Contrastive hierarchies and the formal representation of person

Elizabeth Cowper & Daniel Currie Hall
University of Toronto — Saint Mary's University

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1. The typology of person contrasts

Of **fifteen** logically possible sets of grammatical person contrasts a language might make, only **five** are attested (Harbour 2016):

(1)

a.	'Monopartition':	no contrasts	$\{i_o, iu_o, u_o, o_o\}$
b.	Author bipartition:	first *vs.* non-first	$\{i_o, iu_o\}$ / $\{u_o, o_o\}$
c.	Participant bipartition:	non-third *vs.* third	$\{i_o, iu_o, u_o\}$ / o_o
d.	Standard tripartition:	1st *vs.* 2nd *vs.* 3rd	$\{i_o, iu_o\}$ / u_o / o_o
e.	Quadripartition:	1st excl. *vs.* incl. *vs.* 2nd *vs.* 3rd	i_o / iu_o / u_o / o_o

i = speaker
u = addressee
o = any one other
$_o$ = zero or more others

For example, there is no language that consistently makes only an addressee bipartition (second *vs.* non-second)—though there may be syncretisms of this sort within a particular paradigm. **How can we account for the attested systems without overgenerating?**

The bipartitions imply features [±author] and [±participant]. But how can we derive the difference between tripartition and quadripartition without introducing features that could make unattested partitions?

Parametric deactivation?

Halle (1997) uses binary features [±author] and [±participant]. What systems does this generate?

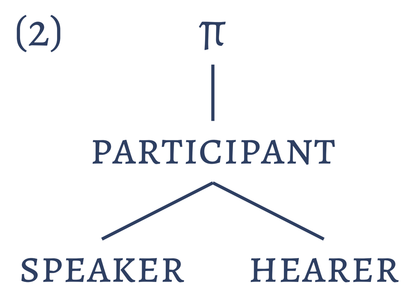
- ✓ no features → monopartition (1a)
- ✓ [±author] only → author bipartition (1b)
- ✓ [±participant] only → participant bipartition (1c)
- ✓ both features → quadripartition (1e)
  (1st excl. is [+author, −participant])
- ✓ Standard tripartition (1d) needs both features, but with the combination [+author, −participant] disallowed.
- ✗ So why can't other combinations of feature values be excluded in other languages?

Feature geometry?

Harley & Ritter's (2002) feature geometry is shown below in (2). What systems does this generate?

- ✓ no features → monopartition (1a)
- ✓ PARTICIPANT only → participant bipartition (1c)
- ✓ PARTICIPANT and SPEAKER → standard tripartition (1d)
- ✓ all three features → quadripartition (1e)
  (but this really yields *five* representations)
- ✗ no way to get author bipartition (1b)
- ✗ PARTICIPANT and HEARER → unattested tripartition
  (1st excl. *vs.* 1st incl./2nd *vs.* third)

(See also Harbour & Elsholtz (2012) against geometries.)

(2)


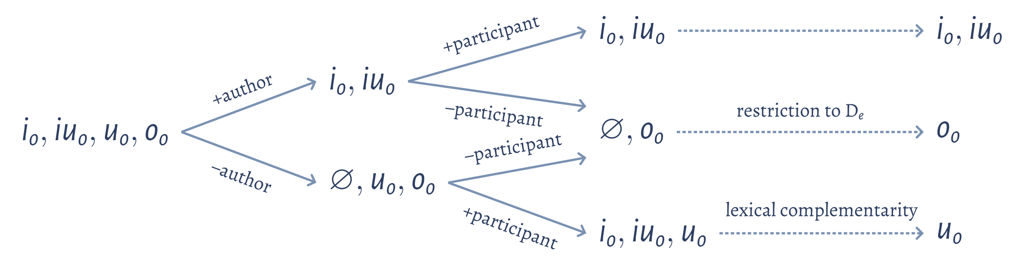
2. Harbour's higher-order features

Harbour (2016) proposes that the features [±author] and [±participant] be reconceived as functions that operate on semilattices:

