

The Elimination of Geometry

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1. Geometries: how we got to where we shouldn't be

(1) History

- a. Jakobson, Karcevsky, and Trubetzkoy 1928: the invention of the contrastive feature.
- b. Greenberg 1966: Person/number systems are not combinatorially arbitrary.
- c. Hale 1973, Silverstein 1986: Decomposition of person/number values into separate feature systems.
- d. Noyer 1992: If languages may activate features in a combinatorially unconstrained fashion, unattested systems are generated. Solution: a filter system for values. Bonet 1991: Geometries, inspired by phonology, as a means of constraining impoverishment operations.
- e. Harley and Ritter 2002: Apogee: features are organized into geometries which encode statements of combinatorial restrictions.

(2) Objections

- a. Combinatorial restrictions are to be explained, not reified.
- b. If a theory overgenerates, a rethink is needed, not just stipulation to rule out the offending cases.
- c. Where are geometries: syntactic structures, autonomous morphological structures, semantic givens?

2. Alternative

(3) Program

- a. For each feature domain (person, number, deixis, location, tense, ...), define a set, *S*, of features such that all (person, number, deictic, locative, temporal, ...) systems attested crosslinguistically correspond to some subset of the relevant *S*—where the sense of ‘correspond to’ will be defined presently.
- b. To show, conversely, that every subset of *S* corresponds to an attested (person, number, deictic, locative, temporal, ...) system.

(4) Consequences

- a. In the domains I've explored (person, deixis, location, number), there turn out not to be any person/number/... features *per se*, but, rather, that the relevant features have a more general semantics of which person, etc., represent a usage

that arises under a particular lattice embedding. (I.e., there’s a degree of semantic underspecification in the predicates that the features denote, which permits the features to be applied to different semantic domains.) Particularly interesting case: there’s near identity between aspectual features of Krifka (1992) and the ‘number’ features, and ‘locative’ features.

- b. Language design exhibits a type of economy envisaged by the Minimalist Program: not only do such traditional grammatical labels as inclusive and exclusive (dual and trial) dissolve into combinations of more abstract features (no news there), but so too do the categories of person and number themselves.
- c. Geometries are otiose. On the current account, all possibilities are not merely permitted, but required.

3. Case study: Person

(5) Data

- a. Inventories of pronouns and of agreement-like affixes (tell us what features there are).
- b. Inventories of spatial deictics for both regions (*here, there*) and objects (*this, those*) (tell us what features there are some more).
- c. Directionals (tell us what features there are yet more).
- d. Patterns of syncretism and metasyncretism amongst these (tells us how the features generate the categories).

(6) Proposal

- a. There are three features used for person designation: $[\pm\text{author}]$, $[\pm\text{participant}]$, $[\text{hearer}]$. Call this set Δ . This is essentially Noyer’s (1992) proposal, except that the last feature is privative. Seemingly inconsequential, but crucial.
- b. The bivalent features $[\pm\text{author}]$, $[\pm\text{participant}]$ are the semantic basis of person deixis (pronominal reference), regional spatial deixis (*here, there, etc.*), and point-wise spatial deixis (*this, those, etc.*). These features are embedded into different lattices (Link 1983); depending on the atoms that generate the lattice, person versus spatial deixis results.
- c. The privative feature $[\text{hearer}]$ is the semantic basis of imperatives. Its privativity is connected to the defectivity of imperatives: hortatives (*Let’s ...*) and jussives (*Let them eat cake*) do not generally form part of a complete paradigm with, *i.e.*, are not the first and third person equivalents of, imperatives.
- d. Deictic systems, whether personal or spatial, arise from a language’s choosing some subset of $\Delta = \{[\pm\text{author}], [\pm\text{participant}], [\text{hearer}]\}$. Eight different systems result. For a language, L , call this Δ_L . Then, $\Delta_L \subseteq \Delta$. Languages may choose different sets for different deictic ends. Notation: Δ^o (for objects), Δ^r (for regions), $\Delta^\pi = \Pi$ (for person). Hence, there may exist L such that, e.g., $\Delta_L^o \neq \Delta_L^\pi$.

(7) Formal details

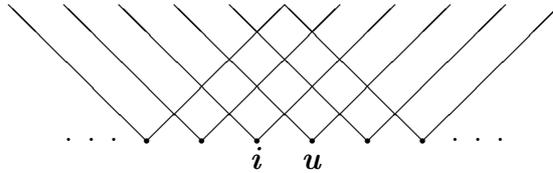
- a. **Feature definitions** Let i and u denote the contextually given speaker and audience. À la Schlenker (2003):

- (i) $\boxed{[+author] = \lambda x . \dot{i} \in x . x}$ (*i.e.*, [+author] presupposes that x contains the atom—person or space—that is mapped to the speaker)
- (ii) $\boxed{[+participant] = \lambda x . \dot{i} \in x \vee \mathbf{u} \in x . x}$
- (iii) $\boxed{[hearer] = \mathbf{u}}$ By parity with the above, one would expect $[hearer] = \lambda x . \mathbf{u} \in x . x$. However, intuitively, I find it difficult to regard imperatives as presupposing the hearer: they are directed at them.

