 2nd person pronouns must have descended from preexisting words, and that kinship appellatives are the only possible ancestral class. While it is certainly beyond our proving and disproving capacities, we do not see another, more consistent evolutionary way through which personal pronouns might have appeared in human language.

Conclusion

In the conjecture presented here, not everything is of equal value. Consistently explaining the multiple reconstructions of pronoun stems in deep-level families, converging onto a handful of stem consonants at the global level, in the near absence of innovated pronouns in low-level families, seems to us to be one of its greatest strengths.

Other general points regarding the early prehistory of language, like the anteriority of kinship appellatives with regard to pronouns, and the phylogenetic reordering of the two articulations of language, we consider as pretty well supported by ontogenetic and evolutionary arguments.

The weakest point, in our opinion, certainly is the transition between kinship appellatives and pronouns through the speculatively assumed "pronominoid" stage, no evidence of which we may propose to the reader. More thought is needed about this stage, but not thought only, and if this point is by now the weakest it also might in the future prove the most fruitful. Here we are getting closer, both in the time sequence and the matter dealt with, to what most readers of *VJaR/JLR* are accustomed to: reconstructing ancient languages.

Our conjecture essentially relies on the observation of reconstructed pronouns in the Eurasiatic and Nostratic macrofamilies, as well as on a statistical observation of the low-level ancestral pronouns at the world level. Generalizing the Nostratic case is thus predictive. And the prediction it makes may be confirmed or belied by the historical behavior of pronoun stems in other macrofamilies: in these ones as well, one should find very few innovated stems in the member subgroups, and most of the changes in pronouns should be restricted to loss of some of the macrofamily's ancestral stems. (Of course, this prediction is meant as a general rule, and may encounter counter-examples.)

A prediction it does not make, as highlighted in the beginning of the second section, is that each macrofamily would have changed some of its kinship appellatives into pronouns or pronominoids. However, since it assumes that the pronominoid stage – or stages – could have lasted for dozens of millennia and perhaps until recently, up into the Proto-Nostratic period, it should not be lost of sight that in some cases there might be after all a closer relation between each macrofamily's particular kinship terms and pronominal stems. Should it prove true in some cases, as the partly parallel distributions of 1sg *ŋgai* and kinship appellative *(ŋ)aŋa* (see note 10 above) might suggest, it could lead to refine the present conjecture.

As a consequence, advances in the comparison of other ancient language families worldwide are likely to provide us with crucial insights allowing to validate or reject our conjecture.

Finally, let us hope that some readers will have enjoyed the tour, however risky it was, and will take us one day for another visit of their own to the earliest prehistory of language.

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