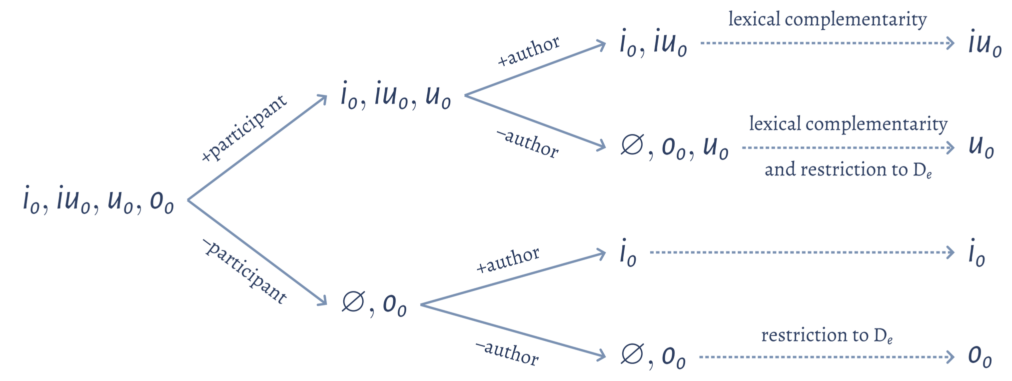
- [+author] adds the speaker i to a lattice.
- [−author] subtracts the speaker i from a lattice.
- [+participant] disjointly adds all participants $\{i, iu, u\}$ to a lattice.
- [−participant] subtracts all participants $\{i, iu, u\}$ from a lattice.

Each of the two bipartitions is straightforwardly derived by using just one of these features. Tripartition and quadripartition each use both, but the features apply in different orders:

(3) Standard tripartition (1d), Harbour (2016: 99):



(4) Quadripartition (1e), Harbour (2016: 99):



Two additional operations apply to the output of the features:

- **Lexical complementarity** applies to any feature combination whose extension is a superset of another's, and removes the overlap. E.g., in (3):
  - ⟨−author, +participant⟩ yields $\{i_o, iu_o, u_o\}$
  - ⟨+author, +participant⟩ yields $\{i_o, iu_o\}$
  - $\{i_o, iu_o, u_o\} \supset \{i_o, iu_o\}$

  So lexical complementarity narrows the interpretation of ⟨−auth, +part⟩ to $\{i_o, iu_o, u_o\}$ − $\{i_o, iu_o\}$, which is $\{u_o\}$.
- **Restriction to D_e** removes the empty set (or we could just assume that if there were any empty persons, languages would use third-person forms to refer to them).

These features generate exactly the attested typology of person contrasts. Because they do not simply denote first-order predicates, the order of their application matters, which is what makes it possible to derive both tripartition and quadripartition using the same two features.

But this also means that the features themselves are formally more complex than has generally been assumed, and the need to invoke lexical complementarity is a further complication.

3. What is a contrastive hierarchy?

In phonology, contrastive hierarchies are a principled way of assigning enough features to give each phoneme a distinct representation without introducing redundancies.

Dresher (2009: 16) gives (5) as a procedure for assigning contrastive features:

(5) Successive Division Algorithm (SDA)

a. Begin with *no* feature specifications: assume all sounds are allophones of a single undifferentiated phoneme.

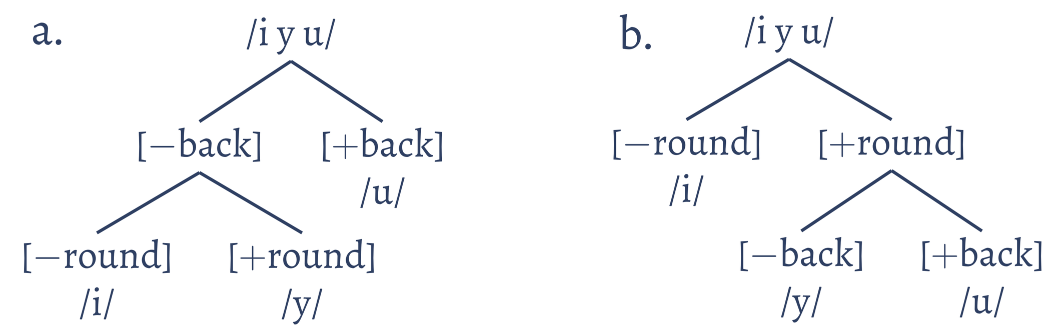
b. If the set is found to consist of more than one contrasting member, select a feature and divide the set into as many subsets as the feature allows for.

c. Repeat step (b) in each subset: keep dividing up the inventory into sets, applying successive features in turn, until every set has only one member.