- b. **Feature negation** $\boxed{\text{If } [+F] = \lambda x . P(x) . x, \text{ then } [-F] = \lambda x . \neg P(x) . x}$

In previous work φ -features, I have adopted $[-F] = \neg[+F]$, which is clearly preferable, as it makes feature values isomorphic to standard logical negation. This is inapplicable here as the binary features are of type $\langle e, e \rangle$, not $\langle e, t \rangle$. What would it mean to negate an e ? The nearest we come to something of negatable type is $P(x)$. So, the negation convention is not unreasonable. However, one might see in this problem an argument against the presuppositional approach to φ -features (beginning with Cooper 1983: Heim and Kratzer 1998, Schlenker 2003, Heim forthcoming; indeed, Kratzer 2006 makes precisely this argument).

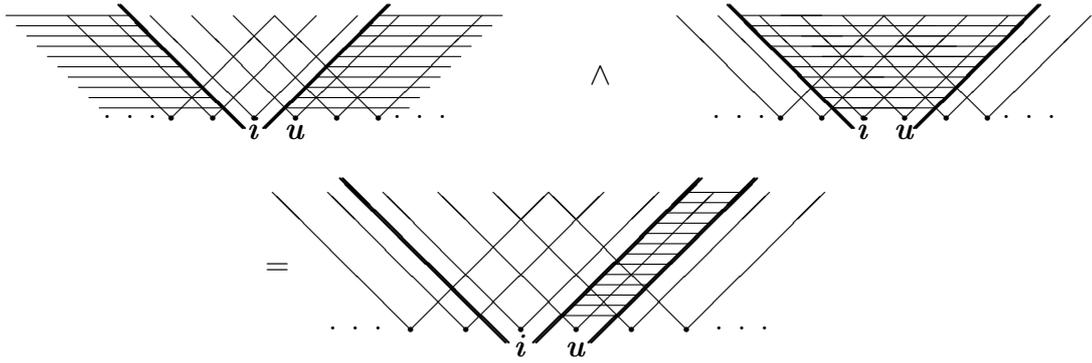
- c. **Lattices** Normal nominals denote lattices. The effect of including deictic features in a syntactic structure is to designate \dot{i} and \mathbf{u} atoms.



This is only possible if the atoms are of such an ilk that they can contain the utterance participants: people (and obvious empathetic extensions, like pets, gods), spaces, ...¹ If inappropriate atoms were chosen—newspapers, say—the structure would simply fail to converge on an interpretation (cf., Sigurðson’s observation: **We’re here*, where *we* = the newspaper and the speaker).

- d. **Valence and partitions** The difference between privative and bivalent features is that bivalent ones induce partitions of a total semantic domain (into those elements of which $[+F]$ holds and elements of which $[-F]$ holds); privative ones induce only partial partitions (between elements of which $[F]$ holds and default elements of the domain; non-default elements of which $[F]$ does not hold are excluded).
- e. **Bundle semantics** Feature bundles define regions of lattices enriched with \dot{i}/\mathbf{u} . They are interpreted simply by conjunction: $\llbracket [F \ G] \rrbracket = \llbracket [F] \rrbracket \wedge \llbracket [G] \rrbracket$. For instance, $\llbracket [-author \ +participant] \rrbracket = \llbracket [-author] \rrbracket \wedge \llbracket [+participant] \rrbracket =$

¹Foley (1986, p. 75) notes that Korafe deictic roots are used to mark degree of speaker involvement with a designated entity: ‘here’ signals identification; ‘there by you’ signals neutrality; ‘there by others’ signals distancing (my labels). Here, the atoms might be taken to be empathetic (rather than physical) spaces. This might be somewhat parallel to English *this/that* as markers of “narrative immediacy” (*I was walking down the road and there was this/that man hanging on the building again*)?



- f. **δ -completeness** Grammars exploit (up to contradiction) every feature-value combination of a chosen feature set. E.g., if $\Pi_L = \{[\pm\text{author}], [\pm\text{participant}]\}$, then the persons, π , of L are [+author +participant], [-author +participant], [-author -participant]; [+author -participant] is contradictory.

(8) **Empirical details**

- a. Show that all individual δ -categories correspond to some feature bundle, and that all feature bundles correspond to some δ -category.
- b. Show that any subset of Δ generates a set of pronominal or deictic categories that is attested in some language, and that the deictic system of any language is generated by Δ .
- c. Give a plausible story for relationships such as syncretism, especially in the more complex systems.

4. Bipartition

- (9) **Methodological remark** Bivalent features induce partitions of $\{i, o, u\}$. There are three such possible partitions: $i_{ou}|ou_o$, $i_{ou}o|u_o$, $i_{ou}u_o|o$. Two-way partitions arise from features acting in isolation, which reveals the minimal units of deictic systems. **Notation** Optional elements are subscripted; e.g., $i_{ou} = \{i, i \wedge o, i \wedge o \wedge u, i \wedge u\}$. Alternatives are written side-by-side; e.g., $ou_o = \{o, u_o\}$.
- (10) **Conclusion** Examples of $i_{ou}|ou_o$ abound, motivating the feature $[\pm\text{author}]$. Examples of $i_{ou}u_o|o$ are also frequent, motivating the feature $[\pm\text{participant}]$. However, $i_{ou}o|u_o$ is apparently absent. Therefore, either there is no such feature as $[\pm\text{hearer}]$, or else it is illicit in isolation—in geometrical terms, it is a dependent feature. (Later sections: I argue for the former, replacing it with $[\text{hearer}]$.)
- (11) **Caveat** Suppose a language distinguishes three person in the singular but only two in the plural. The collapsed plural does not constitute a partition: syncretism can be induced by other means—impoverishment, underspecification of vocabulary items. (See, for instance, Frampton 2002 on the Germanic 13|2 syncretism, replacing his $[\pm\text{hearer}]$ with $[\pm\text{participant}]$.)
- (12) $i_{ou}|ou_o$ — $[\pm\text{author}]$ -induced partition: [+author] = $\{i_{ou}\}$, [-author] = $\{o, u_o\}$
- a. **English spatial deixis** For regions: *here* = in a space containing the speaker (and possibly others, including the hearer); *there* = in a space excluding the speaker (and possibly the hearer). For objects: *this* = an object in the space

containing the speaker (and possibly others, including the hearer); *that* = an object in the space excluding the speaker (and possibly the hearer).

- b. **Alamblak** “has a demonstrative base *ind-*, to which are added *-ar* ‘near’ to speaker’s location or *-ur* ‘far’ to indicate locations other than speaker.” (Foley 1986, p. 77)

c. **Directionals**

Yimas ... *-pu* ‘motion away from village/speaker’ and *-pra* ‘motion toward village/speaker’, related to the verbs ‘go’ and ‘come’ respectively.

Alamblak ... a suffixal set [of directionals] locates the position of an event with respect to that of the speaker ... The prefixal set ... Motion along a level place and motion sloping up are further distinguished for direction away from or towards speaker.

Kemtuk ... the primary distinction is between direction towards speaker and away from speaker... (Foley 1986, p. 149–151)

(13) $i_{ou}u_o|o$ — [+participant] = $\{i_{ou}, u_o\}$, [–participant] = $\{o\}$

- a. **Winnebago pronouns** *nee* for i_{ou}/u_o , *’ee* for o . Similar evidence from Navajo. (Noyer 1992, pp. 163–164)²

- b. **Georgian directionals** Past and future tense forms involve, amongst other things, prefixing an element that is directional in origin. In verbs of direction and motion, the directional component has been retained. Where the verb of motion contains a recipient, the directional element exhibits a $iu|o$ partition:

mo -m-	c-	i		mo -g-	c-	i		mi -s-	c-	a	
to-	1SG.DAT-	give-	PAST	to-	2DAT-	give-	PAST	fro-	3DAT-	give-	PAST
‘He	gave	me	it’	‘He	gave	you	it’	‘He	gave	him	it’

- (14) $io|u$ — [\pm hearer]-induced partition — doesn’t seem to exist, a conclusion underlined by Nevins’ treatment of the Person Case Constraint.

4.1. [\pm participant]: more evidence

- (15) **Obviative** Close analysis of complex agreement systems call on it: Kiowa (Adger and Harbour 2005), Menominee (Trommer forthcoming; seems to permit explanation of an obviative based version of the Person Case Constraint in some Algonquian language, Branigan 2006 GLOW).

- (16) Georgian provides much evidence for [\pm participant], much of it, interestingly, in the domain of indirect objects.

- a. If the source is i/u , the stem is prefixed with *-e-*. Compare (13b) with:

²For this to count as a partition, rather than a syncretism, it must be assumed verbs do not agree with (*i.e.*, pick up their features from) these pronouns (because then pronouns would have to be specified in the syntax for a full complement of φ -features; their postsyntactic poverty would then cease to be unequivocal evidence for [\pm participant]). This would mean that verbal agreement itself ‘satisfies the Θ -criterion’ (Rizzi 1986), with the pronouns being merely some sort of add on (Adger 2005: Combinatorial Variability).

mo-m-	e-c-	i	mo-g-	e-c-	i	mi-v-	e-c-	a
to-	1SG.DAT-E-give-PAST		to-	2DAT-E-give-PAST		fro-	1SGS-E-give-PAST	
	‘You gave me it’			‘I gave you it’			‘I gave him it’	

- b. Certain verbs, when they take applicatives, are marked by *i-/u-*. So, ‘I sent the boy away’ is simply *biči gada-v-gzavne*. But ‘I sent the boy to his parents’ is *biči mšoblebs ga-v-u-gzavne*. Importantly, *i-* is used if and only if the recipient is [+participant]: *ga-m-i-gzavno*, *ga-g-i-gzavno*, *ga-u-gzavno* ‘He sent it to **me/you/him**’. Hence: use of *i-/u-* is ***iu|o***-partitioned.
- c. The plural suffix *-t* marks plurality for local arguments. It can also mark it for third person datives. Not a problem, though: Adger and Harbour (2005) argue that such datives are [–participant] (a fact that ties in intimately, ultimately, with the accusative/dative ambiguity of [+participant] agreement in Georgian). So, *-t* realizes [–singular] in the context of [\pm participant].
- d. Past suffixes *-e/-i* for [+participant], *-o/-a* for [–participant]. Generally, prefixes are for local person (but: third person datives, e.g., *s-*; expl. AH2005.)