A feature that makes a division early on takes wider scope than one that is used later, and may thus end up being specified on more segments.

For example, suppose that the features [±back] and [±round] divide the high vowels /i y u/. There are two possible orders (Burstynsky 1968; Hall 2016, 2017):

(6)



a.
- [±back] is specified on all vowels.
- [±round] is contrastive only on [−back] vowels.
- Québec French: Front /i y/ both trigger assibilation of /t d/.

b.
- [±round] is specified on all vowels.
- [±back] is contrastive only on [+round] vowels.
- Finnish: /y u/ participate in backness harmony; /i/ is transparent.

- Both the **scope** of a feature and its **interpretation** depend on its place in the hierarchy.
- For example, Clements (1991) applies [±open] recursively:
  - A vowel that is [+open] at the first division is low.
  - A vowel that is [+open] within the [−open] subinventory is mid, and so on.
- Cross-linguistic variation in feature scope means that languages can specify phonetically similar segments differently, even if they use the same features.

4. Contrastive hierarchies for person

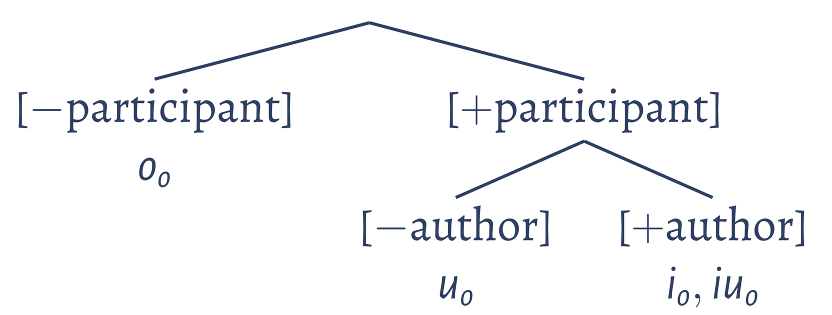
Our proposal: The insights of Harbour's approach can be maintained with **simpler features** if those features are organized into **contrastive hierarchies**.

We use the features of Halle (1997), which denote first-order predicates:

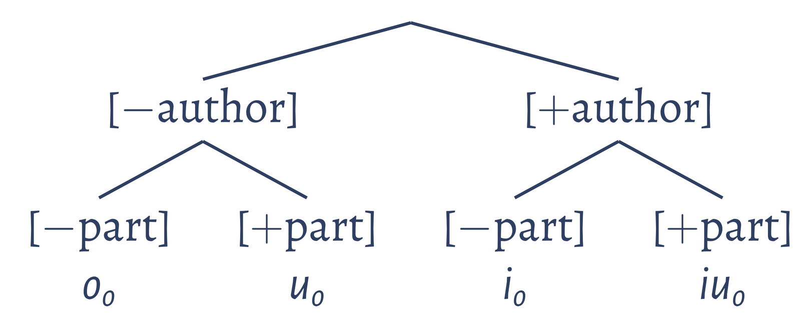
- [+author] = 'includes the speaker'
- [−author] = 'does not include the speaker'
- [+participant] = 'includes a(t least one) discourse participant'
- [−participant] = 'does not include a discourse participant'

As in Halle's and Harbour's accounts, using either feature by itself produces an attested bipartition. And, as in Harbour's, tripartition and quadripartition use both features, but in different orders. For us, though, order is **scope**, not sequence of functional application.

(7) Standard tripartition (1d): [±participant] ≫ [±author]



(8) Quadripartition (1e): [±author] ≫ [±participant]



If [±participant] takes wider scope, [±author] is contrastive only under [+participant].
There is no way to reinterpret [±author] as a feature that could subdivide the [−participant] branch.

If [±author] takes wider scope, [±participant] can subdivide both branches if its **interpretation** narrows to match its **scope**. Under [+author], [±participant] means '{includes / does not include} a participant **other than the speaker**.'

- This approach offers a principled explanation for the range of attested systems, but uses simpler features than Harbour (2016), and does not need to invoke lexical complementarity.
- Because the SDA in (5) can be a learning procedure, this also makes interesting predictions for the acquisition of person contrasts. For example, children acquiring languages with tripartition sometimes conflate first and second persons (Oshima-Takane 1992; Moyer et al. 2015), as we might expect to find after the first division in (7) has been made, but before the second.