5. Consequent combinatorics two features \rightarrow four feature sets; all attested

5.1. Tripartition

- (17) If $\Delta_L = \{[\pm\text{author}], [\pm\text{participant}]\}$, four feature-value combinations are possible:
- $\llbracket [+author +participant] \rrbracket = i_{ou}$
 - $\llbracket [-author +participant] \rrbracket = u_o$
 - $\llbracket [+author -participant] \rrbracket = \ast$
 - $\llbracket [-author -participant] \rrbracket = o$
- (18) This is, of course, the familiar pronominal system of most European languages. It is also used for spatial deixis in some languages:

Korafe ... has three demonstrative roots: *e* ‘this/here’ (the speaker’s location), *a* ‘that/there’ (the addressee’s location) and *o* ‘that/there’ (locations other than that of speaker or addressee). (Foley 1986, p. 86)

5.2. Null partition

- (19) One might imagine that functional pressures would militate against the null set for deictic purposes. However, German (as my Nordrheiner spouse uses it) seems have $\Delta^o = \emptyset$: *Du nimmst **das** und ich nehme **das*** ‘You take **that** and I’ll take **this**’ (**You take this and I’ll take this*—unless accompanied by distinct deictic gestures). Extra specificity can be achieved by coopting Δ^p terms: *das hier* ‘this here’, *das da* ‘that there’ (*dieses*, *jenes* felt to be a bit old).
- (20) Mam (England 1983) lacks pronouns; rather, something like a relative clause is used (*the one who am?*).

6. Further parallels between personal and spatial deixis

- (21) It is not, I believe, traditional in treatments of person features to avail oneself of data from deixis. Therefore, the following notes:
- a. Given the definitions of [\pm author], [\pm participant], which closely follow Schlenker (2003), it is trivial to step from person deixis to spatial deixis: you just change the atoms.
 - b. Treatments of combinatorial restrictions on person systems have in general had to make do with a single fact: *you (the tripartition $i_{ou}|u_o|o$ exists, $*u_{io}|i_o|o$ does not). In spatial deixis, where bipartition is far more common than in person deixis, $i_{ou}o|u_o$ exists, $*i_o o|u_{io}$ does not. There is an obvious parallel between the two missing partitions (they arise by permuting i and u in the attested partitions) which it would be negligent not to analyze.
 - c. There are several clear parallels between personal and spatial deixis.
- (22) **Turkish** Pronouns and spatial deictics are built on the same morphemes. (Similar facts were reported for a number of languages for ‘you’ on the Linguist List a while back. Only Japanese *anata* deriving from a locative comes to mind.)
- (23) **Person-left** In pronouns, even in robustly head-final languages, we observe the linear order person-left number-right.
- a. We find the same effect with object deictics. E.g., Kiowa *éí* ‘here’ and *óú* ‘there’ spawn *éíde/gau* ‘this, these’ and *óíde/gau* ‘that, those’ (cf. *tááde/gau* ‘eye(s)’). Like facts hold for Alambhak (Foley 1986, p. 76).
 - b. If we generalize from Π -left Ω -right, via Δ -left Ω -right (just illustrated), to Δ -left X -right, then further facts become relevant. Consider X =orientation: *éíhau* ‘here precisely’ and *óíhyau* ‘there precisely’; *em* ‘at’ and *óp* ‘there at’; *éípa* ‘against here’ and *óúpa* ‘against there’; ... Like facts hold for Fore (Foley 1986, p. 77). Directionals may be exempt (Kemtuk, Foley p. 151). But this only points to the real question—what syntactic structures underlie these different word types?—which I do not explore here.

7. Quadripartition

- (24) **Obvious gap** Tripartition is not the maximum in Π -complexity. Some distinguish four π -types (π^4): $i \wedge u_o | i_o | o | u_o$. Nothing so far generates this.

7.1. Bivalent [\pm hearer]

- (25) **Obvious solution** Posit [\pm hearer] (Hale 1973, Silverstein 1986; Noyer 1992). If so, it must be prevented from appearing in isolation (otherwise we predict the unattested partition $i o | u$). This is traditionally what geometries are used for. Given that [\pm author] and [\pm participant] are implicationally independent, neither dominates the other; so, [\pm hearer] might be a dependent of either. **Which?**
- (26) If [\pm participant] \rightarrow [\pm hearer], then $\Pi = \{[\pm\text{author}], [\pm\text{hearer}]\}$ is illicit, but $\Pi = \{[\pm\text{participant}], [\pm\text{hearer}]\}$ is licit. However, this generates Zwicky’s (1977) famously unattested *syou* system— $i_o | u_{io} | o$:

- a. $\llbracket [+participant +hearer] \rrbracket = \mathbf{u}_{io}$
- b. $\llbracket [+participant -hearer] \rrbracket = \mathbf{i}_o$
- c. $\llbracket [-participant +hearer] \rrbracket = \ast$
- d. $\llbracket [-participant -hearer] \rrbracket = \mathbf{o}$

(27) If $[\pm author] \dashv \vdash [\pm hearer]$, then $\Pi = \{[\pm participant], [\pm hearer]\}$ is illicit and $\Pi = \{[\pm author], [\pm hearer]\}$, licit. So, this correctly avoids a Zwicky situation. However, geometrists beginning with Bonet (1991) have seen geometries constraining impoverishment: if $[F] \dashv \vdash [G]$, then $[F] \mapsto \emptyset$ entails $[G] \mapsto \emptyset$ (think delinking). Prediction: there's no such language as Kiowa. Geshplunn.

- a. Kiowa distinguishes inclusive and exclusive first person: *Ámkaugau ba-bánma* 'We're going together with you', *Ámheji e-bánma* 'We're going without you'.
- b. However, there is a metasyncretism operative in all parts of the agreement system (except objects) that causes first inclusive to be realized as second person, and first exclusive as third. Hence a systematic ambiguity: *ba-bánma* 'We, including you, or you all are going', *e-bánma* 'We, but not you, or they are going'.³
- c. An obvious account: $[\pm author] \mapsto \emptyset$ (when not an object). Then:

$$\left\{ \begin{array}{l} \mathbf{i} \wedge \mathbf{u}_o = [+author +hearer] \\ \mathbf{u}_o = [-author +hearer] \end{array} \right\} \mapsto [+hearer]$$

$$\left\{ \begin{array}{l} \mathbf{i}_o = [+author -hearer] \\ \mathbf{o} = [-author -hearer] \end{array} \right\} \mapsto [-hearer]$$

But this is impossible, because $[\pm author] \mapsto \emptyset$ coimpoverishes $[\pm hearer]$. So, in fact, $\{\mathbf{i} \wedge \mathbf{u}_o, \mathbf{i}_o, \mathbf{u}_o, \mathbf{o}\} \mapsto \emptyset$, triggering syncretism between all four π -categories. (If the feature bundles contain $[\pm participant]$, the impoverishment does at least produce two equivalence classes, but the wrong ones: $\{\mathbf{i} \wedge \mathbf{u}_o, \mathbf{i}_o, \mathbf{u}_o\}$, $\{\mathbf{o}\}$. But $[+author] \mapsto \emptyset$ in context of $[+hearer +participant]$ is still geometrically impossible.)

(28) **Two questions** What feature creates inclusives? Other arguments for $[\pm hearer]$?

7.2. Privative [hearer]

(29) **Proposal** I propose what the section title says.

(30) **Valence** Bivalence of the previous features was motivated on the basis of their capacity to induce partitions between $[+F]$ and $[-F]$ elements. So, correspondingly, privativity is motivated by inability to induce a partition. Imperatives, then, are a plausible source for this feature: they are defective: orders to first persons (hortatives) or third persons (jussives) cannot be formed by analogy with imperative (by substituting \mathbf{i}/\mathbf{o} -morphemes for \mathbf{u} -morphemes).

- a. E.g.: Kiowa *be-hâa* 'get up!', but $\ast(hét) \text{ bé-hâa}$ 'let's get up', *kâunhaa* ($\ast hâa$) 'let him get up'. Note, interestingly, that *bé-*, as we've already observed, is

³This does not constitute a syou system. It is merely a syncretism that is syou-like. A syou system must be thoroughgoing for the whole language.

ambiguous between first inclusive and second person agreement. However, the imperative is unambiguously second person; the hortative requires *hét*.

- b. Some languages are apparent counterexamples: e.g., Hungarian. I claim (cavalierly) that such cases are subjunctives or similar, used with imperative force. This is hopefully a consequential claim...

(31) **Typology** See table. Comments:

- a. $\Pi = \{[\text{hearer}]\}$ is a partial partition: it excludes i . Functional factors, therefore, militate against its use.
- b. $\llbracket [\text{hearer} + \text{participant}] \rrbracket = \mathbf{u}_o$. One might expect the π -value \mathbf{u}_{io} , that is, $[\text{hearer}]$, \mathbf{u} , with optional $i_o \subset [+ \text{participant}]$. However, $P \equiv (P \vee (P \wedge Q))$ (see truth tables below). Allowing a slight abuse of notation—predicate calculus does not immediately carry over to features that denote entities, yet (Quine, *From a Logical Point of View*) any name can be turned into a predicate—this shows that $\llbracket [\text{hearer} + \text{participant}] \rrbracket = (\mathbf{u} \wedge (i \vee \mathbf{u})) = \mathbf{u}$.

P	Q	$(P \vee Q)$	$(P \wedge (P \vee Q))$
T	T	T	T
T	F	T	T
F	T	T	F
F	F	F	F

- c. $\Pi = \{[\text{hearer}], [\pm \text{participant}]\}$. From the table, one would expect the partition $i \vee \mathbf{u} | \mathbf{o} | \mathbf{u}$. However, I assume that the fuller specification of \mathbf{u} , $[\text{hearer} + \text{participant}]$, is preferred. Consequently, $(i \vee \mathbf{u})_o = i_{ou} \vee \mathbf{u}_o \vee (i \wedge \mathbf{u}_o)$ is used only where \mathbf{u} is not: hence for $i_{ou} \vee (i \wedge \mathbf{u}_o) = i_{ou}$. So, $i \vee \mathbf{u}_o | \mathbf{o} | \mathbf{u}_o \equiv i_{ou} | \mathbf{o} | \mathbf{u}_o$.

Π	π	Partition
$\{[\text{hearer}]\}$	\mathbf{u}_o [hearer] \mathbf{o} []	$\mathbf{o} \mathbf{u}_o$
$\{[\text{hearer}], [\pm \text{author}]\}$	$i \wedge \mathbf{u}_o$ [hearer +author] \mathbf{u}_o [hearer –author] i_{ou} [+author] \mathbf{o} [–author]	$i \wedge \mathbf{u}_o i_o \mathbf{o} \mathbf{u}_o$
$\{[\text{hearer}], [\pm \text{participant}]\}$	\mathbf{u}_o [hearer +participant] \ast [hearer –participant] $(i \vee \mathbf{u})_o$ [+participant] \mathbf{o} [–participant]	$i_{ou} \mathbf{o} \mathbf{u}_o$
$\{[\text{hearer}], [\pm \text{participant}], [\pm \text{author}]\}$	$i \wedge \mathbf{u}_o$ [hearer +participant +author] \mathbf{u}_o [hearer +participant –author] \ast [hearer –participant +author] \ast [hearer –participant –author] i_{ou} [+participant +author] \mathbf{u}_o [+participant –author] \ast [–participant +author] \mathbf{o} [–participant –author]	$i \wedge \mathbf{u}_o i_o \mathbf{o} \mathbf{u}_o$

- (32) **Partitional equivalence** Observe the equivalences in the table. Their existence suggests that, if children exposed to the same morphological primary linguistic data converge on the same I-grammar (at least with respect to Π), then they must utilize more data than merely the number of person categories they hear. Syncretic patterns can distinguish partitionally equivalent Π sets. So, the system does non-redundant.
- For instance, suppose an $i_{ou}|o|u_o$ -language consistently conflates first and third person, but not second, in some context (as Germanic in various tenses; Frampton 2002). This easily captured under $\Pi = \{[\text{hearer}], [\pm\text{participant}]\}$, given the impoverishment $[\pm\text{participant}] \mapsto \emptyset$.
 - Conversely, if the language consistently conflates second and third person (as in Kuman, Foley 1986, p. 70), then the learner is driven to posit $\Pi = \{[\pm\text{participant}], [\pm\text{author}]\}$ and $[\pm\text{participant}] \mapsto \emptyset$.
 - The learner of Kiowa, which, recall, has a π^4 system, is driven to posit the richer $\Pi = \{[\text{hearer}], [\pm\text{participant}], [\pm\text{author}]\}$ because, for local objects, this collapses into a European $i_{ou}|o|u_o$ system, prompting $[\text{hearer}] \mapsto \emptyset$; no impoverishment, or other process, can act on the simpler $\Pi = \{[\text{hearer}], [\pm\text{author}]\}$ to produce the European system.

$$\begin{aligned} \{[\text{hearer}], [\pm\text{author}]\} &\equiv i \wedge u_o | i_o | o | u_{io} \equiv \{[\text{hearer}], [\pm\text{participant}], [\pm\text{author}]\} \\ \{[\text{hearer}], [\pm\text{participant}]\} &\equiv i_{ou} | o | u_o \equiv \{[\pm\text{participant}], [\pm\text{author}]\} \end{aligned}$$

7.3. Arguments for bivalent $[\pm\text{hearer}]$?

- (33) **Arguments for bivalence** The gold standard:
- Adduce a bipartition. (Tried and failed)
 - Demonstrate a polarity effect, *i.e.*, an α -rule. (Noyer)
 - Demonstrate a three-way contrast $[-F] \sim 0 \sim [+F]$. (Hmm...)
- (34) **Mam** The enclitic *-a* has the distribution $[\alpha\text{author } \bar{\alpha}\text{hearer}]$ (Noyer 1992, pp. 170ff). This yields the very unnatural class of first exclusive and second person singular and plural; first inclusive patterns with third person.

φ	Mam	English
$[+\text{author } -\text{hearer } +\text{singular}]$	<i>n-wi: xh-a</i>	'my cat'
$[-\text{author } +\text{hearer } +\text{singular}]$	<i>t-wi: xh-a</i>	'your cat'
$[-\text{author } -\text{hearer } +\text{singular}]$	<i>t-wi: xh</i>	'his/her cat'
$[+\text{author } +\text{hearer } -\text{singular}]$	<i>q-wi: xh</i>	'our (incl) cat'
$[+\text{author } -\text{hearer } -\text{singular}]$	<i>q-wi: xh-a</i>	'our (excl) cat'
$[-\text{author } +\text{hearer } -\text{singular}]$	<i>ky-wi: xh-a</i>	'you all's cat'
$[-\text{author } -\text{hearer } -\text{singular}]$	<i>ky-wi: xh</i>	'their cat'

However reanalysis is possible (cf, Nevins' 2003 purely privative treatment). $\Pi = \{[\text{hearer}], [\pm\text{participant}], [\pm\text{author}]\}$. The enclitic is sensitive to $[+\text{participant}]$, but $[\text{hearer } +\text{participant } +\text{author}] \mapsto \emptyset$. This impoverishment is thoroughgoing (induces a metasyncretism) in, e.g., Caddo (Melnar 2004). In order for the impoverishment not to bleed insertion of $[+\text{author}]$ *q-*, it must be supposed that *-a*

occupies a syntactically autonomous head (and so realizes a feature bundle separate from that of the prefix); England, author of the Mam grammar, has a 1976 paper arguing this. (So [\pm author]-and-number and [\pm participant] are separate probes.)

- (35) **Polarity** Noyer’s purpose in considering Mam was to argue against Zwicky’s (1977) claim that only + values are morphologically visible. Although I reject Noyer’s argument, his conclusion is correct, as there are polarity phenomena in the domain of person. (This has been treated by Béjar and Hall under the title of ‘diagonal syncretism’.)

- (36) **Epistemic alignment** Curnow (2002) discusses a phenomenon whereby verbs receive a special marking when an argument of verb aligns with the likely source of knowledge (first person for statements, second person for questions). The shape of an analysis: [α Q] \Leftrightarrow /s/ in the context [$\bar{\alpha}$ author +participant] (though, of course, I’m glossing over certain factors that Curnow’s description brings to light).

- a. (i) (na= na) pala ku- mtu- *s*
 (1SG.(NOM)=TOP) plantain eat-IMPf-[$-Q$ +**author** +participant]
 ‘I am eating plantains’
- (ii) (nu= na) pala ku- mtu- *y*
 (2SG.(NOM)=TOP) plantain eat-IMPf-[$-Q$ –*author* +participant]
 ‘You are eating plantains’
- (iii) (us= na) atal ayna-mtu- *y*
 (3SG.(NOM)=TOP) chicken cook-IMPf-[$-Q$ –*author* –participant]
 ‘He is cooking chicken’
- b. (i) min=ta= ma ashap-tu- *y*?
 who=ACC=Q annoy-IMPf-[+ Q +*author* +participant]
 ‘Whom am I annoying?’
- (ii) shi= ma ki- mtu- *s*?
 what=Q do-IMPf-[+ Q –**author** +participant]
 ‘What are you doing?’
- (iii) min= t- as a- mtu- *y*?
 where=LOC-ABL come-IMPf-[$-Q$ –*author* –participant]
 ‘Where is he coming from?’

- (37) **Person-number polarity** Foley 1986, pp. 72 ff.: “An intriguing feature of many Papuan languages is the often transparent morphological association between the first and second persons, most commonly between the first person nonsingular and second singular.”

- a. E.g.: Awa [α author +participant $\bar{\alpha}$ singular] \Leftrightarrow *-na* (ignoring dual, which has its own form for all persons; presumably person is impoverished, preventing *-na* from inserting here).
- b. Foley observes that this occurs only in π^3 languages (ones lacking an inclusive/exclusive distinction). I don’t know why this should be: maybe coincidental areal cooccurrence? Nothing in (a) leads one to expect this.

7.4. Arguments against privative [hearer]?

(38) **Substrings and subsets** In any π^4 , the feature set corresponding to i_o is a proper subset of that corresponding to $i \wedge u_o$ (see typological table). So, if the exponents of these two are in a substring relation, we expect $\exp(i_o) \sqsubseteq \exp(i \wedge u_o)$.

- a. This happens. E.g., Tok Pisin (Foley 1986, p. 76): $\exp(i_{ou}) = mi(tu)pela \sqsubseteq yum(i(tu)pela = \exp(i \wedge u_o)$.
- b. However, the converse happens too, if rarely (only in Australia?). E.g.: Nyawaygi (Cysouw 2003, p. 274):

$$\begin{aligned} 1IN.DL &= \eta ali \sqsubseteq \eta alili\eta u = 1EX.DL \\ 1IN.PL &= \eta ana \sqsubseteq \eta anali\eta u = 1EX.PL \end{aligned}$$

- c. A possible analysis, if one has bivalent $[\pm\text{hearer}]$, is that $[-\text{hearer}] \Leftrightarrow /li\eta u/$ (in the context of $[\text{+author}]$). However, this violates person-left number-right (Trommer 2002, Harbour forthcoming): it would be pure person after a person-number amalgam. So, *li\eta u* must instead be regarded as a special form of (person-conditioned) number marking: $[-\text{singular}] \Leftrightarrow /li\eta u/$ in the context of $[-\text{hearer}]$. (This would need further contextualization to prevent the third person (*dana*, *bula*) from bearing *li\eta u*.)
- d. However, if the language utilizes $\Pi = \{[\text{hearer}], [\pm\text{participant}], [\pm\text{author}]\}$, then we can attribute *\eta ali* and *\eta ana* to just $[\text{+author}]$ and number; *li\eta u* can then be attributed to $[\text{+participant}]$. To prevent its occurrence with the inclusive forms, we impoverish: $[\text{+participant}] \mapsto \emptyset$ in the context of $[\text{hearer}]$.
 - (i) Immediately derives the *li\eta u*-lessness of second person: *n\u0304ura*, *n\u0304ubula*.
 - (ii) The account requires no extra mechanisms to prevent *li\eta u* from appearing on third person forms: *li\eta u* requires $[\text{+participant}]$ but they are $[-\text{participant}]$.

7.5. Scope of quadripartition

(39) I suggested in (7a) that $[\text{hearer}]$ differs semantically from $[\pm\text{author}], [\pm\text{participant}]$: it introduces a person directly, but the others presuppose that an entity contains the speaker or participants (in accord with imperative versus other uses of person). This affords the bivalent features a denotational flexibility that $[\text{hearer}]$ lacks: it is restricted to persons. As such, though it can be coopted from imperatives into person deixis, it cannot be further coopted into spatial deixis. This predicts, correctly to my knowledge, that spatial deixis cannot muster an inclusive/exclusive distinction; it is maximally tripartite.

8. Somersaults and Sunama

(40) **Complexity; you** Thus far: in order to derive systems that do not follow straightforwardly from the typology the current theory generates, one consistently has to posit a rich Π system and then do things to it. In a sense (A. McMahon, LAGB 2002?), this is good: one wants difficult (*i.e.*, scarce) things to be difficult (*i.e.*, grammatically complex)—though counting like this is a risky business (cf,

Newmeyer⁷ on typology)—e.g., Kiowa, Mam, Nyawaygi. Recently, *syou* has returned: Sunama displays *syou* metaparadigmatically, apparently (Cysouw 2003, McGinnis 2005). Non-emphatic pronouns (Cysouw, p. 155):

Person	singular	dual	plural
1EX	—	<i>makö</i>	<i>makö</i>
1IN	sa	samakö	samakö
2	wa	<i>makö</i>	<i>makö</i>
3		(classifiers)	

- a. The first thing to observe, if I recall correctly a footnote of McGinnis', is that the language does not conflate imperatives with hortatives. So, the *syou* syncretism is precisely that: a syncretism; it is not a partition that places entities subject to imperatives and entities subject to hortation on a par. So what type of syncretism is it?
- b. Suppose, as before, that $\Pi = \{[\text{hearer}], [\pm\text{participant}], [\pm\text{author}] \}$. Then, obviously, $[+\text{participant} -\text{singular}] \Leftrightarrow /mak\ddot{o}/$, $[+\text{author}] \Leftrightarrow /sa/$, $[\text{hearer} +\text{singular}] \Leftrightarrow /wa/$. If this exhausts the vocabulary list, then we need only impoverish $[+\text{author}] \mapsto \emptyset$ in the context of $[\text{hearer}]$ to derive the pronouns above.
 - (i) Observe that this impoverishment is only possible in this system, not in a $[\pm\text{author}] \rightarrow [\pm\text{hearer}]$ geometry (assuming that (a), or other reasons, are compelling enough to prevent one jettisoning the geometry).
 - (ii) Observe that this relies on *wa* being specifically second singular, not just second numberless. More impoverishments, carefully phrased or ordered, to avoid bleeding, would then be needed.

I hesitate to take this proto-analysis further with access to further facts.

9. Conclusion

See Introduction.

10. Appendix: Speculations

Full typology (\mathfrak{T})? Given 7.5, we expect the space of possible languages, in personal and spatial deixis, to be:

$$\mathfrak{T}_\Delta = |\wp(\Delta^o)| \times |\wp(\Delta^\rho)| \times |\wp(\Delta^\pi)| = 2^3 \times 2^3 \times 2^4 = 2^{10}$$

However, some of these are rare owing to functional pressures, and if $|\Delta^x| \leq |\Delta^y|$ generally implies $\Delta^x \subseteq \Delta^y$, then \mathfrak{T}_Δ lowers substantially. Confining attention to common systems (those compliant with functional pressures), and if we do not double count partitionally equivalent Δ^π systems, we expect, more likely:

$$\mathfrak{T}_\Delta \approx 2^1 \times 2^1 \times 2^2 = 2^4$$

Ontological differences, semantic differences Tripartition of spatial deixis, but closer to me–not-me–distant, rather than me–you–other. *Possible answer.* Semantic definition of speaker space and hearer space does not mean ‘space containing’ but ‘space

in space containing speaker’ (cf., ‘point in space contain speaker’; hmm, ‘person in group containing speaker’ might explain why ‘I’m the only one who did my homework’ is acceptable). These extend beyond me/you. So, this may force *o*-spaces off into the distance. *Alternative*. In Fore’s spatial deixis, there is me–you–other, with other having additionally a neutral–mid–far distinction. If this motivates a [far] feature, then Japanese maybe has $\Delta^o = \{[\pm\text{author}], [\text{far}]\}$. Therefore, not all tripartitions produce equal domains. Turkish may permit empirical consequences of these alternatives to be teased out.

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